The Nurses of Pearl Harbor: December 1941

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Abstract

The surprise Japanese attack on the morning of December 7, 1941 at Pearl Harbor killed and wounded thousands of men, placing an incredible burden on the military hospitals on the Hawaiian island of Oahu. Much has been written about the attack on Pearl Harbor, but the nursing and medical activities are often absent or overshadowed by the military activities. This dissertation fills a gap in the historical literature about Pearl Harbor through identifying and describing the role military nurses performed caring for the patients injured in Pearl Harbor during and immediately following the Japanese attack.

The purpose of this study was to identify, describe, and analyze (1) the state of military nursing training in the United States in the early 1940s; (2) the role of the nurse in the care of soldiers injured during the Pearl Harbor bombing; (3) the nurses' response to the traumatic events; and (4) the role of race, military rank, and gender in their ability to prepare and respond to this disaster. This analysis answered the following research questions: (1) How did the level of medical disaster preparedness for Pearl Harbor affect preparedness throughout the rest of World War II?; (2) How did nurses forge their own space within the evolution of triage?; and (3) How was nursing scope of practice affected by a disaster situation?

This dissertation used traditional historical methods with a social and military history framework. The corresponding social, political, and cultural climates, as well as the state of the science of nursing and medicine, is examined as context for further understanding the nurses' experience in Pearl Harbor. Both primary and secondary sources were used as source material for this dissertation, including data gathered from the U.S. Army Medical Department Center of History and Heritage, the National Archives, and the Bureau of Medicine and Surgery. Oral

history transcripts, letters, pictures, and other documents related to the work of the nurses at Pearl Harbor were used to inform this study.

The nurses of Pearl Harbor played a critical role in the care of the wounded after the Japanese attack by providing pain relief, shock treatment, wound care, surgical care, comfort to dying men, and other essential nursing duties. Collaboration and teamwork among the nurses, physicians and volunteers was pivotal to the prompt and adequate care of the wounded. Improved training in disaster response, trauma care, or triage could have improved the nurses' ability to contribute to care in the initial phases of the arrival of casualties; however, the detailed plans, preparations, and collaboration between the civilians and military during the attack were truly unprecedented and had a profound impact on the success of the nurses and physicians. Even though triage was outside of the skill set of nursing at that time, the nurses successfully utilized principles and techniques of triage to prioritize the nursing care and first-aid they were able to provide. In disaster situations, traditional boundaries between race, class, and gender can be redrawn, and practice boundaries between physicians and nurses blurred.

Table of Contents

Dedication

This research is dedicated to all of the Pearl Harbor nurses, who in our country's time of greatest need stepped forward with grace, determination, and a fierce compassion for the lives of the men killed and wounded during the attack. You are an inspiration to every nurse who has ever felt overwhelmed or inadequate, to rise to the occasion with duty and poise. We thank you for your service.

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Chapter 1: Introduction and Methods

The dawn of World War II came for the United States over the island of Oahu, Hawaii. In the early hours of December 7, 1941, the men and women living and serving in Pearl Harbor were not prepared for the aerial assault that ensued over a two-hour period that morning. The casualties of the "day that will live in infamy" included twenty-one of ninety ships anchored in the harbor; 157 damaged and 188 destroyed aircraft; and 2,403 dead and 1,178 wounded Americans, including both civilian and military losses.[1] Hundreds of wounded and dying soldiers were rushed to first aid posts and medical facilities, all of which were under staffed, under supplied, and unprepared for an attack of this magnitude. Nurses who were not trained in emergency or trauma care were expected to quickly triage and care for hundreds of patients, perform tasks beyond their normal duties or expertise, and work unending hours to tend to those injured in the attack.

This study fills a gap in the historical literature about Pearl Harbor through identifying and describing the role military nurses performed caring for patients injured in Pearl Harbor during and immediately following the Japanese attack. There is currently no scholarly historical literature that examines and recounts a comprehensive history of the Army and Navy nurses serving in Pearl Harbor.[2]

Review of the Secondary Literature

Much has been written about the attack on Pearl Harbor, but the nursing and medical activities are often absent or overshadowed by the military activities. Countless books, movies, articles, museum exhibits, and websites address Pearl Harbor as a pivotal moment in America's military and political history.[3] However, these documents do not

reach the depth, breadth, and level of analysis of this study surrounding the role and experiences of the nurse. Existing sources also use political or military historical research methods, and focus on the soldiers, sailors, leadership, and the impact of the attack on Pearl Harbor. The majority of these sources do not tell the individual stories of those involved in the conflict, and those that do focus primarily on the male soldiers or sailors, not on the voices of the female nurses in Oahu.

Histories of the United States Army Nurse Corps, the Navy Nurse Corps, and the nurses of World War II have been completed and include a brief discussion of the nurses of Pearl Harbor.[4]

There also have been peer-reviewed studies which feature a story or an aspect of care related to the work of the nurses in Pearl Harbor.[5] In the 2001 blockbuster hit movie, *Pearl Harbor*, nurses were featured as flirtatious beautiful ladies in white, a prize to be won by the attractive Army pilot, or the bloodstained, dazed women sent out to the front of the hospital to triage and sort the casualties. Although dramatic, the film fails to capture the true narrative of the nurses of Pearl Harbor. This research tells an accurate and complete story based on historical evidence, using primary data from several transcripts of nurses discussing their experiences at Pearl Harbor.

Purpose

The purpose of this dissertation is to examine the experience of military nurses during December of 1941, with a specific focus on their work after the attack on the Army and Navy bases of Oahu on December 7, 1941. The study identifies, describes, and analyzes (1) the state of military nursing training in the United States in the early

1940s; (2) the role of the nurse in the care of soldiers injured during the Pearl Harbor bombing; (3) the nurses' response to the traumatic events; and (4) the role of race, military rank, and gender in their ability to prepare and respond to this disaster. This analysis answers the following research questions: (1) How did the level of medical disaster preparedness for Pearl Harbor affect preparedness throughout the rest of World War II?; (2) How did nurses forge their own space within the evolution of triage?; and (3) How was nursing scope of practice affected by a disaster situation?

Historical research has been identified as a priority direction for nursing research within the realm of disaster nursing.[6] Several nursing scholars, particularly military nursing scholars, have been actively researching the experiences of nurses in wartime, preparation requirements, emotional reactions, and nursing challenges in times of war. Researching triage during mass casualty events, especially the psychological impact on nurses during such events, has also been identified as a research focus for disaster nursing.[7] This research adds to the growing body of historical nursing disaster research available, including two books edited by Barbara Mann Wall and Arlene Keeling that have collected a myriad of accounts of the historical role of nurses throughout the response and recovery phases of a disaster.[8]

This research is also significant and applicable to modern challenges in nursing. The Tri-Service Nursing Research Program prioritizes research specific to the needs of military nurses, both in order to provide competent care to soldiers, as well as caring for the caregiver.[9] Understanding how nurses responded to disasters in the past can inform how modern nurses can be better prepared to handle the physical, mental, and emotional stresses associated with intense war or disaster situations. A thorough investigation of

characteristics and techniques used to cope and thrive in these traumatic environments will inform nursing leaders how to mentally train and prepare nurses for work on the front lines, decreasing burn out and increasing resiliency among nurses.

Disasters and stressful work environments are not limited to the military, and emergency nurses, operating room nurses, and nurses across the spectrum of acute care and public health should understand their role in a disaster. Events such as Hurricane Katrina in 2005, the theater shooting in Aurora, Colorado in 2010, and the Boston Marathon bombing in 2013, are reminders that disasters can occur in any community at any time. Evidence from nursing history can serve to document how nurses have previously coped and practiced in dangerous and traumatic environments, and offer insight and guidance for addressing current and future challenges in the preparation and retention of nurses on the front lines of conflict, both at home and abroad.

Ethical Considerations

When conducting historical research, the historian must consider several ethical issues in the retrieval and interpretation of sources. Some of these issues include safety of historic materials, copyright restrictions, and confidentiality of personal records.[10] Copies of declassified and publicly available sources were made digitally by photographing pages in accordance to the policies and guidelines of each archive. A note created by the researcher was photographed with each document, indicating the source folder and archive of the document to ensure each source is properly and accurately cited.

When conducting research involving health information, researchers must also consider the Privacy Rule of the Health Insurance Portability and Accountability Act

(HIPAA), which protects all identifiable health information, regardless of the age of the information or whether the subjects are living or dead.[11] No health records were accessed for data collection; however, within the oral history collection, nurses speak of specific patients that they encountered during their work, and these stories are included in this study. There is no identifying information included in the primary source to be able to link the patient to any particular person, which satisfies the Privacy Rule for HIPPA.

The Institutional Review Board (IRB) for Social and Behavioral Sciences (SBS) at the University of Virginia (UVA) is responsible for reviewing all research proposals, excluding medical research, for compliance with federal regulations protecting human research subjects. The IRB requires that all individuals affiliated with the University of Virginia submit a research protocol for any proposed research study. Based on the preliminary review of risk to human subjects, each protocol is assigned full, expedited, or exempt review status.

Historical research, including this study, is usually classified as "exempt," implying that the protocol subjects a minimal amount of risk to research subjects, and the study does not require any further review. The definition of research activities that qualify for an exemption is indicated in CFR 45 46.101(b)(4), and states,

> Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.[12]

The use of oral histories may alter the status from "exempt" to "expedited" if there is concern that the interview may inflict psychological harm on the narrator during the interview, or if disclosure of the information within the interview could reasonably

place the subject at risk.[13] Additionally, the names of the narrators of the oral history are used to ensure historic integrity in the description of the nurses' work, and highlight the specific experience of the individual in addition to generalizing the experiences of the nurses. Both the American Historical Association and the Oral History Association support this exception of anonymity.[14]

This study protocol was submitted in May of 2016 and has been reviewed by the Institutional Review Board for the Social and Behavioral Sciences (IRB-SBS) at the University of Virginia. This study was classified as exempt from review on May 23, 2016 (See Appendix A). All data for this study is publicly available through archival sources, and all military information used has been declassified. No new interviews were completed as part of the research design; however, archived transcripts of interviews from an earlier date are included.

Research Design and Framework

This dissertation uses traditional historical methods with a social and military history framework.[15] This study is limited to the time period of December 1941, detailing the events immediately preceding and following the Japanese attack on Pearl Harbor. The corresponding social, political, and cultural climates, as well as the state of the science of nursing and medicine, is examined as context for further understanding the nurses' experience in Pearl Harbor. Much of the analysis involved investigating common experiences, characteristics, and actions among the nurses in their various roles at the military hospitals on Oahu.

Social history, political history, and military history are all frameworks that have been used to describe an event like the bombing of Pearl Harbor. Political history is a commonly used form of historical analysis, using the past to inform current policy development and decisions. Unlike political history which focuses on world leaders and great events, social historical frameworks investigate the past experiences of the common person (in this case the nurse), and focuses on themes of race, class, and gender. Social history frameworks take a "bottom up" approach, building the narrative from the people experiencing it rather than the leadership and policy shaping and directing the events. Social history examines experiences and artifacts of ordinary people within the context of class, gender, and race.[16] Military history can be analyzed at several different levels: on a unit level, on a military campaign level, or at its broadest level as a political-military history. Political-military history examines war through its association with political, social, and economic factors.[17] This study used traditional historical methods with a social historical framework, in combination with a military and political perspective.

Data Exploration and Criticism of Sources

The majority of the primary source data used in this study consist of archived oral histories and written accounts of nurses serving in Pearl Harbor. Oral histories were an important source of data. All oral histories were available and archived as transcripts. Therefore, no additional permission was needed from subjects to use data from their oral histories. These provided the researcher with first hand accounts of the nurses' experiences. They added richness and nuances to the experience that could otherwise be missed.[18] Some limitations of oral histories are that information is filtered through the

lens of time and hindsight, and the presence of a researcher and types of questions asked may bias the data.[19]

Written diaries, letters, photos and other primary sources were also used. These provided documentation about the culture and context of duty in Pearl Harbor, and highlighted the lived experience of the participants. Using diaries and letters enabled the researcher to glimpse the nurses' emotional responses to events.

The genuineness and authenticity of all primary sources were investigated in each case. As Pearl Harbor is a poignant event in American history, those involved may wish to represent the military and/or their actions and the actions of others in a positive or heroic light. To account for this potential bias, multiple oral histories discussing the same event are compared in conjunction with other source material to deduce the truthfulness of the claims made in the oral histories. All data were corroborated with other primary sources, secondary sources, and the within context of the event. Oral histories in particular were analyzed within the appropriate context with attention to the potential participant and researcher bias in its expression and interpretation.[20] All data were corroborated using multiple sources to verify the claims of each individual. For example, the oral histories in the Army Nurse Corps collection were all recorded at roughly the same time, and used the same semi-structured interview questions. Although there are variations in responses based on individual experiences, there is a repetition of themes, facts, and ideas that is consistent throughout various accounts of the same event. This corroborated each account, giving validation and authenticity to the claims in the oral histories.

Both primary and secondary sources were used as source material for this dissertation. Historic journal articles from the *American Journal of Nursing*, the *British Medical Journal*, and the *Journal of the American Medical Association* were used as primary sources as they were written in the 1930s and 1940s. Some primary source data were gathered from a variety of sources including the US Army Medical Department Center of History and Heritage, the National Archives, and the Bureau of Medicine and Surgery. These collections contain dozens of oral history transcripts of Army and Navy nurses serving in Pearl Harbor, as well as letters, pictures, and other documents related to the work of the nurses at Pearl Harbor. The following collections were investigated:

1. U.S. Army Medical Department (AMEDD) Center of History and Heritage, San Antonio, Texas: This archive includes primary historical documents of the Army Nurse Corps that have been fully explored and include information about Army Nurse Corps training, oral histories of nurses in Pearl Harbor, and information about the Army's medical activities at Pearl Harbor. This archive was visited in January and June of 2016.
2. University of North Texas Library: This archive includes transcripts from an extensive oral history collection, including over 1,000 World War II veterans. This archive was accessed electronically and four oral histories were retrieved.
3. Idaho State Historical Society, Idaho Oral History Center: This information was requested electronically, and one oral history was retrieved.
4. Office of Medical History, Bureau of Medicine and Surgery, Falls Church, Virginia: This extensive collection includes all aspects of naval history, including primary documents related to the medical care in Pearl Harbor. This archive was

visited in May 2016, and oral histories, photographs, and primary source material related to the medical activities at Pearl Harbor were retrieved. Oral histories from the Navy Nurse Corps, Navy Bulletins, photos, and reports related to the Navy's medical activities at Pearl Harbor were retrieved from this collection.

5. National Archives, Washington, D.C. and College Park, Maryland: Correspondence and training activities related to the Red Cross in Hawaii as well as data and correspondence from the Navy Bureau of Medicine and Surgery was accessed in May 2016. The original hospital logbook from Naval Hospital Pearl Harbor as well as declassified correspondence related to Naval medical activities and preparations were found in the National Archives. The Hawaii Red Cross collection contained documents relating to disaster and first-aid training given to volunteer civilians.
6. Oahu, Hawaii: The physical sites of three Army hospitals and one Naval hospital were visited in July 2016. Data were accessed from the Pearl Harbor Hickam Joint Base Office of History, the U.S. Army Garrison- Hawaii, and the Tripler Army Medical Center Library. Museums and historic sites visited in July 2016 included the *USS Arizona* Memorial, Pearl Harbor, the Tropic Lightening Museum at Schofield Barracks, the U.S. Army Museum of Hawaii at Fort DeRussy, Hospital Point at Pearl Harbor, the Pacific Aviation Museum Pearl Harbor, Hawaii, and the National Memorial Cemetery of the Pacific. Both historic and modern day photographs were collected from each of the hospital sites and the nurses' quarters when available. Information about the history of

Schofield and Tripler Hospitals was collected, and a rare book written and self-published by one of the nurses at Hickam Field was also reviewed.

7. National Park Service, World War II Valor in the Pacific Oral History Interviews: This collection of 90 oral histories from Pearl Harbor survivors was accessed electronically, and several oral histories from nurses and patients sharing their experiences were also used.[21]

Secondary sources related to the events and medical care at Pearl Harbor were found through online searches of newspaper articles, published books, the Army and Navy websites, and other reputable historical websites related to the attack on Pearl Harbor. Texts focusing on military nurses, military medicine during the Second World War, civilian preparedness in Oahu, and the attack on Pearl Harbor were also used. The secondary sources proved valuable in understanding the state of medical and nursing care at the time, the political and military history related to Pearl Harbor, and the context in which American military nurses practiced prior to and following the United States' entrance into World War II.

Data Analysis

After all data sources were collected, the primary and the secondary literature were reviewed and evaluated within the context and time frame of the research topic. All data including the numerous oral history transcripts (as well as diaries and any written correspondence) were analyzed using traditional historical methods with a social, political, and military history framework. The historical data were separated and categorized by hospital, and all the data from each hospital were read together in order to

get an overview of the data. Claims made by the nurses were crosschecked with other oral histories and secondary sources to ensure validity of the data. The researcher examined the primary and secondary sources, placed the data within the context, and drew connections between the different variables in the data.[22]

Contextual factors such as time, place, race, military rank, and gender were considered as part of the interpretation of the data. The interpretation was composed into a narrative, which tells the story of the nurses at Pearl Harbor within a social, political, cultural, and geographic context. The narrative answers the research questions, explains any ambiguities, highlights similar experiences and themes, and exposes biases in the data within the context of the time period.[23] Results from these analyses has already been presented or published as listed below:

- Milbrath, G. (2014). "We just had to line them up: Monica Conter, Army Nurse Corps." *Windows in Time:* The newsletter of the University Of Virginia School Of Nursing Eleanor Crowder Bjoring Center for Nursing Historical Inquiry. 22(2): 8-11.
- Milbrath, G. (2015). "Monica, the whole world knows we're at war: The nurses of Pearl Harbor." March 14, 2015. Podium presentation at the Southern Association of the History of Medicine and Science Conference: Jackson, MS.
- Milbrath, G. (2015). "The Bombing of Pearl Harbor, Hawaii, December 7, 1941" in *Nurses and Disasters: Global, Historical Case Studies* ed. Arlene Keeling and Barbra Mann Wall, Springer Publishing Company, 145 – 167.

- Milbrath, G. (2015) Grace under fire: The nurses of Pearl Harbor. September 17-20, 2015. Podium presentation at the American Association for the History of Nursing Conference: Dublin, Ireland.
- Milbrath, G. (2016). Grace under fire: The Army nurses of Pearl Harbor, 1941. *US Army Medical Department Journal,* Oct-Dec;(3-16):112-117.
- Milbrath, G. (2016). "I never saw or hope to see again such casualties." March 11-12, 2016. Agnes Dillon Randolph International Nursing History Conference: Charlottesville, VA.
- Milbrath, G. (2016). "The Bravest of the Brave": Nurses at Tripler General Hospital, Pearl Harbor, 1941. September 22-25, 2016. American Association for the History of Nursing: Chicago, IL.

Chapter Overview

Chapter 1: Introduction and Methods

This chapter provided an overview of the research study, identifying the significance, purpose, and research questions guiding the dissertation, as well as the proposed methodology. A brief review of existing literature was presented, which highlights the knowledge gap to be filled with this research study. The methodology used to collect and analyze the data was discussed. This chapter also included descriptions of primary and secondary data sources and archival material investigated, as well as a list of presentations and publications related to preliminary findings from this research.

Chapter 2: Background and Setting

Chapter two provides a broad introduction to the history and context of nursing, military events, and American culture leading up to the attack on Pearl Harbor. This chapter begins with a brief synopsis of the history of military nurses, the creation of the Army Nurse Corps and the Navy Nurse Corps, and the rise of the nursing shortage entering the World War II era. Next, the chapter describes the qualifications needed to be a nurse in the Army or Navy Nurse Corps, and the factors drawing nurses into the military, especially to Hawaii, in 1940 and early 1941. The inclusion or exclusion of men, women, and minorities in the military is discussed, as well as the general culture of America in the 1940s. The chapter also describes the general lifestyle of the nurses, soldiers, sailors, and civilians living in Hawaii in 1941, as well as brief descriptions of the military hospitals. Finally, this chapter discusses the rise of Japan as an imperial power, its relationship with the United States leading up to December 1941, and the failures and oversights of the U.S. military leading to a surprise attack on Pearl Harbor.

Chapter 3: The Army Nurses of Oahu

Chapter three describes the work done at the three Army hospitals on Oahu, Hawaii, on December 7, 1941: Schofield Barracks Hospital, Hickam Field Hospital, and Tripler General Hospital. Details related to the types of injuries treated, as well as the medical, surgical, and nursing care provided, are discussed. Despite fear and racial tensions, the nurses triaged injured soldiers and provided exemplary wound care, pain control, anesthesia, and surgical care.

Due to the limited bed capacity, Hickam Field Hospital converted to an evacuation hospital. Nurses, physicians, and medical corpsman triaged, stabilized, and transported those likely to survive, while piling the dead behind the building. The intersection of duty, resilience, and compassion shaped the nurses' work at Hickam Field Hospital.

The nurses at Tripler General Hospital were able to provide care to hundreds of wounded soldiers quickly and efficiently. The nurses thought quickly and creatively to maximize the available space, supplies, and staff, and even accepted prostitutes as volunteers on the wards, guiding every available person to care for the casualties. Delivery rooms were converted to neurosurgery suites, and nurses were versatile and flexible, often working outside of their area of expertise. The shortage of doctors on the wards required nurses to work to the full capacity of their training and knowledge in wound care, pain management, and the supervision of corpsmen and volunteers.

At Schofield Hospital, collaboration between tireless doctors, nurses, and nurse anesthetists was key to providing life-saving operations for those requiring immediate surgery. The nurses prioritized the needs of their patients despite long hours, blackout conditions, and fear of Japanese invasion or sabotage.

The resilient nurses used humor, camaraderie and religious practice to cope with the fear, grief, exhaustion, and uncertainty that followed the Japanese attack. Despite stressful and suboptimal work environments, morale remained relatively high for the nurses caring for Pearl Harbor's wounded. Through collaboration, triage, providing emergency interventions, and organizing response efforts, the Army nurses of Oahu

saved hundreds of lives. These stories and others that describe the experiences of the Army nurses at Pearl Harbor are explained in detail in this chapter.

Chapter 4: The Navy Nurses of Pearl Harbor

The Navy nurses in Pearl Harbor were stationed at the Naval Hospital Pearl Harbor, and the hospital ship, *USS Solace*. These nurses provided critical burn care to hundreds of patients in the hours, days, and weeks following the attack on Pearl Harbor. Specifics of how the Navy nurses at Pearl Harbor triaged and bathed severely burned patients, provided wound care, shock treatment, burn care, pain relief, and emotional support to those with severe burns are discussed. These nurses worked alongside the corpsmen and some Red Cross volunteers, and collaborated with physicians to care for these complex patients. Chapter four details the experiences of the Navy nurses at Pearl Harbor and how they coped with such emotionally and physically exhausting nursing care.

Chapter 5: Analysis and Conclusions

The final chapter of this dissertation answers the aforementioned research questions and conclusions drawn from the examination of the data presented in the previous chapters. Commonalities and key differences between the nurses' experience are summarized. Chapter five compares and contrasts the level of nurse military training and medical preparedness both before and after the attack on Pearl Harbor, arguing that the lack of nursing preparedness for the surprise attack at Pearl Harbor informed future medical casualties plans and military training for nurses in World War II. The military

training and disaster preparedness knowledge of the nurses is contrasted with that of nurses in World War I, the physicians, as well as the civilians. This chapter also discusses the role of the nurse in the triage of casualties, despite a lack of knowledge or expertise in trauma assessment or principles of triage. Although physicians were responsible for the majority of the triage decisions, nurses also played a key role in prioritization and treatment of casualties. Finally, this chapter describes the scope of practice of the nurses in Pearl Harbor during and following the bombing, and argues that nurses worked to the full extent of their scope of practice and occasionally beyond their expertise and familiarity to care for the injured soldiers and sailors, while collaborating heavily with the physicians, corpsmen, and volunteers that worked together to care for the mass influx of patients after the attack on Pearl Harbor.

Chapter 2: Background and Setting

In order to understand the role of military nurses in Pearl Harbor in 1941, it is important to understand the context in which they lived, learned, and practiced. This chapter describes the historical setting, noting in particular the cultural, political, and professional contexts, which are critical to understanding the role of military nurses during and following the bombing of Pearl Harbor. This chapter begins by describing the history and evolution of the military nurse, including the development of both the Navy and Army Nurse Corps. The state of American Nursing leading up to the Pearl Harbor attacks will also be discussed, including the recruiting efforts leading up to the United States entrance into World War II. Finally, important cultural and political events leading up to the attack on Pearl Harbor will be discussed with a description of American and Hawaiian culture in the early 1940s and the diplomatic and communication failures that occurred between Tokyo, Washington D.C., and Honolulu that led to a surprise attack on Pearl Harbor.

Following World War I and the economic depression of the 1930s, the number of trained civilian and military nurses in the United States had decreased significantly. At its peak in 1918, the Army Nurse Corp was 21,480 nurses strong. A total of 1,551 Navy nurses served during World War I, with hundreds more caring for those during the aftermath of the conflict. However, in 1932, a bill to cut government spending reduced the nurse's pay by 15% and severely decreased the number of active duty nurses.[1] By 1939 there were only 332 nurses in the Navy Nurse Corps, and 672 active duty nurses in the Army Nurse Corps.[2] The contrast is striking as this decline dropped the number of military nurses down to levels that had not been seen since the founding of both the Army

and Navy Nurse Corps. After the inception of the Army Nurse Corps in 1901 and the Navy Nurse Corps in 1906, both had been slowly expanding while trained graduate nurses asserted their role as the best care givers for hospitalized patients in the military. As its history has shown, these nurses were necessary, especially during times of war.

Military Nursing in Early America

Although the birth of professional nursing is generally attributed to the work of Florence Nightingale in the Crimean War in the 1850s, family members, Catholic nuns, and volunteers have been caring for the sick and wounded for far longer.[3] From the American Revolutionary War through the United States Civil War, soldiers and stewards who were assigned or volunteered for nursing duty usually provided nursing care. Starting in 1856, Congress passed legislation allowing the enlistment of hospital stewards, and in 1861, untrained civilian nurses were contracted by the Army to provide nursing care to soldiers.[4] During the Civil War, the first designated Naval Hospital ship, the *Red Rover* made its way up and down the Mississippi River providing care to almost 3,000 patients between 1862 and 1865. Aboard this ship were three Catholic nuns; the first trained nurses used in the Navy, as well as five untrained black nurses working under the direction of the sisters.[5]

The Civil War also prompted the reappearance of general hospitals to supplement the tented field hospitals, with almost 200 general hospitals in operation by the mid-1860s in the Union alone.[6] After the end of the Civil War in 1869, the American Medical Association formally recognized the need for trained nurses in hospitals.[7] Evidence from both Florence Nightingale and Civil War medical history supported the idea that positive

patient outcomes were correlated with the diligence and training level of the nurse, leading to the development of several hospital-based training programs, primarily in New England, in the post-Civil War era.[8]

The dawn of the Spanish-American War at the turn of the twentieth century brought widespread death to soldiers from typhoid, infectious diarrhea, and malaria from the tropical weather and poor sanitation. At the beginning of the conflict, the Army intended to rely primarily on the Army Hospital Corps, which consisted of untrained enlisted men. When this was inadequate to meet the medical needs of the soldiers, nurses were again begrudgingly contracted to care for the soldiers in base hospitals.[9] Navy nurses, both trained and untrained served during the Spanish-American War in Cuba, the Philippines, New York, and Virginia. The first hospital ship to fly the Geneva Red Cross flag, the first *USS Solace,* staffed eight trained nurses and was used to ferry soldiers from Cuba back to Naval hospitals in New York, Virginia, and Boston, and cared for both victims of war and yellow fever.[10] The highly successful and integral role of the nurse during the Spanish-American War convinced even more medical officers of the necessity of trained nurses during wartime. After the Spanish-American War, 202 contract nurses voluntarily remained in the service of the Army both on the mainland and abroad in Cuba, Puerto Rico, the Philippines, and Hawaii.[11]

The Rise of the Army and Navy Nurse Corps

By 1900, nursing was recognized as a respected profession with the publication of the *American Journal of Nursing*, and over 500 hospital-based nursing programs graduating approximately 10,000 trained nurses.[12] Nurses began to advocate for official

integration into the Army. The Committee to Secure by Act of Congress the Employment of Graduate Women Nurses in the Hospital Service of the United States Army was formed in 1899, and in two years they officially succeeded in creating the Army Nurse Corps as part of the Army Reorganization Act on February 2, 1901.[13]

The Army Nurse Corps had a challenging start, with the original 202 members dropping to 99 nurses by 1903, the majority of which were serving in the Philippines. Poor rations, difficult work environments, and ineffective leadership contributed to the decrease in the Army Nurse Corps numbers. In 1909 under new leadership, the Army Nurse Corps again began to make improvements through expanding food allowances, improving staffing, shortening shifts, and improving the nurses' living quarters. [14]

After two failed attempts to establish the Navy Nurse Corps in 1902 and 1904, the bill finally passed on February 6th, 1908, seven years after the establishment of the Army Nurse Corps. The Navy Nurse Corps was organized to employ one superintendent and as many chief nurses and reserve nurses as needed. All members of the Navy Nurse Corps had to be female graduates of hospital training schools and were paid the same wage as those in the Army Nurse Corps. Navy nurses served three-year appointments. A total of twenty nurses formed the inaugural class of the Navy Nurse Corps with one superintendent, two chief nurses, and seventeen nurses. As the first women to be part of the U.S. military, both Army and Navy nurses existed in an undefined space within the military ranks. Nurses had no rank as military officers, but were also not considered enlisted. This ambiguity of authority and power made it difficult for nurses to assert themselves within the military hospital structure.[15]

New Navy nurses reported to Washington for a six-month orientation to the Navy, and were then sent across the mainland and abroad to naval hospitals in the United States, Philippines, and Japan. Upon arrival, these new military nurses were assigned to their duty station and trained on the ward with a senior nurse for several weeks. A typical day on the wards would begin with receiving patient report from the night nurse, acquainting herself with the condition of her patients, checking the cleanliness and stock of the ward, and organizing the records and treatment book to be signed by the ward officers during morning rounds. Most wards had thirty to forty patients with one nurse and four corpsmen responsible for providing the nursing care. Navy nurses were committed to properly training the corpsmen in all aspects of bedside nursing care including baths, treatments, and medication administration. The Navy was sure to recruit nurses who would not only be good at the bedside, but would also be good instructors. Navy nurses were very dedicated in training the enlisted corpsmen in the Navy. After the corpsmen were trained, they were often later assigned to Navy ships or Marine units as the only person with any medical knowledge, and would be responsible for the care of any ill or injured sailors until they could reach a medical facility. Nurses were also responsible for ordering supplies, general ward housekeeping, and ensuring the ordered nursing care was completed properly.[16]

By 1912, over 3,000 nurses had been recruited for the Army Nurse Corps reserve through a partnership with the American Red Cross, but there were only 125 active duty nurses in the Army Nurse Corps. After years of requests for more nurses, conflicts at the Mexican border finally authorized an increase of 276 nurses from the reserves to serve at base hospitals along the Mexican border.[17] The Navy Nurse Corps continued to grow as

well, nearly doubling their numbers by 1909. By July 1917, the number of active duty Navy nurses swelled to 190 after adding 155 reserve nurses to their ranks.[18]

As tensions dissipated at the Mexican border, war broke out in Europe with a ferocity that had yet to be seen. Although the United States remained neutral in the war in Europe from 1914 until mid-1917, the Army Department of Medical Relief, the Army Nurse Corps, and the American Red Cross prepared and coordinated their plans to care for those wounded in the war, organizing and mobilizing fifty base hospitals, and drawing resources from the staffs of large civilian hospitals. The Red Cross and Army agreed that if the Untied States officially entered the war, all hospitals would become actual Army units, and the Red Cross Volunteer nurses would automatically be inducted into the Army Nurses Corps. Unlike the Army Nurse Corps, the Navy Nurse Corps had its own reserve of Navy Nurses who had enrolled directly through the Navy in addition to a reserve force from the Red Cross.[19] These partnerships and preparations allowed the United States to mobilize a medical response while remaining neutral.[20]

The United States entered World War I on April 6, 1917, and the nurses serving in Europe cared for patients who suffered from horrific casualties of war, including the debilitating effects of mustard gas and the unexpected pandemic flu.[21] These nurses provided care to patients throughout Europe, guarding against infection with only intense irrigation and debridement, as sulfa drugs and penicillin antibiotics were not yet available.[22] They also provided care to gas casualties, many learning on the frontlines about these unique casualties, and treated patients with rest, oxygen, good ventilation, warm environments, and good skin and oral hygiene. As the war progressed, field hospitals were replaced by more permanent evacuation hospitals as the troops continued

to advance, and mobile hospitals were used to provide care as close to the battle lines as possible. Nurses serving at these facilities were carefully screened for their mental stability and professional competence. Army nurses also provided care in specialized units such as shock wards, as well as on hospital trains and base hospitals. Many other nurses served throughout the world in the Territory of Hawaii, the Philippines, Puerto Rico, on transatlantic transport ships, and domestically at Army hospitals across the United States until World War I officially ended November 11, 1918.[23]

Creating and Addressing the Nursing Shortage

Nurses returned from the war with a wider and deeper knowledge of nursing and caring for the sick and wounded. The success of specialized units in World War I had an impact on the utilization of nurses in civilian hospitals as well as nurses from the war began to reintegrate into civilian life. Nursing began to transition from private duty nursing to group nursing, which was modeled after nursing practices from World War I. Prior to the shift to group nursing, those who could not afford a private duty nurse were cared for by the student nurses training at the hospital, with a graduate nurse supervisor, or an attendant. Students provided the majority of hospital nursing care. Because of the economic depression of the 1930s, 574 hospital-based nursing schools were forced to close, and the demand for private duty nurses dropped dramatically. Patients were unable to afford to hire private nurses, however hospitals still required their services to operate. Hospitals began to hire graduate nurses to care for patients alongside student nurses, and between 1929 and 1941, the number of nurses working in hospital staffing positions rose from 4,000 to over 100,000.[24]

This transformation of nursing also had a dramatic impact on the type of nursing care provided, with the organization of work shifting from patient-oriented care to task-oriented care. By the late 1930s, nurses were providing more complex care including dressing changes and preparing patients for the operating theater. Nurses expanded their scope of practice beyond making beds, feeding patients, giving backrubs, stocking supplies, and taking vital signs. Patient care tasks that were formally fundamental to the daily work of the nurse were delegated to others. Nurses were often busy coordinating patient activities, preparing and administering medications, and writing nursing notes.[25]

As staff nursing was a still a relatively new concept in the 1930s, the majority of nurses still worked in private duty as opposed to group nursing or staff nursing. However, the recovering American economy of the late 1930s brought an increase in hospital use, higher patient acuity and complexity, and reduced working hours for bedside nurses.[26] This, as well as expanding opportunities for women to work in support of the war effort caused a large nursing shortage leading up to World War II.

Congresswoman Frances Payne Bolton sponsored two bills in Congress, the first of which allocated a total of $1.25 million in 1941 towards nursing education. This financed refresher courses for graduate nurses, funds to support nursing school expansion, graduate nursing programs, training of more nursing instructors, and training for specialty care in nursing. The federal government expected nurse training programs to double their enrollment and to expedite promising students to graduate early.[27] With this investment in nursing education, the United States hoped it would have enough trained nurses should they be needed for another war.

Recruiting Military Nurses

The combination of the civilian nursing shortage and possible involvement in another world war created a sense of urgency within the Army and Navy, and both groups began aggressively recruiting nurses through any means possible. With the impending threat of war, the Navy Nurse Corps began recruiting nurses again into both active duty and to the reserves.[28] Army nurses were recruited solely though the American Red Cross. The National Nursing Council for War Services was a joint effort between both the Army and Navy Nurse Corps to identify available nurses, coordinate a recruiting campaign, and contact women about serving as a military nurse. Although all service was voluntary, these organizations shamelessly appealed to a woman's sense of patriotism to recruit nurses at an intensity never seen before in nursing history. Thousands of pamphlets were distributed throughout nursing schools, nursing organizations, high schools, and colleges. Mainstream media promoted military nursing through radio advertisements, films, women's magazines, and celebrity endorsements. One recruiting poster (Appendix B) actually features one of the nurses stationed at Hickam Field Hospital in Pearl Harbor, Second Lieutenant Monica Conter Benning.[29]

In just eighteen months, the Army forces increased from 290,000 to 1.6 million soldiers, with the medical department expanding from 18,000 to 130,000 by December 1941.[30] The Army nurse corps correspondingly grew from 672 nurses in 1939 to 7,043 by December of 1941.[31] For the first time in history, Army Nurses would be stationed at hospitals at Army Air Corps bases instead of at evacuation hospitals.[32] By May 1940, Army nurses had been deployed at 45 different stations domestically as well as in Puerto Rico, Hawaii, and the Philippines.[33] The Navy also increased their numbers

substantially, and by November 1941, there were 787 active and 966 inactive nurses in the Navy, with almost half of those nurses recruited in 1941 alone.[34]

Despite the Army and Navy Nurse Corps' rapid expansion and aggressive recruiting strategies, they still struggled to recruit an adequate number of nurses to meet the growing demand. Both the Army and Navy made regular pleas for applicants in the *American Journal of Nursing*. Even Eleanor Roosevelt aided the recruitment efforts through a personal plea to nurses who had yet to volunteer for military service. "I ask for my boys what every mother has a right to ask – that they be given full and adequate nursing care should the time come when they need it. Only you nurses who have not yet volunteered can give it. You must not forget that you have it in your power to bring back some who otherwise surely will not return."[35]

One major barrier to recruiting enough military nurses was low wages. Nursing wages in the Army Nurse Corps had not been increased since 1922 when the peacetime Army Nurse Corps nurses managed to secure better pay, retirement, and relative rank for nurses in the Army Nurse Corps.[36] As a result, large disparities formed between nurses and other service members in pay ranking. The lowest ranked enlisted man in the Hospital Corps made $85 per month compared to a second lieutenant in the Army Nurse Corps, who only made $70 per month.[37] Army nurses did receive additional support for room and board, and fortunately these young patriotic women were less interested in making money and more interested in serving their country, seeing the world, and meeting new people.[38]

Despite the extraordinary need for trained nurses, the Army Nurse Corps and Navy Nurse Corps maintained high eligibility standards for nurses applying to join the

growing ranks of military nurses. Eligible nurses had to be a U.S. citizen (or citizen of an allied nation for Army Nurse Corps), a graduate of high school and an approved nursing school, a registered nurse in at least one state, and a member of a nursing organization affiliated with the American Nurses Association. Only single, white, females were allowed to join the Army or Navy Nurse Corps. African American nurses were purposefully excluded. Women with children under 14 were also disqualified from service. Nurses could only resign if they were incompetent or mentally or physically incapable (which included pregnancy). Army nurses had to be between 22 and 30 years old, and Navy nurses had to be unmarried and between 28 and 40 years old.[39]

Inequality in Military Nursing

Despite the shortage of nurses, the corps remained limited to white females.[40] The issues of gender, race, and social class are prevalent throughout nursing history, and military nursing is no exception. African American women had a history of serving alongside the Navy since the Civil War in 1863; however, due to Jim Crow laws, black women were barred from service from 1922 until 1942, when President Roosevelt called for the desegregation of the Navy.[41] For example, Isadora Denike, a registered nurse who trained in both hospital and public health nursing at the Lincoln School of Nurses in New York City requested to be considered for the Navy Nurse Corps. When her initial request to join the Navy Nurse Corps was denied, she appealed her case to the President of the United States, who passed the letter on to the Surgeon General, who wrote the following reply:

> The rejection of your application for appointment to the Navy Nurse Corps was in no way a reflection on your ability to measure up to the requirements of

> intelligence, initiative, experience or other factors that are taken into consideration in connection with applicants for the Nurse Corps, nor was it in any way a reflection on your race. Requirements for employment in the various Governmental Services differ and at present there are no activities in the Naval Service where colored [sic] nurses could be advantageously utilized.[42]

Despite the Surgeons General's assurance that it was not a "reflection on race," his letter clearly states otherwise by stating she is qualified to serve based on her merits but not based on her status as a "colored nurse."[43]

During World War I, over 100 African American nurses applied to serve as Army nurses through the Red Cross. Only 18 African American nurses were actually called to duty, and they were only allowed to treat black patients.[44] In the Army, there were no African American nurses allowed in the Army Nurse Corps except for a quota of 48 nurses who worked domestically at segregated hospitals.[45]

Women of Asian or Hispanic descent were also excluded from the ranks of the Army Nurse Corps and Navy Nurse Corps at the beginning of World War II. In general, minorities in the 1940s were not only discriminated against, but were almost invisible to mainstream culture and society. At this time, anti-Japanese sentiment and mistrust were highly pervasive throughout all levels of American society, however many still underestimated the threat of imminent war with the Japanese. Hispanic American nurses were not banned from enlisting like other groups, but they were grossly underrepresented. Puerto Rican nurses were not accepted into the Army Nurse Corps or Navy Nurse Corps until 1944, when the Army Nurse Corps recruited a group of thirteen Puerto Rican nurses to care for the newly inducted Puerto Rican troops; however, these nurses did not serve outside of Puerto Rico.[46]

Despite the struggle that racial minorities faced serving in the Army Nurse Corps or Navy Nurse Corps during the 1930s and early 1940s, they had at least one asset: they were women. Men who wished to serve as military nurses were repeatedly denied the opportunity. Prior to the establishment of the Army Nurse Corps or Navy Nurse Corps, men served as contract nurses during the Spanish-American War. However, once the Army Nurse Corps and Navy Nurse Corps were legally established as female organizations, male nurses were excluded. Male nurses appealed to and were denied service as nurses during World War I, citing the aforementioned legality. After the establishment of the Men Nurses' Section of the American Nurses Association in 1940, men continued with renewed enthusiasm to assert their right to serve as a military nurse, appealing to President Roosevelt himself. In a letter from June 13, 1940, one frustrated male nurse wrote,

> It is at a time like this that we feel something should be done about the status of the registered men nurses in the Army and Navy Medical Services. We have tried for years to obtain the same relative rating for men nurses as is given to women nurses. We cannot understand why there should be such discrimination between the two groups. Men nurses receive the same training as the women; are accepted for membership in all the national nursing organizations and are eligible for registration in every State of the Union. Yet, in spite of equal training, we are not accepted for peacetime, or war service.[47]

Men who were denied service as male nurses were encouraged to enlist and to serve in other ways. Many male nurses did serve, but not as registered nurses.

Despite a documented nursing shortage both within and outside of the military, nursing organizations were reluctant and resistant to offer opportunities to men in nursing. In fact, from 1940-1942, the only nursing schools accepting men were the four nursing schools in the United States that were established exclusively for male students.

None of the coed programs had any new enrollments of men in nursing 1943, and in other years, the number of new enrollees was generally less than those studying nursing prior to the start of World War II in 1939.[48] Part of the enrollment drop is undoubtedly due to drafting and recruiting men to contribute to the war effort, however this dramatic decrease of men in nursing at this time would lead to a drop in the already small percentage of men in nursing overall during the war period.

Preparing Nurses for Military Service

As the threat of war loomed heavy on the United States, the Army, Navy, and Red Cross struggled to meet the projected demand for nurses. Experienced nurses were encouraged to apply for the Army and Navy Nurse Corps, but received little formal training from the Army and Navy. In the Navy, new nurses went through a six-month probationary period where they dressed in their civilian nursing uniform, and were put on a ward with a more experienced nurse where "you just learned the language and the routine."[49] Ann Bernatitus, a newly accepted Navy nurse in September 1936, remembered her time as a nurse on probation in Chelsea, Massachusetts. "New nurses were coming into the Corps roughly every two to four weeks. I found myself supervising the corpsmen and keeping the books. Every morning you went on duty and had to count all the blankets, the thermometers."[50] Nurses were assigned to a ward for several weeks with an experienced nurse, and were later assigned to their own wards. Each ward had between thirty and forty beds, and was staffed with one nurse and four corpsmen to care for the patients. The nurse was responsible for overseeing the nursing care provided by the corpsmen, caring for the patients with the highest acuity, ordering

supplies for the ward, and general ward housekeeping. As nurses were continuously recruited and added to the Navy, it was difficult to give any formalized training. After the six-month probationary period, nurses were taught what to expect as a nurse in the Navy by an experienced Navy nurse.[51] However, no additional training was provided related to the care of casualties, or personal safety and survival during war.

Similarly, Army nurses did not receive any special training once they entered the Army Nurse Corps. Any training that was provided was designed to prepare the nurse for specialized clinical or functional assignments (like anesthesia, physical therapy, etc.), not to provide any sort of military training. The Army Medical Department believed that the duties of a military nurse did not differ significantly from civilian duty, and no extra training was needed. This logic was also used to justify the lack of a Nursing Reserve force, as no preliminary military training is required to be a nurse, so no active duty training was needed for reserve officers. The Army Nurse Corps was confident in the ability of the National Red Cross Nursing Service to supply qualified nurses if needed. In general, new nurses trickled into the Army Nurse Corps weekly, and nurses received an informal, on-the-job orientation to the Army at their first assignment. The Army did offer an eighteen-lecture course in "Medical Department Administration" in 1933 to all Army Nurses with less than three years of experience. However, only about one third of the corps at that time (236 nurses) completed the training, and it was not offered again.[52]

The peacetime orientation for Army nurses began with an assignment in the continental U.S. "to afford her an opportunity to become acquainted with military customs."[53] This initial orientation mostly consisted of processing activities such as

obtaining uniforms, creating personnel records, and becoming familiar with the military post, the Army Hospital, and the nurses' quarters. Any additional instruction in the duties specific to Army nurses was left to the chief nurse of the hospital, who was often busy with other tasks. The Army nurse orientation completely lacked any training in operating under field or combat conditions. With a steady influx of new nurses to the Army hospitals, chief nurses could not deliver a consistent or thorough orientation when supervising a large number of nurses in varying stages of their "orientation."[54] Specifically, several nurses stationed in Pearl Harbor all agree that they did not have any special orientation to the Army Nurse Corps, they received no training in the care of gas casualties, and they had never been instructed or had a conversation about how to handle a large number of casualties at once. Knowledge of and access to gas masks varied among the nurses' accounts. Some nurses state they were not issued gas masks until after December 7th, and others state they had masks and drills where they had to quickly put on their masks prior to December 1941.[55]

In contrast to the nurses, physicians who would become Medical Corps officers received nine months of postgraduate training prior to receiving an assignment, and also had a reserve force of medical officers that had completed training and could be mobilized quickly if needed.[56] Physicians received military training in field maneuvers and were trained to be soldiers as well as physicians, and strove to find "a balance that permitted them to find satisfaction in a world where they could be good doctors only by being good soldiers," and vice versa.[57] Enlisted corpsmen also received training prior to their first medical assignment. They were trained to be litter bearers, ambulance

drivers, and technicians. The training centers for corpsmen combined traditional military training with instruction in anatomy, nursing, and pharmacy.[58]

Military Rank in Nursing

Military nurses worked to achieve relative rank throughout the 1920s. In June 1920, Army nurses were given relative rank in the Army. Relative rank referred to a hierarchical system within the Army Nurse Corps where newly inducted nurses were given the lowest rank of Second Lieutenant, and head nurses, chief nurses, and the superintendent of the Army Nurse Corps were given higher ranks. However, there was no comparability of authority, pay, or mobility between the Army Nurse Corps rankings and those of the Army. Navy nurses were explicitly excluded from the legislation giving relative rank to Army nurses.[59] In the Navy, nurses were not given relative rank or any ranking at all until after the United States entered World War II.

Differences in social or financial class are generally less relevant in the military than civilian circles. The nature of the military as a structured, uniformed, and purposeful organization providing specialized education blurs traditional class boundaries. However, differences in rank among the military essentially resulted in a military class system. The nurses were charged to care for patients regardless of the patient's age, rank, or status. However, enlisted and ranked personnel were treated differently. The officers had a medical ward separate from the enlisted men, which mimicked much of the overall segregation of enlisted men from the officers throughout the military.[60]

Army nurses existed in a gray area between the worlds of the enlisted and the officers because of their relative rank. Socially, they were invited to the Officer's Club, were housed separately from enlisted personnel, and had titles like Lieutenant, Captain, etc., but they only had rank within the nurse corps, not within the larger military itself.[61] Naval nurses existed outside of the ranking system, reporting to the head nurses and physicians and providing direction to the corpsman, but without any official rank or authority to advance the interests of nurses within the Navy.[62]

Despite these inequalities, nurses newly recruited to the military in 1940 were blissfully unaware of their rank in relation to the male officers.[63] Nurses were also accustomed to the customary relationship between a nurse and a physician, and naturally viewed physicians (who had rank within the Army) as a superior officer in charge of the ward and treatment decisions. Despite the ambiguity of rank, authority, and military class, the nurses generally reported excellent collaboration among the corpsman, physicians, nurses, and patients.[64] However, not all corpsmen had good relationships with the nurses.[65] Some corpsman resented nurses since the nurses would take over the skilled tasks and delegate the less desirable, unskilled tasks to the corpsman.[66] However, the majority of men under the direction or care of military nurses were grateful and respectful, and viewed their nurse as a motherly or sisterly figure.[67]

The Westernization of the Pacific

In order to understand the events of December 7, 1941, it is important to understand the geographic, political, and economic forces that led to the Japanese attack on Pearl Harbor. Hawaii is an island chain located in the middle of the Pacific Ocean,

isolated from any foreign threats by thousands of miles of ocean, and is strategically much closer to the Far East than the western coast of North America. Hawaii is located approximately 2,400 miles off the coast of San Francisco, California, and 4,000 miles east of Tokyo, Japan. The United States became interested in acquiring Hawaii as early as the 1820s, when Western imperialism was popular and the United States was interested in expanding its borders. Missionaries from New England arrived to evangelize the native Polynesians living in Hawaii, and the U.S. government began to invest in the sugar industry in Hawaii. After the U.S. Civil War and the collapse of the sugar industry in the southern United States, the sugar industry in Hawaii thrived. In 1890, a tariff was placed on foreign sugar, upsetting the sugar market in Hawaii and many of the white, American sugar plantation owners. In order to bypass this tariff, the sugar planters organized a coup of the Hawaiian monarchy in January of 1893 with the help of unsanctioned American Marines. Queen Liliuokalani was forced to abdicate her title as Hawaii's monarchy. President Cleveland, who strongly opposed the annexation of Hawaii, ordered an investigation into the shameful overthrow of the Hawaiian monarchy, and hoped to restore Queen Liliuokalani to power; however, the American public favored the annexation of Hawaii. After a new president was elected and a war began with Spain in 1898, Hawaii was officially annexed by President McKinley to serve as an American Navy base. Its location was critical in supporting the war against the Spanish in the Philippines.[68] Hawaii remained a distant extension of the United States, having proved its worth as a territory rich in natural resources and its strategic military advantage in the Far East.

Traditionally, the Japanese were a highly isolationist society, and limited their conquests and concerns to their own island nation until the mid-nineteenth century. In 1853, the United States sent a naval delegation to Japan with the intent of opening Japan for trade to Westerners, in a similar fashion as China. Rather than resisting westernization as China had, Japan embraced western ideas and technology. Japan began to replicate the technology and ideas of colonialism in search of more resources. In only fifty years, Japan successfully blended western political, technological, economic, social, and military norms with traditional Japanese culture, and restored the figurehead of the emperor back to its former power. Japan tested its newfound military power throughout the surrounding region by attempting to colonize parts of Eastern Europe in a fashion similar to other imperial world powers. At the turn of the 20th century, Japan beat both China and Russia for control over Manchuria and the Korean peninsula.[69]

Although the emergence of Japan as an imperial power was concerning to most westerners including the United States, the United States did not interfere with Japan's plans, and actually helped mediate peace between Japan and Russia over control of Korea in 1902. However, the cooperation between Japan and the United States was short-lived. Japan continued its territorial conquests into China in 1905, which threatened China's territorial integrity and its profitable trade agreement with the United States. The United States continued to antagonize Japan through segregation and racism directed toward Japanese immigrants in the western United States. Diplomacy and policy changes between the two countries kept both sides relatively appeased, although treatment of Japanese immigrants in the United States was still poor, and Japan continued to threaten American interests in China with their thirst for more resource-rich land.[70]

Diplomacy Fails

By 1937, Japanese conquests in China had reached a level that was unacceptable to the United States. The Japanese had killed hundreds of thousands of Chinese civilians in the Nanking Massacre in the name of imperialism.[71] Japan had also allied itself with Germany and Italy, creating the Axis powers in 1940. As the United States had strong economic ties and sympathies for China, the United States placed an embargo on trade to Japan which included resources critical to their conquests, including oil and scrap metal. Other Allied countries, including Great Britain and the Netherlands, had also stopped shipping to Japan, cutting off about 75% of Japan's imports of precious fuel and scrap metal.[72]

Diplomatic talks between the United States and Japan continued from January to late November of 1941, although it appeared the two countries had reached an impasse. Throughout the summer of 1941, Japan continued to occupy Indochina and amass a large, growing military presence, despite ongoing peace negotiations with the United States. Japan asked the United States to stop sending aid to China, to give up all presence in the Far East, and to limit their interests to the Western Hemisphere. In order to lift the embargo, the United States demanded that Japan withdraw from the Axis Powers, withdraw from its occupation of French Indochina and the Chinese mainland, renounce their aggression in the area, and allow equal trade in the Pacific region.[73] The United States issued an ultimatum to Japan, stating the embargo would not be lifted until Japan withdrew from China.

Despite diplomatic negotiations, Japan continued to gather military intelligence about the United States and its territories. Japan also began developing a secret plan to launch a surprise attack against the United States, and continued to evade questions regarding massive troop movements into Indochina, which the United States feared was a precursor to invading Thailand. If Japan conquered Thailand, American trade routes to the Indian Ocean and to China would be blocked, and both American and British leaders viewed the invasion of Thailand as an act of war. However, the United States was over-confident that if war did occur, they would have the strategic advantage over Japan due to their military presence in the Philippines, which the United States was continually strengthening. In addition to evading certain questions, Japan was also sending mixed messages with diplomats voicing Japan's willingness to negotiate and continue peace talks, while the premier of Japan was publicly stating he wanted to purge American and British influence from the Far East. Although the premier later denied ever saying this, it was clear that Japan's diplomatic intent and militaristic actions were incongruent.[74]

On December 4, 1941, Tokyo formally rejected the conditions set forth by the United States for peace, and continued to remain silent with respect to Japanese intentions in Thailand. Japan claimed troops were sent to Indochina as a security measure to maintain peace in response to Chinese troop movement. The American press disregarded Japanese claims of security threats in Indochina as the French had already peacefully signed it over to Japan over a year ago, while the Japanese press claimed that the United States was becoming more hostile against Japan. Japan continued to publically assert their willingness to negotiate and continue peace talks, and stressed that the tensions were an exaggerated misunderstanding on the part of the United States. In

almost the same breath, Japan also contradictorily accused the United States of colonialism, being too militant, not being militarily prepared, being both too soft and too hard, and plotting against Japan. By the end of 1941, American diplomats believed an agreement between Japan and the United States could not be reached; however, they both continued peace talks to stall any future problems in the Pacific, as neither seemed willing to make the first move towards an all out war.[75]

Eventually, Japan realized that war with the United States was inevitable, and in order to have any chance of winning, they would need to cripple the U.S. Naval base at Pearl Harbor. As early as January of 1941, Japanese military leaders drafted secret plans for a surprise attack on Pearl Harbor. The leader of Japan's Navy approved the plan in October, and the Japanese Navy began to practice their attack. On November 26, 1941, the Japanese fleet sailed for Hawaii, despite ongoing diplomatic peace talks between the United States and Japan.[76] In the days leading up to the Pearl Harbor attack, Japanese spies both on the continental United States and in Hawaii gathered as much intelligence as possible about the military power of the United States, especially in and around the West Coast, the Panama Canal, and the Territory of Hawaii. However, the American military grossly underestimated the value of Japan's intelligence, as the majority of the information being sent to Tokyo was publically reported in the press, and unclassified. Interested Americans assumed that any Japanese aggression would be against Great Britain in Singapore and Hong Kong, not against the United States. However, most Americans were ignorant to any possible conflict in the Pacific, and few could even find Hawaii on a map.[77]

America in the 1940s

The inclusion of women in the military as nurses was a large step forward toward gender equality; however, the majority of American women, including nurses, remained strongly defined by the gender roles of the time. The role of the middle-class white woman in 1940 and 1941 revolved around her husband and family. Getting married and staying married was the most important task for a woman at this time, and many magazines included tips as to how to accomplish this goal. A woman's service to her husband and family superseded any personal desires for love or companionship, and family roles in general were very well defined. Rather than publishing employment statistics, all-women's colleges published their five-year marriage rates.[78] Americans wore their "Sunday Best" to church, the movies, out to dinner, and whenever they travelled. The women's pages were full of articles on fashion, wedding announcements, how to get a husband, and proper conduct in the workplace.[79]

As the United States began to mobilize for the possibility of war through the recruitment of soldiers, medical personnel, equipment, and raw materials, the lives of millions of Americans continued, with the war in Europe creating divisions in American politics. The United States was divided between isolationist and interventionist mentalities; the former wanting to stay out of the war in Europe and the latter feeling compelled to be involved. America was preparing for the possibility of war. Car factories started making tanks and shortages of steel and other raw materials needed for the war effort were commonplace.[80] Military and civilian cultures mixed easily, promoting national unity with print ads showing uniformed men beside civilians, and companies advertised their contribution to both war and civilian life.[81]

Throughout the decade prior to America's involvement in the war, most American policies promoted isolationism in regards to the war in Europe. Congress passed several neutrality policies banning the trade and sale of military equipment in Europe, and banning American troops from leaving North America. As the war in Europe intensified during the early 1940s, the United States began to support the Allied war effort in spite of these laws. The Lend-Lease Act of 1941 replaced the old neutrality laws, allowing Americans to supply their allies with "borrowed" military equipment or resources to pay back America at a later time. This behavior incurred open aggression from Germany against American ships. In May of 1941, German U-boats sunk an unarmed American freighter, and Germany ordered U-boats to fire on all American vessels. Americans began to fight back to ensure their cargo crossed the Atlantic.[82] Although all-out war had yet to be declared, tensions were high between the United States and Germany, and American opinion was divided on whether or not the United States should continue to stay out of the war. Most American eyes were focused on the war in Europe, and few were aware of any tensions with Japan until late 1941.

Defending Pearl Harbor

In the early 1940s, Honolulu, the largest city on the island of Oahu, was a small, low-rise city hidden and nestled amidst lush trees and flowers, with an unobstructed view of the miles of sugar cane fields and beautiful peaks in the distance. The breeze was sweet with the smell of flowers and wild tropical fruits that people grew in their yards. The perfect climate made water heaters or air conditioning unnecessary, and weekday afternoons were a time to relax and enjoy life. Honolulu was relatively unscathed by the

depression, especially considering the defense boom which had poured millions of dollars into their economy.[83] Hawaii was also a place of solace for those seeking a respite from the troubles in Europe and the Far East. Hawaii was relatively isolated from the United States, with the telegraph or mail being the only means of communication with the mainland. The advertising slogan of Honolulu in 1941 was, "A World of Happiness in an Ocean of Peace."[84] As war tensions grew across the world, Hawaii became a safe haven for those fleeing countries such as China, Europe, and the Philippines. The new arrivals lived alongside the native Hawaiian population, creating a highly diverse population living in peace.[85]

Pearl Harbor is located in the southern part of the island of Oahu, Hawaii. It was built in 1908 and officially opened in 1911 as the headquarters of the U.S. Naval Command of the Pacific.[86] By May 1940, the majority of the Pacific fleet of the U.S. Navy had relocated to Pearl Harbor, and the Army was tasked with defending this fleet from attack.[87] The primary fleet at Pearl Harbor consisted of eight battleships, two heavy cruisers, six light cruisers, and twenty-nine destroyers. Many other ships were also docked, including the newly outfitted *USS Solace*, one of two of the Navy's hospital ships.[88] To provide air support and defense, the U.S. Army and Navy also had several air bases with hundreds of planes scattered throughout the Island of Oahu.[89] Hawaii was touted as an impenetrable fortress that the Japanese or anyone else would never be able to successfully attack. However, military leaders recognized and prepared as well as possible for potential threats against Hawaii.

As early as February of 1941, military leaders in Hawaii recognized that an attack by air, submarine, or a combination of both could be possible by Japan. Japan also had a

history of attacking prior to declaring war in their other conflicts, increasing the suspicion of a potential surprise attack. The United States recognized that Oahu would be vulnerable to an air attack as the Army did not have sufficient resources to patrol an area large enough and for enough time to detect an inbound enemy plane, unless there was intelligence stating an attack was imminent. Operating under routine conditions with no heightened state of alert, the Army estimated it would need up to four hours to be fully prepared and have all available planes mobilized for defense.[90] This made advanced intelligence a key component to any plan or hope of defending Pearl Harbor against an enemy attack.

The Army Medical Department Prepares for War

In preparation for a possible war, the U.S. Surgeon General advised the Army Medical Department to enlarge existing medical facilities, create new medical facilities, create unit medical detachments, create training programs for medics, and revise emergency medical plans. As the military made preparations against potential threats to Oahu, the Army and Navy medical departments also began to prepare to treat the injured should an attack occur. The two war plans relevant to the defense of Hawaii were the Rainbow Plan and the White Plan. The Rainbow Plan detailed the military defense of Hawaii from external threats, and the White Plan was its corresponding plan for civil disturbances, and included a medical disaster plan.[91]

The White Plan was established long before 1941, and revisions to the plan began in 1933 in order to meet the growing medical needs of both civilian and military populations. The plan outlined evacuation procedures, delegated potential casualties to

specific hospitals, authorized the military to use civilian hospitals if necessary, and required military personnel to provide first aid to civilians. Tripler Hospital was responsible for casualties in and surrounding Honolulu, and Schofield Hospital was responsible for causalities in the north and western areas of Oahu. Minor injuries would be treated at medical dispensaries instead of hospitals. The key to the success of this plan was collaboration between military and civilian personnel in a crisis, as their joint resources were so intricately connected.[92] However, the military nurses were unaware of any planning or preparation related to a disaster, and had no formal training in the care of emergencies or disasters after entering the Army Nurse Corps.[93]

In 1940, the White Plan was further expanded to assume full responsibility for the collection, treatment, evacuation, and hospitalization of any civilian casualties on Oahu in the event of a disaster. This required more supplies and aid stations dispersed throughout Honolulu and the island of Hawaii. The Honolulu Medical Society fully cooperated, and offered to supplement the Army defense force with civilian physician and medical teams to work under the direction of Medical Department personnel. Specific measures for treatment of gas casualties were also developed, but multiple nurses stated they never received training in treating gas casualties prior to December 1941.[94]

Oahu had a total of seventeen military and civilian hospitals located throughout the island, which could be available to the military for use to evacuate convalescent patients from military hospitals in the event of an attack. To supplement these facilities, several schools were selected as emergency casualty treatment centers. Schools were preferred as they were fire resistant, had layouts that were easily adaptable to a hospital, and were located throughout the community and away from potential enemy targets. By

December 1941, the Army was in the process of occupying Farrington High School, and plans were ready to immediately occupy the others if necessary. [95]

Despite all the preparations, the Hawaiian Medical Department was short on personnel and had an open request for 80 more medical officers, 100 nurses, and 600 enlisted men to staff the expanded facilities. The Army was in the process of procuring more personnel and supplies, and men and equipment were on their way but had not yet arrived.[96] Dr. King, Department Surgeon for the U.S. Army Hawaii, employed civilians in both direct and supportive services to the medical department to supplement the limited medical corps.[97]

Inadequate medical personnel as well as a shortage of medical supplies were a major concern in preparing for a potential disaster. Due to Hawaii's isolation from the U.S. mainland, supplies would not be readily available to Hawaii for many weeks unless they were already stored on the islands. The central medical supply depot at Tripler Hospital stockpiled critical supplies including 58,000 surgical dressings and sulfonamide drugs. A supplementary supply depot was established at Schofield Barracks hospital, and civilian hospitals also began to increase and save their own stocks of medical supplies. [98]

Civilian Preparedness

Public funds for medical preparedness in Hawaii from both local and national sources were limited around 1940, as America's resources were stretched supporting the war effort in Europe and mobilizing for war if the United States were to become involved. Both the military and the civilian medical personnel collaborated closely with the Red Cross to support medical preparedness and civilian defense efforts.

The National Red Cross Organization supported the Armed Forces and Civilian Defense in the following ways:

- Supporting and expanding local ambulance services
- Enrolling blood donors, collecting and storing blood products
- Recruiting nurses and other medical technologists – including occupational therapists, physical therapists, dieticians, x-ray technicians, etc.
- Training community members in first aid, water safety, and accident prevention
- Training volunteers to make surgical dressings, to drive ambulances, to work in canteens to provide food, and to serve as a nurse's aid in hospitals and first aid stations
- Providing supplies for hospitalized men including cigarettes, writing paper, stamps, shaving cream, razors, and tooth brushes[99]

With the support of the Hawaii Chapter of the Red Cross, the Civil Defense program for Hawaii began to organize in 1939, when military leadership warned that the islands should be prepared for an enemy attack on Honolulu at any time. The Honolulu County Medical Society began to organize an emergency medical service to "cope with any disaster that might befall the community."[100] In February 1941, Dr. King, Department Surgeon for the U.S. Army Hawaii, urged the Medical Defense Committee to enact its plan and start to recruit volunteers. The Medical Defense Committee began to establish disaster training centers for volunteers, to collect and store blood plasma, and to purchase and stockpile materials needed for the storage and administration of plasma. Ninety doctors volunteered to teach four-hour first aid classes, and soon 5,000 people had been trained.[101]

Civilians were trained following the curriculum and textbook developed by the Red Cross. According to the 1937 publication of the *Red Cross First Aid Textbook*, civilians would have learned critical information in the initial treatment of injuries from air raids. Chapters in the text discuss the treatment of shock, wound care, and transportation of patients. In general, first aid training taught students to keep the injured

person supine to help prevent shock, to assess the patient's breathing, pulse, and skin color; and to look for any obvious bleeding or injuries. If an ambulance or physician were needed, the rescuer would describe their location, the injury, and what treatment had been given. Students were also shown various ways to transport the injured in litters (stretchers), chairs, and how to carry the wounded if needed.[102]

Students studied first aid and learned basic anatomy and physiology, proper bandaging techniques, basic wound care, and how to recognize and support a person in shock.[103] In Hawaii, between forty to sixty nurses and physicians in the community volunteered their time to teach these courses. Courses were at least twenty hours in duration and were held every Sunday morning near Queen's Hospital. In order to complete the course, attendees had to pass a written test and demonstrate proficiency in "artificial respirations, digital pressure, and practical problems."[104] Volunteer training also included basic instruction in military courtesy and discipline, as well as the basics in the treatment of gas casualties.[105] Volunteer ambulance drivers were trained in first aid, and received additional training in convoy driving without lights (in case of blackout), and shuttling the transport of wounded. Two ambulances were assigned to each of 17 first aid stations, and 200 ambulances were held in reserve if needed.[106]

By April 1941, volunteer training was progressing, but other areas of preparation were deemed inadequate. Dr. Faus, Chair of the Medical Defense Committee, stated, "the island hospitals were utterly unprepared in case of a national emergency." Even though 45,000 surgical dressings had been prepared and stockpiled, the island hospitals needed reorganization, and first aid stations had yet to be identified. Lieutenant General Walter Short, the US Army Commanding General in Hawaii, noted additional

shortcomings in civilian preparedness, identifying the need for more production and storage space for food. He encouraged civilians to start home gardens and to stock their shelves with canned goods to open warehouse space for more food. The Army planned to make warehouse space for a six-month supply of essential foods. Lieutenant General Short also stressed the need to organize doctors and nurses to specific emergency units and to create plans for evacuating and sheltering women, children, and essential workers. The Army estimated that 86,000 people who were living in designated "danger zones" would be needed to be evacuated from homes. This included a large portion of Honolulu residents.[107]

The city of Honolulu, under the new leadership of mayor Lester Petrie, completed a city disaster plan, with the primary objective "to coordinate our plans and schedules with the Military Services, so that in time of extreme emergency the military service will not be hampered unnecessarily by civilian problems, which we can well take care of ourselves."[108] The leadership in Honolulu understood the Army and Navy were not charged with protecting the population of Honolulu, but with defending the American defenses Hawaii.[109]

By May, the Territorial Medical Association was ready to start testing and practicing their medical plans. Together with the Eleventh Medical Regiment at Schofield Barracks, the Red Cross First Aid trainees conducted a

> two-hour medical preparedness show on the Queen's Hospital grounds [in Honolulu]. Off-duty [civilian] nurses flocked from Queen's, passersby stopped and stared, and neighborhood youngsters begged to act as 'victims.' In a special 'dug-out' station, the Red Cross group of interns and nurses cared for the 'wounded' as they were brought in by the stretcher bearers.[110]

Schofield personnel explained the unit could be set up in twenty minutes and evacuated in twenty-five, and consisted of five trucks, ninety men, and eighteen ambulances. [111] That month, the entire Territory of Hawaii practiced a successful blackout drill at 9:00 p.m. on May 21, 1941.

A couple of weeks after this demonstration, approximately 3,000 volunteers under the direction of the Honolulu County Medical Association, began to organize volunteers into teams. Volunteers were divided into eighteen smaller units. All units were centered on schools and other buildings to be used as first aid stations except one, which was a designated mobile unit. Medically certified volunteers (about 1,500 of the 3,000) were assigned to a specific medical facility in their respective areas. Civilian physicians and dentists practicing in Honolulu were also divided into groups and assigned specific duties at either a hospital or a first aid station. Civilian surgeons and their nurses were assigned to military hospitals to assist military surgeons in caring for war casualties. Other physicians were assigned to first aid stations dispersed throughout the island to care for minor casualties or to provide life-saving stabilization and treatment to those needing transfer to a hospital. First aid units consisted of "three doctors, one dentist, six nurses, six nurse's aids, a dietician, a cook, a supply clerk, a motorcycle messenger, stretcher bearers, triage clerks and others, including a boy scout."[112]

Precautions were also taken to warn the citizens of Oahu of any impending attacks. In June, funding was allocated for thirty emergency sirens to be placed throughout Oahu to warn of a possible air raid or the need for an immediate blackout. [113] By December 1941 the air raid warning system had begun construction, but only about

one third of the project was complete.[114] The Honolulu County Medical Society also issued a booklet to civilians explaining air raid precautions.[115]

Lastly, the Red Cross of Hawaii had collected and stored blood plasma for use by the military or civilians if needed in emergency. By October 1941, the Blood Bank Committee of the Honolulu Chamber of Commerce reported there was enough blood plasma stored that it was able to serve both donors and borrowers. For every two pints of blood, the blood bank was able to dispense one pint of plasma, as this ratio was needed to keep stores adequate. Plasma was preferred to whole blood as whole blood could only be stored for thee weeks and frozen plasma's shelf life was much longer.[116]

Navy Medical Preparedness

Medical preparedness for the Navy was much different than that of the Army. As the Army bases were more integrated with the community and as their charge was to defend Pearl Harbor and its surrounding area, the Army became highly involved and prepared for an attack involving the Army, Navy, and/or civilians. By nature, the Navy is more self-sufficient and contained as its primary function is to exist in waters, isolated from any resources. Unlike the Army, the vast majority of the Navy was located at Pearl Harbor, with the exception of the Naval Air Station at Kaneohe and the Marine Corps Air Station at Ewa. When on duty, sailors worked, ate, and slept aboard their ships, and each ship had its own specific emergency plan. By August 1941, the entire Navy at Pearl Harbor had been blood typed and identification tags were in route.[117]

Navy Medicine was decentralized compared to Army Medicine, with medical officers and corpsmen spread among the various battleships, medical dispensaries,

dressing stations, and hospitals. A large battle ship would have space for a sick bay as well as three to four battle dressing stations.[118] These areas were equipped with supplies to render advanced first aid and care until patients could be transferred to a hospital. With the shortage of bed spaces on shore, medical officers tried to decrease transfers to hospitals and hospitals ships for minor injuries, minor surgery and mild conditions. This assisted in preparing medical department personnel aboard ships, stimulated resourcefulness on board, and maintained an intact crew while undergoing their scheduled training.[119] Medically trained corpsmen working under the command of a medical officer were trained and prepared to care for most minor injuries and illnesses aboard the ship in addition to providing advanced first aid should the ship or its sailors come under attack. There were no nurses assigned to any of the battleships. These large ships also had smaller motorized boats that could be deployed if the ship needed to be evacuated, or if someone needed to be rescued from the water.[120]

Additional medical care was available ashore at medical dispensaries located on the Naval and Marine Air Bases at Ford Island, Kaneohe, and Ewa. Like the ship sick bays, the dispensaries also focused on first aid and care for minor illness or injuries, and those requiring hospitalization would have to be transferred to the Naval Hospital Pearl Harbor.

Naval Hospital Pearl Harbor was the only permanent hospital for the Navy. With the rapid and massive influx of sailors, by 1940 the 250-bed Naval Hospital Pearl Harbor had become overcrowded. The Navy invested in adding more beds, new equipment, and more supplies, and increased staff for the hospital as a temporary solution.[121] The bed capacity was increased to 863 with the ability to expand to 1043 beds in an emergency.

The average census near the end of 1941 was approximately six hundred patients, leaving four hundred beds open for immediate treatment of casualties if needed.[122] The nursing staff was also increased from twelve nurses to twenty-nine.[123] In addition to being too small, Naval Hospital Pearl Harbor was also very vulnerable to attack due to its position so close to the harbor.[124] By August 1941, a new Naval Hospital had been planned and approved, but construction had not yet begun. This hospital would be located in Aiea, which is still conveniently close to Pearl Harbor but is less vulnerable to attack, as it would no longer sit along the shore of the Harbor.[125] However, the new hospital could not be built quickly enough to meet the medical needs of the growing fleet and personnel at Pearl Harbor.

To address this concern, the Surgeon General secured permission for the Navy's Mobile Base Hospital Number 2 to be located at Pearl Harbor. This was a transportable medical facility that was pre-organized and able to be assembled quickly. However, as the supplies and equipment had only arrived in November 1941, the hospital had yet to be assembled. Learning from experiences with Mobile Hospital Number One, all the equipment was packed, marked, and arranged logically so the mobile unit could be quickly and easily assembled when needed.[126] When assembled, the mobile hospital could accommodate 500 beds.[127] By December 1941, the only structure that had been erected was the crew quarters, and corpsmen had been assigned to the unit for only one week.[128] The *USS Solace*, a newly commissioned hospital ship, was also sent to Pearl Harbor to augment medical support for the area. Both the mobile hospital and hospital ship augmented the capacity of the Navy Medical Department, however local Navy

Medical officers were still concerned about bed space if a major conflict involving Pearl Harbor should occur.

One solution was to collaborate with the civilian hospitals in Honolulu, with agreements similar to those between Army and civilian hospitals. The Navy was interested in leasing three plantation hospitals in Aiea, Waipahu, and Ewa, all of which could rapidly care for 200 convalescent Navy patients if needed. As all the identified facilities had operating rooms, laboratories, x-ray equipment, and wards, the Navy would only need to supply staff and quarters to make these facilities available for use by the Navy.[129] However, in July 1941 the Chief of the Bureau of Medicine in Surgery, Ross McIntire, advised against investing in the infrastructure needed to lease the plantations hospitals, and to instead focus resources on completing the new Naval Hospital, which would add 400 beds and could increase to 1000 beds if needed without further construction.[130] Navy Medicine in Hawaii continued to express concerns about the availability of beds for Navy personnel in Hawaii, especially considering the directive from Washington DC against fitting plantation hospitals to serve as convalescent Naval Hospitals. Although the mobile hospital and *USS Solace* provided more bed space for casualties, they were designed to be mobile units. In the event of war, these facilities would need to be available to relocate to other Pacific Islands.[131] Despite the relative shortage of beds for casualties, Navy Medicine was relatively prepared to handle a large influx of casualties if necessary due to their numerous dressing stations, first aid stations, and medical dispensaries in and around Pearl Harbor.

Disaster Nursing in the 1940s

In 1940, nursing leaders within the Red Cross Organization began to have formal conversations about the role and training of nurses in disasters. In a December round table discussion of the Nursing Service in Disasters, the nurses present noted, "the immediate responsibility of the Nursing Service is to prepare nursing personnel for disaster service." The Red Cross decided to hold institutes on disaster preparedness. These institutes would be a two-day workshop for nurses held in different parts of the country, in order to better prepare nurses for disasters.[132] One of these Disaster Nursing Conferences was held in Washington, DC in March of 1941. The conference discussed the need for disaster preparedness and relief, problems and trends in disaster relief, the role of the medical service in disaster, the roles and policies of nurses in disasters, and the organization, direction, and supervision of nursing during disasters.[133]

It was also noted that nurses were rarely utilized in disasters, and when they were used, their success depended on cooperation. They stressed that local nurses are imperative to the disaster response and should be used whether or not they are enrolled in the Red Cross in order to provide efficient nursing care in disasters. Once available, Red Cross enrolled nurses could be substituted for local nurses to relieve those in the emergency period. Nurses in a disaster could be utilized in medical stations, hospital duty, public health nursing, emergency hospitals, and refugee shelters. The nurses also advocated for the use of standing orders to expedite care.[134]

In Hawaii, civilian nurses under the leadership of Miss Mary Williams, director of the Board of Health's Bureau of Public Health Nursing, were mobilized and ready to take their part in the event of an emergency. Miss Williams's nurses received additional

training and attended a series of eight classes dealing with trauma. Six nurses were assigned to each of the twelve emergency units. Public Health nurses were specially trained to handle a variety of complications relating to a war emergency, including possible epidemics. These nurses also received the Red Cross first aid training as well as specialized training in home deliveries, the care of newborns, and nursing injured patients convalescing at home.[135]

Nurses also assisted in the Red Cross training of Nurses' Aides. Volunteers assigned to be nurses' aides were taught how to make supplies including sponges, compresses, cotton balls, pledgets, and applicators. They were also taught to recognize and provide emergency treatment for patients with shock, hemorrhage, fainting, burns to the eyes or skin, and heat exhaustion. Other lessons included details on lifting and moving patients; housekeeping; taking vital signs (temperature, pulse, and respirations); assessment of blood pressure, skin condition, restlessness, and pain; keeping records; bandaging, feeding, and shaving patients; identification and sterilization of surgical instruments and other medical supplies; and medication administration.[136]

The civilians of Oahu took their role in disaster preparedness seriously, and supported an interdisciplinary plan dependent on the careful coordination of civilian and military resources in the event of a national emergency. By December 1941, Oahu was well prepared for an enemy attack, and had mechanisms in place for warning, evacuating, sheltering, feeding, and caring for the citizens of Oahu, both military and non-military, should the need arise. However, nursing was largely absent from the planning, preparation, and training for medical preparedness. Some civilian nurses participated in disaster drills or taught nursing aid classes as part of the red-cross training; however, the

Army and Navy nurses were largely unaware of any reason to have a disaster plan, were not involved in disaster training, and were unaware of any need to prepare for a potential medical emergency.

Military Life in Hawaii

While the civilian population prepared for the worst, the nurses and many other service men and women focused on enjoying the best that the Territory of Hawaii could offer. Many of the newly recruited and inducted nurses into the Army and Navy Nurse Corps were anxious to capitalize on the opportunities available to them as military nurses, especially travel. Most nurses that joined in the late 1930s and early 1940s were first sent to serve in military hospitals on the home front. Nurses assigned overseas, specifically to the Territory of Hawaii or the Philippines, were only accepted from current corps members. To many of the small-town nurses joining the military, they saw an opportunity to serve in Hawaii as a chance to travel and see the world.[137] Some nurses just wanted a change from their daily duties.[138] A large group of Army nurses arrived in July of 1941 on the *USS Mariposa.* Hawaii was described as "the paradise it was supposed to be," where the arrival of a new ship was the most excitement Hawaii residents and visitors could expect, and where war was far from most minds.[139] "Boat Day," when ships would leave or arrive, was akin to an island holiday where bands would play, confetti would fly, and locals would produce thousands of leis for the inbound passengers to be greeted in the true Hawaiian spirit of "aloha," a Polynesian tradition of friendliness and generosity.[140] On December 5, 1941, the large passenger liner *Lurline* departed for San Francisco with American diplomats returning from the Far

East, military wives, children, Japanese Americans, and others leaving Hawaii. Others saw no point in leaving Oahu, as war seemed remote and impossible given the extensive Naval and air defenses at Pearl Harbor.[141] As the *Lurline* pulled away from the pier and set sail for the mainland, passengers threw streamers to friends on the pier, creating a colorful tangle of string momentarily holding the ship to the dock and the fleeting peace that she left behind.[142]

The Island of Oahu had four hospitals, and one hospital ship in December 1941. Navy Medicine at Pearl Harbor included a naval hospital, a partially assembled mobile hospital, and the *USS Solace* hospital ship. Preparing for the threat of war, the Navy commissioned a second hospital ship in addition to the *USS Relief,* which was converted from a passenger liner into the *USS Solace* by August 1941, and traveled to Pearl Harbor, Hawaii to provide medical support for the Pacific fleet.[143] The 250-bed Naval hospital was well equipped and staffed, and supported by the *USS Solace* due to the large concentration of Navy personnel in Hawaii at the time.[144] There were twelve Navy nurses stationed at Pearl Harbor in December 1939, which grew to twenty-nine at the Naval Hospital, thirteen nurses on the *USS Solace,* and two at Kaneohe Air Base by December 1941.[145]

The Army had a total of three hospitals: Tripler Hospital at Fort Shafter in Honolulu, Schofield Barracks Hospital at Wheeler Field, and Hickam Field Hospital located adjacent to Pearl Harbor. Combined, Tripler and Schofield Hospitals had an initial capacity of 650 beds. However, with the expansion of the Army in Hawaii in 1940, Dr. King, chief surgeon of the Hawaiian Department, ordered temporary wards in barracks and porches.[146] This was augmented by building Hickam Hospital with a

capacity of 30 beds, as well as the potential to set up emergency wards in barracks and on porches. With these modifications, the combined capacity of all three Army hospitals was up to 1,449 beds.[147] In December 1941, there were approximately 150 Army nurses stationed in Hawaii serving at the three Army medical facilities.[148] For a map showing the various locations, please refer to Appendix B.

Nurses in Hawaii worked eight, ten, or twelve hour duty, but were able to enjoy their time off by dating military officers or spending time with friends touring the island of Hawaii, bowling, swimming on Waikiki beach, attending parties at the Officer's Club, enjoying local pork rib dinners, or gazing at the harbor as the lights reflected off of the water.[149] In a letter home to her parents dated December 1, 1941, Lieutenant Monica Conter describes her life as an Army nurse in Hawaii to her family.

> …This war situation is really something. We have been on alert for a week now and don't [know] when we are coming off. It looks quite "bad" at times… Tonight (Wed) I am going to Hickam Club with Lt. Andrews. Tomorrow (Thurs) I am going to Ft. Shafter Club with Lt… from Georgia. Friday dinner and dancing with Lt. Benning. Saturday dinner and dancing with Lt. Benning. I have a New Year's Eve date with Lt. Benning too. My bedroom is fixed up so pretty. All in blue. Wish you could see it. All for now – write soon to – your loving daughter Monica.[150]

The referenced state of "alert" at the base did not prevent Monica, or many other young nurses, officers, and their wives from enjoying the beautiful diversions the island of Hawaii had to offer. The alert was lifted on Saturday, December 6, just in time for Monica to keep her date with Lieutenant Benning. The evening of December 6 on Honolulu was a typical Saturday night in paradise, where both the enlisted men and officers of the U.S. military could be found enjoying the many diversions Oahu had to offer. Uniformed service men enjoyed free drinks, while others attended luaus, shooting galleries, pool halls, private parties, formal black tie events, time off with friends, live

music, games, local street hotdogs, or some much desired female companionship. Campfires on the beach, Japanese lanterns, and luau torches created a soft glow around the island of Oahu that night.[151] One such event was hosted at the Hickam Officer's Club where officers could be seen in their white dress uniforms, with their wives or dates in long formal dresses, including several Army nurses, enjoying the formal event.[152] Overall, there was a desire to enjoy the moment, as many feared this could be their last weekend free from the pressures of the impending war.[153]

American Folly Becomes Japanese Fortune

Despite many warning signs that the Japanese may be planning an imminent attack on Pearl Harbor, the Japanese completely surprised the United States Army and Naval forces upon their arrival on the morning on December 7, 1941. The interception of suspicious messages from the Japanese consulate in Honolulu to Tokyo were ignored by Washington intelligence officers and not communicated to the forces at Pearl Harbor. The United States military did not take the threat of Japanese spies seriously and did not think they were passing along any information that was not already available to Japan through newspaper reports and other public forums.[154]

Although the American forces at Pearl Harbor were on high alert for "hostile action possible at any moment" from Washington, they interpreted sabotage by Japanese civilians as their biggest threat.[155] In addition to the many servicemen, their families, and the native Hawaiian population, a number of Japanese lived in Hawaii. Approximately 40% (or 160,000 people) of the population was of Japanese decent. Despite the fact that there were no confirmed acts of sabotage from civilians, Americans feared the Japanese

race loyalty would supersede that of their citizenship, residence, or place of birth. Although there was no evidence to suggest sabotage as a credible threat, the United States military saw it as a more legitimate threat than a direct attack from Japan, and therefore made preparations against sabotage in lieu of defending against an aerial attack from Japan.[156]

The military took several precautions to guard their bases against sabotage. All ammunition was boxed and locked away to prevent theft from the Japanese locals. Both Wheeler and Hickam airfield disarmed and aligned their planes wingtip to wingtip in the middle of the airfield so they could be easily guarded. At Hickam, they dug trenches to protect against a land-based attack, but were extremely vulnerable to an air attack. Ammunition was removed from the planes and locked in hangers, and the unattended planes were also locked. The Navy regularly had sabotage drills and posted guards on ships. Sentries were given whistles instead of guns (due to the large number of false alarms), and weapons were unloaded with the ammunition locked away and immediately unavailable. In reality, many second generation Japanese-Americans were determined to prove their loyalty and Americanism to the point of completely abandoning Japanese culture. Many Americans viewed any retention of Japanese culture as a sign of disloyalty. At the time of the Pearl Harbor attack, many Japanese felt caught between a culture they had rejected and a nation that would not embrace them.[157]

The island of Oahu had been on alert for approximately one month prior to December 7, and the alert was finally lifted on December 6, 1941. The tension felt by many on the island had been released and the military personnel were looking forward to a worry free weekend in paradise. In the early morning hours of December 7, there were

several warning signs that were ignored or improperly interpreted. A submarine was spotted, attacked, and hit at 6:45 a.m.; however, this information was not disseminated to the Army or the rest of the Navy due to delayed communication and seeking verification of the information. A second ship was sent over an hour later to investigate, four minutes prior to the attack.[158]

The newly operational radar station in North Oahu identified a large unidentified "blip" on their screens, which was interpreted as a large group of planes located 132 miles northeast of Oahu. Again, due to poor communication and unfamiliarity with the new equipment, this was incorrectly interpreted as the scheduled incoming American B-17 bombers, en route from San Francisco to the Philippines. In fact, the local Honolulu radio station was instructed to continue broadcasting throughout the night so the B-17 pilots could track the signal to Honolulu. Unfortunately, the Japanese also used the same signal to hone in on Oahu. The radio operators went off duty shortly after incorrectly identifying the first wave of Japanese planes, and the unmanned station and did not detect the second wave of planes coming behind the first. Additionally, the Army had not established pre-determined flight approach patterns to be able to distinguish between friendly aircraft and an enemy attack.[159]

In Washington D.C., a message was decoded early on December 7, instructing the Japanese diplomats in Washington to deliver their message to the Secretary of State by 1:00 p.m. EST (8:00 a.m. in Hawaii) and to destroy their code machine. When the Chief of Naval Operations learned of this information, rather than warning Pearl Harbor, he instead called the White House to alert the President and the Army Chief of Staff, who

would then inform those in Pearl Harbor. The warning from Washington was not received in time to warn the forces at Pearl Harbor.[160]

The arrogance and overconfidence of the United States military was another major contributor to the disaster at Pearl Harbor. In September of 1941, the local *Honolulu Star-Bulletin* reported "A Japanese attack in Hawaii is regarded as the most unlikely thing in the world, with one chance in a million of being successful. Besides having more defenses than any other post, it is protected by distance."[161] This quote is one of many circulated by the Hawaiian and American press asserting that an attack on Pearl Harbor would be impossible. The United States assumed that Japan feared the American Pacific fleet, and local and national propaganda boasting the strength, power, and readiness of the United States Navy fed into a vicious cycle, each convincing the other that the United States was invincible to a Japanese attack at Pearl Harbor.[162]

It was in this setting that nurses stationed in Pearl Harbor worked when the Japanese attacked on December 7, 1941. The following chapters will detail the role of the military nurses during this disaster ,and how their work was an important contribution to the events on this monumental day in history.

Chapter 3: The Army Nurses of Oahu

By December 1941, the approximately 150 Army nurses stationed on Oahu were dispersed between its three Army hospitals.[1] Most of the nurses had only recently joined the Army Nurse Corps. Some nurses sought adventure, others merely wanted to get away from home, and others felt it was their patriotic duty to serve their country. This chapter argues that regardless of their original motives for joining the Army, the nurses would be called to unprecedented levels of duty and service to their county on December 7, 1941. The Army nurses were largely personally and professionally unprepared for the bombing of Pearl Harbor, were called to make critical decisions regarding patient triage, and worked beyond the scope of their daily nursing duties during and following the Japanese attack on Pearl Harbor.

Medical preparedness was an important aspect in the response to Pearl Harbor. High levels of collaboration and preparedness between civilian and military organizations played a key role in the response to the attack; however, nurses were excluded from these plans and discussions. Without preparation or training in casualty triage, disaster preparedness, or any of the expected sights and sounds of war, they could only turn to the skills they had learned as nursing students to manage this major disaster. Battlefield triage belongs exclusively in the realm of experienced military surgeons; however, the nurses frequently made decisions and recommendations that shaped the prioritization of the wounded men's care.

Nurses played a critical role in the care of the men wounded in Pearl Harbor. Despite the unexpected events of December 7, the nurses responded with professionalism, prioritizing duty before their own fears. Professional practice

boundaries between nurses and physicians were blurred, and nursing during the bombing required a high level of practice autonomy. Collaboration and cooperation among nurses, physicians, corpsmen, patients, and both trained and untrained civilians were essential. The following will detail the individual experiences of the Army nurses stationed at Hickam Field Hospital, Tripler General Hospital, and Schofield Barracks Hospital in support of the aforementioned themes. A list of all of the Army nurses included in this account is available in Appendix C.

Joining the Army

Between 1939 and 1941, the Army Medical Department had increased the number of doctors and nurses by over 800 percent, increasing the number of nurses both domestically and abroad.[2] The Army Medical Department was organized as a system of five general hospitals in the United States, two foreign duty hospitals (Hawaii and the Philippines), and 104 smaller station hospitals at major Army posts.[3] When a new nurse joined the Army, each nurse was encouraged to "familiarize herself with [army regulations] for by these her future life is governed. While it is one duty of a chief nurse to instruct her, it is the nurse's direct responsibility to study and understand "regulations" that she may measure up to all that is expected of her, and all that she hopes to be."[4] An article published in the *American Journal of Nursing* in May 1940 states,

> The Army nurse must be versatile, must think and act quickly in any emergency; must be willing and ready to do duty in diet kitchen, operating room, obstetrical, or psychiatric ward if and when needed. She must have confidence in herself and be able to make the doctor feel and recognize that confidence. Seldom is she closely supervised for it is assumed that any nurse acceptable to the Army Nurse Corps is conscientious enough, with pride enough in herself, her profession, and her training school to carry on to the best of her ability without supervision.[5]

Army nurses were expected to have mastered their profession, and be versatile and highly trained prior to entering the Army Nurse Corps. Although this was the expectation, there were no standardized trainings, orientations, or examinations to gauge the skill or expertise of the nurse, other than what was written in her application or stated during her interview. After the nurse had acquainted herself with the traditions of the Army in a domestic Army hospital, she would be eligible for foreign service, and many nurses elected to serve in Hawaii.

Prior to the United States' official involvement in World War II, many men and women had joined the armed forces out of a sense of duty or patriotism towards their country; however, this was not always the case. Second Lieutenant Anna Urda said that the older nurses would tell her about the wonders of overseas duty in beautiful Hawaii or the Philippines, and she wanted to see it for herself.[6] Second Lieutenant Gelane Barron was set to go to the Philippines, but was able to get her orders changed as she was engaged to an infantry officer headed to Hawaii.[7]

Most experienced nurses joining the Army Nurse Corps followed a path similar to Second Lieutenant Bertha Gilmer. Gilmer joined the Army Nurse Corps in 1940, mostly because her friends encouraged her and told her "it would be fun." She wrote a letter to the Army requesting to be enrolled, and after two interviews was sworn in at the rank of second lieutenant. Her first assignment was at Letterman General Army Hospital in San Francisco, one of the Army's five general hospitals. While at Letterman, she volunteered for foreign service and was soon transferred to Hawaii in May of 1941. She arrived aboard the Army transport vessel, *USS Grant*, alongside thousands of other servicemen

and several other nurses.[8] Gilmer was assigned to the surgical ward at Schofield Hospital, located in near the mountains of Oahu, several miles north of Pearl Harbor.

Other nurses joined the Army soon after graduating nursing school. Student nurses interested in military service could sign up for the reserves through the Red Cross. Second Lieutenant Elizabeth "Betty" Elmer joined the Red Cross as a student and elected to be in the Army over the Navy should her service be needed.[9] She graduated nursing school in August of 1939, and was assigned to the Army Nurse Corps in November 1940.[10] After a short tenure of domestic service, she was ready to transfer to the Philippines, but instead had her orders changed to Oahu only days before she was scheduled to depart. Oahu's need for nurses was greater than the Philippines due to the rapid expansion of the military forces and medical facilities in Oahu at that time.[11] Another large group of nurses, including Second Lieutenants Nellie Osterlund and Doris Backinger, arrived as recently as November of 1941, just three weeks prior to the attack.[12] These nurses, along with thousands of other servicemen, added to the flood of military personnel arriving in the Hawaiian Islands in response to growing tensions between the United States and Japan.

Thoughts of war were quickly forgotten as the nurses viewed the beautiful, idyllic island for the first time. When Second Lieutenant Elmer arrived in Oahu in October 1941, she glanced into the water as the ship pulled into the dock. She remembered seeing small Hawaiian boys swimming in the water, diving for the coins the passengers tossed into the water as the ship docked. She and the other Army Nurses aboard were met by head nurses Rockefeller and Clearwater, from Tripler Hospital and Schofield Hospital, respectively. Rockefeller escorted Elmer and the other nurses assigned to Tripler

Hospital to Fort Shafter, while chief Nurse Clearwater, armed with a handful of leis for the newly arriving nurses, welcomed them to tropical duty.[13]

Life as an Army Nurse

Life as an Army nurse in early 1940s Hawaii was, in a word, paradise. For many nurses such as Second Lieutenants Verla Thompson and Revella Guest, the Army Nurse Corps offered opportunities to do something different, see the world, and seek adventure in far off places. Thompson arrived in Honolulu in 1939 and worked in the maternity ward at Tripler Hospital. When her contract with the Army was completed, she decided to extend her time for another term because of all the fun she was having in beautiful, tropical Hawaii.[14] Second Lieutenant Rosemary Corrigan, an experienced Army nurse, remembers how the nurses would befriend each other and enjoyed their work. She stated that the nurses generally worked hard at the hospital, but they all looked forward to their time off duty, and enjoyed the swimming and dancing available on Oahu. [15]

A large part of the Army nurse's life off duty involved dating. As there was a small number of female officers and thousands of male officers in the Army, the women were highly regarded by the male officers. Second Lieutenant Elmer described her leisure time in Hawaii.

> I had dates waiting for me from the time I got off the ship—some of the fellows that I met on board [the] ship, and some of them that heard about the nurses coming. You know, I don't know how word gets around, but they had my name and called me up. I had a wonderful time. I would go to a formal ball at Hickam Field, and that was wonderful. Everybody was in long dresses, and all the officers were dressed up in their fancy uniforms. And I went to Waikiki swimming.[16]

On weekends off, the nurses could often be found visiting Oahu's many beaches, attending formal balls at the Hickam Field Officer's Club, or going out on a date with one of the many single military officers.[17] Second Lieutenant Celeste Brauer, who also worked on the maternity ward at Tripler, arrived in Hawaii in June 1940 and described her way of life prior to December 1941. "Everything was quite social. People had to dress for dinner after 6:00, the officers had to wear their white tuxes, and we always wore long dresses for dinner. In fact, you had to wear a long dress just to go to the movies…shows, if you were going on any of the bases. So we had a very, very nice social life." As tensions with Japan continued to increase, the military personnel were "on alert" for a month until December 6. Many believed that the Japanese ambassador's negotiations with the United States in Washington, DC, would improve the relationship between the United States and Japan.[18] To celebrate, there were several parties across the various bases, including an event at the Hickam Field Officer's Club, which many of the nurses attended until the early hours of the morning of December 7.[19]

Trauma Education on Oahu

On December 3, 1941, Dr. John J. Moorhead arrived from New York as a guest of the Honolulu Medical Society to provide a serious of lectures on traumatic surgery. Dr. Moorhead was "one of the nation's most distinguished practitioners of traumatic surgery," a fellow of the College of Surgeons, a founder of the American Board of Surgery, and a Colonel in the Medical Reserve Corps.[20] On Friday, December 5, Dr. Moorhead delivered a lecture entitled "Treatment of Wounds, Civil and Military" to an audience of approximately 300 physicians, many of which were Army and Navy medical

officers. This lecture stressed early and adequate cleansing of wounds using soap and water, the use of sulfa in preventing infection, allowing wounds to remain open after surgery, and keeping surgical dressings intact for an extended length of time following surgery.[21] Dr. Moorhead also gave a lecture the morning on December 7, bringing together several prominent surgeons in Hawaii to learn about trauma surgery.

While the Army and Navy physicians learned about casualty care, knowledge of war and the casualties it often brings was largely unknown to the nurses. Only those seasoned veterans had ever seen any war casualties. Some nurses had never even heard of shrapnel, and any training in the care of trauma or emergencies would have been learned from their experience as a civilian. The nurses had no formal training provided by the Army in the management of casualties, how to prioritize the care of trauma patients, the treatment of shock, or fundamentals of assessment in trauma. Little did they know, the nurses' expertise, knowledge, stamina, and fortitude would soon be tested in a way they had never imagined.

Pearl Harbor Attacked

The morning of December 7, 1941 was a beautiful Sunday morning with a clear, blue sky; it was a perfect day for swimming.[22] To the surprise of all but the Japanese attack force, the blue sky would soon be tainted with smoke and flames. At 6:00 a.m. on the morning of December 7, 1941, six Japanese carriers stationed 200 miles north of the island of Oahu launched the first wave of 181 planes set to destroy Pearl Harbor.[23] At approximately 7:55 a.m., the Japanese arrived flying low over Pearl Harbor and began dropping armor-piercing bombs, shallow water torpedoes, and a hail of bullets on Pearl

Harbor and the other military strongholds of the island of Oahu. This well-executed surprise aerial attack by the Japanese caught the United States completely off guard and unprepared. Although the Naval Base at Pearl Harbor was the primary target of the Japanese, the Army air bases also were heavily attacked and damaged to prevent any U.S. fighter planes from defending against the Japanese attack force. Had any U.S. bomber, fighter, or patrol planes been airborne, the primary Japanese aim of destroying the Pacific fleet would have been severely compromised.[24]

In northern Oahu, approximately ninety aircraft were on the ground at Wheeler Field at the time of the attack, but few were able to get off the ground to mount a counter attack. Twenty-five dive-bombers dropped approximately thirty-five bombs on the Wheeler Field, setting fire to two hangars and two storehouses. One bomb struck the mess hall, inflicting a large number of casualties. Once the planes dropped their bombs, they returned to strafe the flight line and the adjacent Schofield Barracks where the hospital was located.[25] Wheeler Field was attacked primarily on the first strike, and the second strike was focused on Hickam, although both bases were under heavy fire during both waves.[26] At Hickam Field, heavily casualties occurred after a bomb hit and collapsed the barracks. As Fort Shafter did not have an air force, it escaped the worst of the bombing, but did experience damage from machine gun fire, and fall out from anti-aircraft shells fired from the base.[27]

During and immediately following the two waves of the Japanese aerial attack, hundreds of wounded and dying men were rushed to several medical facilities including first aid stations, mobile hospitals, aboard ship sick bays, and medical dispensaries. These patients were quickly transferred to the military hospitals on or near the Naval and

Army bases: the Navy Hospital at Pearl Harbor, Tripler General Hospital, Schofield Hospital, Hickam Field Hospital, or aboard the hospital ship *USS Solace*.[28] On radios across Oahu, everyone heard the same message. "Attention. This is no exercise. The Japanese are attacking Pearl Harbor. All Army, Navy, and Marine personnel are to report to duty."[29] The chief nurses at the various hospitals called the nurses' quarters, woke the nurses who were still sleeping, and instructed them to report to the hospital immediately. The nurses quickly dressed in their white uniforms and reported to their units to begin receiving casualties.

The Nurses of Hickam Field Hospital

Hickam Hospital was located at Hickam Field, one of the Army airbases. Hickam Field was the newest airbase, and was completed and officially activated on September 1, 1938. Hickam Field was the principal army airfield in Hawaii, and was the only air force station large enough to land the B-17 bombers. This heavy bomber B-17 aircraft (also known as the flying fortress) became part of the Army Air Corps fleet in 1935 and was the first four-engine heavy bomber developed for the U.S. Army Air Corps.[30] To protect against sabotage, all of the planes at Hickam were parked wingtip to wingtip to make them easier to guard, however this left the planes vulnerable to an air attack.[31]

Hickam Hospital was a brand new hospital located only three blocks away from the flight line (the area where the aircraft are parked and serviced), next to the Air Corps headquarters building, and separated by only a fence from Pearl Harbor.[32] It stood three stories high and was constructed from reinforced concrete.[33] The hospital also had screened porches around most of the perimeter to allow the tropical Hawaiian breeze to flow through the building.[34] The ground floor was primarily home to administrative offices, the second floor housed the operating theater and clinic, and the patient wards were located on the third floor.[35] Behind the hospital were the enlisted medical personnel barracks, a kitchen, and the mess hall.[36] The small thirty-bed hospital was opened on November 17, 1941, and was staffed with three nurses from Tripler Hospital and three from Schofield Barracks Hospital, all of whom were permanently reassigned to Hickam.[37]

Of the several nurses working in the Army hospitals on Oahu, only six were fortunate enough to be stationed at Hickam Hospital, including nurses Monica Conter and

Kathleen Coberly. Second Lieutenants Conter and Coberly, both nurses in the U. S. Army Nurse Corps, started their Army careers at Walter Reed Hospital in Washington, D.C.[38] While in Washington, Second Lieutenant Conter was chosen to be pictured in a military nurse recruiting campaign, and was featured in posters and newspapers.[39] In a 1982 interview, she recalled her role as an official model for the Army Nurse Corps during the 1930s and 40s: "My picture appeared all over the country when the first reserve nurse was called into active duty. I got to meet all of these famous people at a lawn party at the White House. It was very exciting... [But at the time] I was dying to get overseas, and I kept bugging them about when I was going to get to Hawaii, the Island."[40] Conter's close friend, Coberly, had originally requested foreign duty in the Philippines, but was asked to go to Hawaii when another nurse was unable to go.

Coberly and Conter travelled together on the *USS Mariposa* from San Francisco to Hawaii in July 1941 with a large group of Army personnel.[41] Conter's first impressions of Hawaii were unforgettable. She wrote, "I found Oahu to be all I had ever hoped or dreamed it would be—romantic, beautiful, scenic, and well, just everything! I loved the ever blooming flowers, the ideal climate, the world famous drives, the pali (cliffs), the old volcanic mountains, the delightful sea and the beautiful moonlit nights.[42] Joining Conter and Coberly were Sally Entrikin, Winifred Mallet, Irene Boyd, and Chief Nurse Annie Fox. Lieutenant Annie Fox joined the Army Nurse Corps in 1918 and served in World War I as well as in the Philippines in the late 1920s. Lieutenant Fox came to Hawaii in May 1940 and worked at North Sector General Hospital at Schofield Barracks. Later she transferred to Hickam Hospital where she was promoted to Chief Nurse.[43]

These nurses would be shocked on December 7, as that day was a far cry from their usual routine. In fact, just the night before, both Conter and Coberly had dates at the Pearl Harbor Officer's Club.[44] Monica Conter and her date decided to walk to the harbor shortly after arriving at the club. She remembered, "It was the most beautiful sight I've ever seen. All the battleships and the lights with the reflection on the water. We were just overwhelmed. I'll just never forget it."[45] As Hawaii was thousands of miles removed from Japan, the mainland United States, and the raging war in Europe, many of those living in Hawaii felt completely safe on their secluded tropical island. Coberly, who opted to stay at the Officer's Club and dance, recalled her dance partner told her, "And you know, this is so beautiful. They talk about the Japanese but [they] could never get in here."[46]

The Japanese Attack at Hickam Field

The morning of December 7, 1941, Second Lieutenant Conter reported for duty at Hickam Field Hospital. She began her daily routine on the ward, caring for the dozen or so patients recovering from minor illness—among them, patients with cellulitis and pneumonia. She and fellow Army nurse Irene Boyd were the only two nurses on duty early that morning. Coberly and Chief Nurse Annie Fox had the day off; Second Lieutenant Sally Entrikin, was scheduled to arrive later that morning, and Second Lieutenant Winnifred Mallet was just heading back to her quarters to sleep after working through the night.[47] No one expected what would happen next.

The Japanese flew low over Hickam Field, guns blazing, a few minutes before 8:00 a.m. on December 7, 1941.[48] Coberly and Entrikin were in the nurses' quarters a

few blocks from the hospital when the bombing began. Both watched the attack from their bedroom window, facing Pearl Harbor. From the window, Coberly could see the planes, painted with the rising sun, and the smoke rising from the harbor. She was terrified. The phone rang, and her date from the previous evening said, "Honey, we're at war," and all the phones went dead.[49] As Entrikin watched the scene unfold out her window, all she could think about was her twin sister, Helen Entrikin, who was a Navy nurse at the Naval Hospital Pearl Harbor.[50] Coberly, frightened and numb from the shock of what she had just witnessed, quickly threw on her uniform just before one of the Army officers arrived to take her and Entrikin to Hickam Hospital.[51]

Others, including the chief nurse and physicians, were equally surprised and unprepared. Chief Nurse Annie Fox was about to enjoy her morning cup of coffee when the Japanese arrived, and she rushed to the hospital under fire. Lieutenant Fox would not see her coffee cup again for several days.[52] The medical officer on duty that day, Captain Andre D'Alfonso, was three blocks away on the flight line. He was patiently awaiting the scheduled arrival of the American B-17 pilots to spray them for bugs. Instead, he arrived at the hospital in an ambulance, caring for the casualties occurring on the flight line.[53] Captain Frank Lane, the acting hospital commander, ran the four block distance from his home to the hospital to provide leadership and direction to the nurses and medical personnel at Hickam.[54]

Meanwhile, Second Lieutenant Monica Conter and Irene Boyd were already on duty at the hospital. Conter remembered hearing a plane overhead losing altitude and feared it might crash. According to her, she "ran out on the porch overlooking the [airfield]…about that time, all broke loose…I saw the rising sun on these planes that

were flying low."[55] She went downstairs and found Captain Lane, who had by that time arrived at the hospital, on the phone. Lane confirmed Conter's fears and instructed her to evacuate the patients from the third floor to the first floor, where they believed everyone would be safer from the bombing and strafing. Conter and a corpsmen went upstairs to begin to evacuate their patients to the first floor. They walked into the elevator and the electricity went out. All of the clocks froze at 7:55 a.m., marking the beginning of the attack.[56] Conter continued to evacuate her patients and make room for incoming casualties. Patients that were well enough to leave their beds were discharged. Some stayed to helped with the incoming casualties rather than attempting to return to their duty station during the attack. [57]

The Japanese attacked Hickam Field with both machine guns and heavy bombs in two waves, about one hour apart.[58] Shells ricocheted off the outer walls of the hospital as the sounds and smells of war permeated the air.[59] In the chaos, Conter remembered hearing phrases and words she had never heard before like "strafing" and "shrapnel." [60] Later, she would learn strafing referred to the attack-style used by the Japanese against Pearl Harbor, featuring repeated machine-gun fire and bombing from low-flying aircraft. Shrapnel is the metal casing surrounding an explosive. When the Japanese bombs exploded, the casing was ripped apart, traveling extremely quickly through the air, and was later found imbedded in the bodies of the casualties.

Hickam Hospital was quickly overwhelmed with casualties. Within ten minutes of the first gunshot, the casualties started to arrive at Hickam. Conter was downstairs on the main level, trying to triage the seemingly endless influx of the critically wounded. Although the first floor was safer, it was not set up as a patient ward. There were no beds

on the ground level for the injured, as the hospital's ward was set up on the third floor. Patients lay strewn across the ground, or propped up against the wall.[61] Conter remembered the scene, its noise and confusion, and the staff's lack of preparation: "All of these patients were coming in, and we were putting them all out on the porch. There were some who were killed, and we were putting them out in the back yard behind the hospital. They were just beginning to stack up and the noise was terrible. I can't tell you how terrible the noise was."[62] The nurses, doctors, and corpsmen at the hospital began providing first-aid as quickly and efficiently as possible to the casualties, but without any training as a team in handling a mass casualty scenario, chaos and confusion often prevailed over order. The doctors and nurses "were just in a daze, doing things almost automatically."[63]

Staff arrived from across the base to help the wounded men. All medical personnel, including a total of sixteen doctors, six nurses, and several corpsmen arrived to help, including those who had just been relieved from night duty.[64] Three civilian Filipino orderlies ran to the hospital during the attack in order to report to their jobs.[65] Regardless of their training or rank, doctors, corpsmen, and nurses all performed the same job: giving morphine and tetanus; applying tourniquets, splints, and bandages; and tagging patients with identifying information and any treatment they had received.[66]

Communication during the attack was problematic. All the phones were busy with people calling for help. A medical officer called Tripler Hospital at Fort Shafter for support, but they had difficulty convincing those at Tripler that the attack was not a drill.[67] Coberly remembered overhearing one of the doctors requesting supplies:

> … I heard one of our doctors calling Fort Shafter asking for ambulances, gas masks, helmets, supplies, everything. And then he listened. And there was this

> burst of profanity and then a plea for help. He said, "Please. We are at war. The Japanese are bombing the hell [sic] out of us down here. We're sending patients to Tripler. Now we need ambulances. We need help; we need gas masks and helmets. This is not a false alarm. We're not just having maneuvers…this is the real thing.[68]

Surviving the Surge of Casualties

Soon after the end of the first attack, the wounded started to arrive at the hospital by any means possible; many desperate for immediate help. A severely wounded soldier arrived carried on a door, barely conscious, and with severe wounds to his abdomen and hip. Captain Lane knew the patient was probably beyond hope, but sent him up to the operating room anyway. Dr. Lane quickly assembled a surgical team of five, consisting of himself, Dr. Garret (another Hickam physician) and half of the hospital's nursing staff, Fox, Coberly, and Boyd. Together they prepared for and assisted with the emergency surgery.[69]

The second raid began as the team operated. The bombs continued to explode with unimaginable force. The team desperately tried to focus on completing the surgery in front of them, knowing that more casualties were most certainly awaiting their attention downstairs. Without warning, a terrifyingly loud 500-pound bomb exploded on the front lawn of Hickam Hospital, about sixty or seventy feet from the building.[70] The surgical team took cover under the operating tables as the bombs fell.[71] Kathleen Coberly later recalled:

> All at once there was this terrible noise and the building shook and the windows were shattered there in the operating room. And it seemed like the whole building was going to tumble down… We heard the plane and then another noise and the hospital shook again. Finally when we got outside to look around there was a crater, a huge crater on one side of the hospital and then another crater on the other.[72]

In the midst of the confusion, the patient died from his injuries on the operating table.[73]

Downstairs, everyone felt the force of the bomb explode next to the hospital, and took cover under whatever they could find. Conter hid under the lid of a garbage can in an attempt to protect herself in case the building started to collapse. The bomb exploded with such force that it left a thirty-foot crater next to the right wing of the hospital.[74] Fortunately, the reinforced concrete structure escaped with little to no damage. The bombs continued, seemingly without end. With the boom of each exploding bomb and the buzz of low-flying planes, nurses and patients alike would drop to the floor to protect themselves.[75] The noxious fumes from of the explosions filled the air inside the hospital, and a number of people yelled "Gas! Gas!" adding to the panic and confusion.[76] They feared that gases from the bombs might also be lethal, and the nurses did not have gas masks. Instead, they used moist towels as a makeshift gas mask until actual gas masks and helmets were distributed later that day. After one of these close calls, Second Lieutenant Monica Conter turned to her close friend Coberly and asked, "'Do you suppose they know back in Apalachicola, FL where I'm from that we're at war?' [Kathleen responded], 'Monica, the whole world knows we're at war.'"[77]

Fortunately, Hickam Hospital sustained little damage. Besides the large bomb crater on the lawn, there were a few machine-gun bullet holes in the screen of the hospital porches and some bomb fragments on the porch floors.[78] The majority of casualties were concentrated along the flight line, in the rubble of the large barracks, and near the mess hall, all of which were heavily bombed and strafed.[79]

The surgical team abandoned the operating theatre and returned to the main casualty receiving area, just outside and in front of the hospital. Hundreds of casualties

continued to arrive, congesting the hospital far beyond its capacity. The Hickam medical staff soon realized that continuing to provide any care beyond first aid would be impossible. As they had just learned, surgery would occupy several doctors and nurses who were very obviously needed to give emergency treatment to others.[80] Captain Lane remembered feeling frightened by the attack, but his fear was secondary to the frustration he felt due to "[their] inadequacy to properly care for the seemingly endless stream of injured arriving at the hospital, with no indication of when the attack would be over."[81]

Across Hickam Field, people called the hospital for ambulances to respond to various parts of the base.[82] As Hickam Hospital had only a small number of ambulances, more ambulances were desperately needed. In response, the Emergency Medical and Ambulance Committee at Kaahumanu School, located near Pearl Harbor, mobilized its resources. Trained volunteers placed prepared casualty frames in more than one hundred laundry, lumber, and delivery trucks, which had been repurposed as ambulances. Within half an hour of the start of the attack, about half of these trucks were dispatched to Hickam, and the other half headed to Pearl Harbor. As all of the drivers had received first-aid training from the Red Cross, the drivers were able to provide immediate first aid on the scene prior to transporting the wounded to Hickam.[83] To save time and space, the wounded were stacked on top of each other in the back of ambulances for the short ride to the hospital. Every available airman, both wounded and healthy, worked to transport the injured to the hospital. One soldier helped carry injured men to the hospital, despite having shrapnel embedded in his back, and another carried a wounded man to the hospital despite having a broken arm.[84]

The scene in front of the hospital was unforgettable. The wounded men and their escorts swarmed the front lawn. The hospital driveway was full of trucks and ambulances. James Duncan, a soldier who helped carry the wounded to the hospital, remembered seeing approximately fifty people in front of the hospital with a variety of injuries, from minor to life threatening. A physician was in front of the hospital, attempting to triage the casualties and prioritize care appropriately. "He was deciding who to treat and who not to treat, who was dead, and who was going in for treatment."[85] The living and treatable were placed along the porch of the hospital or lifted into trucks and ambulances, and the dead and dying were stacked behind the hospital. Periodically, one of the medical officers would check the pile of dead bodies to make sure there was not any living among the dead.[86]

It seemed as though everyone was covered in blood. There was so much blood, it was difficult to tell the injured from the unscathed, so the doctors checked everyone who came to the hospital for injuries. Even though James Duncan claimed he was unharmed, the physician had him undress to assess his skin as his clothes were covered in another man's blood. Some injured soldiers ignored or hid their own injuries so they could continue to help others that they believed were more severely injured. The shock and fear surrounding the event kept many from feeling the extent of their own injuries.[87]

While the doctors managed the flow of casualties in front of the hospital, the nurses cared for those inside. They worked tirelessly relieving the pain of the injured and dying soldiers by giving pain medication injections, using whatever supplies were available, and prioritizing treatment above cleanliness and sterility.[88] Morphine was prepared by the pharmacy in syringes holding ten doses each. [89] As Conter recalled:

> In the meantime, we were giving morphine. They had some sterile water from somewhere, and they gave us 10cc syringes. We would fill those… and go down that porch giving shots…trying to stop the hemorrhaging and the pain…we would give it just as fast as we could… We told them not to let anyone give them another shot…It was a thing to do in an emergency, which is an understatement. Just going down the porch giving those ten shots with a 10cc syringe…We went in to fill up and came back out where we left off and gave more…that's how I reacted and everybody else was doing it. That was the only thing we knew to do in the middle of all of this. We hoped we were saving their lives, keeping them from pain, and maybe stopping some of the hemorrhaging.[90]

The patients continued to line up inside and outside of the hospital, and the medical staff was quickly overwhelmed. Second Lieutenant Conter later reflected, "[The soldiers] were just butchered… We just had to line them up."[91] The nurses prioritized pain relief and control of bleeding for the hundreds of patients lined up on the porch. Army pilot Lieutenant Philip Sprawls watched the nurses work that day. "They laid victims on the porch floor for first aid. Many died, even while she was extracting the hypo needle! The blood actually ran on the floor. She showed me where it came up over the soles of her shoes."[92]

According to varied accounts from soldiers, doctors, and nurses who were present during the attack, the scene at Hickam was utter chaos. Second Lieutenant Conter described feeling helpless, inadequate, and overwhelmed, not knowing where to begin.[93] A patient arrived with the top of his head gone, but somehow still moaning and gasping.[94] Another walked in with his left arm completely gone as he waved with his right, and managing a smile, made a joking remark. Still another arrived with a large piece of shrapnel lodged in his left leg and his left arm still barely attached to his shoulder.[95] The porch was literally stacked with casualties. Patients beckoned to the nurses, begging them to take care of their fellow soldiers, ignoring their own pain and injuries. Men died

in a pool of blood as those around them mourned their loss. The nurses walked by these dead men, helpless to save those who had expired, and with no time to comfort the grieving. A patient with his foot missing sat holding a cloth tourniquet near his knee and asked, "Nurse, don't I let it bleed about every few minutes?" All around, voices called out for water, and there was no water. The dead were strewn throughout the hospital, their "bodies were mangled masses of bone and bloody charred tissue—all too awful to describe. Everything around [them] was burning."[96]

With several competing priorities, the Hickam nurses struggled to discern who to give care to first. With no standardized training in triage, trauma care, or first-aid, the nurses could only rely on their limited and varied trauma training and experience as student or civilian nurses. Without the skills to identify and prioritize the immediate conditions first, the nurses cared for those that caught their attention, providing the best care they could for the patients in that moment.

The nurses were so busy giving what treatment they could that they had no time to document their care or identify the wounded. Instead, they dressed severe wounds, provided morphine and tetanus injections, and told patients not to let anyone give them another shot, hoping that would be enough.[97] Of course this technique was not reliable. One injured soldier remembers getting a tetanus shot in the ambulance and was marked with a cross on his forehead with Mercurochrome, a red-orange topical antiseptic, to indicate he had received a tetanus injection. When he arrived at Hickam Hospital, his forehead was washed, removing the mark, and he received a second injection before being evacuated to Tripler for more advanced care.[98] When possible, the nurses

attempted to identify their patients and document their care before they were transferred to Tripler, but there was no consistent form of documentation until that evening.[99]

The small team of doctors and nurses equipped to care for thirty patients at a time was overwhelmed by the number of casualties dropped on the hospital doorstep. Eventually, there was physically no more space to unload casualties at Hickam Hospital. A nurse and a doctor came out to the front lawn of the hospital shouting, "don't unload any more, we are full…Take them to Tripler! Take them to Tripler!"[100] As the staff had no way of knowing how long the air raid would last, the team refocused their efforts, and converted into an evacuation hospital. The wounded continued to receive first aid care only, and were quickly evacuated the five-mile distance to Tripler Hospital or the civilian Queen's Hospital in Honolulu.[101] Slowly, the environment at Hickam Hospital became more organized. Available vehicles began a regular circuit to evacuate casualties at the flight line, mess hall, and barracks. Other ambulances made regular rounds between Hickam and Tripler Hospital, evacuating the seriously wounded to Tripler after receiving first aid at Hickam.[102] Hickam Hospital became a revolving door for many of the injured soldiers as the nurses and doctors quickly triaged, bandaged, and medicated the injured, then arranged transportation to a larger facility. Casualties continued to be evacuated to Tripler until early afternoon.[103]

Nursing and First Aid Care at Hickam Field

A first aid textbook written in 1943, shortly after the bombing of Pearl Harbor, detailed the type of care wounded soldiers would have received. Although the text was published after the Pearl Harbor attack, it is reasonable to assume that the knowledge of

first-aid care detailed in this text was similar to what was known and performed by the staff at Hickam. At Hickam Field, most injuries were caused by the blast or debris from the bombs, or crush injuries from structural collapse. Multiple fractures, hemorrhage, and extensively torn muscles were commonly occurring injuries, with many going into shock from pain or blood loss.[104] The rapid detonation of the half-ton bombs caused the steel jacket to be blown into small, sharp fragments (shrapnel) at a high enough velocity and rotational force to carry them over 1500 yards. The combination of the forward and rotational momentum would cause severe damage to human tissue and bone with little external evidence of injury, with an estimated one-third of those wounded suffering mortal injuries. Those standing upright during the blast were the most likely to be injured, with wounds to the legs being most common. The recommended first aid treatment was to splint any fractures or suspected torn muscles, provide warm blankets, sedate with morphine, and rest. Those incurring more serious injuries involving the abdomen or chest would need surgical treatment immediately to manage any organ damage or internal bleeding.[105]

Wound care at this time heavily emphasized protection from bacteria and bleeding control. Direct pressure was applied for two to three minutes before bandaging to control bleeding. For most wounds, nurses would apply a pressure dressing using a dry, sterile dressing, a freshly ironed handkerchief, or a towel.[106] If a pressure dressing was inadequate to control the bleeding, a tourniquet was applied to either the upper arm or thigh, with enough pressure to compress the artery against the bone. The tourniquet should have been loosened every thirty minutes and the wound reassessed for bleeding. If the bleeding had decreased, direct pressure to the wound and a pressure dressing could

be applied, restoring critical blood flow to and from the injured extremity. Wounds were not irrigated due to a high risk of re-bleeding; rather, they would sprinkle 3-10 grams of sulfadiazine into the wound, cover it with a dressing, and prepare the patient for transport to the hospital or await surgery if needed.[107] Sulfa containing compounds were frequently used at Pearl Harbor as the sulfa kept bacteria from multiplying, allowing the body's natural immune system to kill any bacteria that may have infected the wound.

Tetanus and other infections were a chief concern of those providing wound care; however, inside the war zone, sterility was not always possible. All soldiers would have received a tetanus immunization prior to entering the combat zone, and those with injuries from shrapnel, bullets, or other metals were given a booster vaccine. Other wound care techniques included packing and dressing gaping wounds instead of closing them with sutures. This allowed the sterile packing material to absorb infectious drainage from the wound and decreased the incidence of wounds colonized with anaerobic bacteria, including the often-fatal gas gangrene. Unfortunately, the Hickam nurses worked under less than ideal circumstances. There was no electricity and no sterilization abilities for the needles they were using for injections.[108] The soldiers' cries for water went unanswered since the water supply was reportedly poisoned.[109] The nurses resorted to wiping the needle and the site with alcohol prior to administering the morphine injection.[110]

Secondary to controlling bleeding, nurses prioritized the prevention, recognition and treatment of shock. The nurses understood shock as failure of the peripheral vascular system, resulting in inadequate circulation or shock, due to a loss of blood. This could be caused by loss of one to two quarts of blood resulting in pallor, mental status changes,

gasping respirations, increased heart rate, and a profound drop in blood pressure. Shock was prevented through controlling bleeding, immobilizing fractures to prevent further bleeding from movement, and warming the body with blankets and warm oral fluids. Pain control was also an important tenet of shock prevention. Pain was understood to worsen shock, so morphine was given not only to relieve pain, but also to improve a soldier's chance of survival. Morphine was given intramuscularly in doses of a quarter to half grain, or 15-30mg. If a soldier showed early signs of shock, he would be positioned with his legs above his head and given oral fluids immediately unless he needed an emergent operation. As most patients required surgery and the water was reportedly contaminated, it is unlikely many soldiers received any oral fluids. Solutions with 3%-5% glucose or 0.9% sodium chloride were given either subcutaneously or preferentially, intravenously. Intravenous fluids were preferred because glucose solutions could provide some nourishment, and the fluids aided in stimulating the kidneys to remove toxins from the body. However, soldiers with severe shock saw only temporary improvement from IV (intravenous) fluid administration as the solution quickly left the peripheral vascular system and diffuse into the surrounding tissue, causing edema. For soldiers suffering from severe shock, blood products including fresh blood plasma were key in preventing mortality from shock and massive hemorrhage. The technology of "banking" blood products was newly introduced during this period, allowing them to be safely collected and stored prior to administration.[111]

Crush injuries and compound fractures plagued those injured at Hickam Field. Crush injuries were treated by immediately compressing the affected tissue with an elastic bandage with ideally 40-60mmHg of pressure. This would compress the tissue

enough to decrease swelling, but would allow blood flow to the injury, preventing gangrene.[112] Compound fractures were best treated in the operating theater; however, first aid care involved splinting the affected bone, reducing the fracture if possible, applying sulfonamide powder into the wound, and covering with a dressing until surgery could be performed.[113]

Ingenuity and Service in a Crisis

Within hours of the bombing, Hickam Hospital's supplies were quickly depleted, and the medical staff had to improvise. Hickam Hospital was stocked with supplies to care for only thirty patients, and had no stockpiled supplies immediately available. Doctors ran out of local anesthetic for sutures, and instead instructed conscious patients to drink whiskey.[114] The Mayor of Honolulu sent twenty cases of whiskey to Hickam, and the Hickam Officer's Club was also well stocked with liquor.[115] Tourniquets were fashioned out of belts, gas mask cords, and pistol shoulder straps.[116] Bandages and other supplies were sent from Tripler.[117] World War I vintage gas masks and helmets appeared later that day and became the nurses' constant companions.[118]

Although medical supplies were running low, the staff's main concern was the lack of electricity and clean water. Without electricity, equipment could not be sterilized and reused. Clean water arrived between the first and second attack, but it soon ran out since the water supply on base may have been contaminated.[119] Hickam did not have the proper equipment or facilities to quickly determine whether or not the water was safe to drink. Improvising, Captain Lane ordered some soldiers to capture a couple of stray dogs to test the water. The dogs were force-fed about a gallon of water each and kept in a

room for observation. After a few hours of watching the dogs, Captain Lane concluded the water was safe to drink, and his findings were confirmed the next morning once the water could be officially analyzed.[120]

Volunteers were integral to the work at Hickam Hospital. After the immediate threat of attack had past, Hickam Field began to evacuate all women and children from Hickam to a safer location off the base. About thirty wives begged to be allowed to remain on the base, as several of them had husbands who were killed or wounded during the attack, and did not want to be separated.[121] These volunteers, in addition to others that had been sent by the Red Cross, arrived at the hospital and started to make more bandages.[122] Replenishing the hospital's bandage supply was a top priority, as no one knew if the Japanese would be returning for another attack or if they may try to invade the island. The volunteers stayed and helped at the hospital for several days, sleeping on mattresses in the mess hall. [123] Volunteers also worked in the kitchen and mess hall, which released other military personnel for other assignments.[124] While awaiting the results of the "dog experiment," water arrived in cans so the mess hall could be operational. [125] That afternoon, a steady stream of hungry men arrived at the hospital as it was the only operational mess hall on base. The small mess hall designed to feed around 100 people fed over 1,000 that day.[126]

Within hours, life at Hickam Hospital had changed dramatically. Although the men were eventually relocated from the ground floor to the hospital's ward on third floor, the nurses had little time off. Conter remembered that the first night after the attack, she went to her room only briefly -- to change her uniform – and then returned to work that night. Due to fears of an invasion or another attack, mandated blackouts forced the

nurses to work by flashlights that were dimmed by blue cellophane. No one was allowed to light a cigarette. Blankets were tacked up over the windows, which were later painted black, to keep any light from escaping.[127]

Cooperation and Collaboration

The nurses remained in the hospital around-the-clock for about three weeks after the attack, and worked with physicians to care for their patients. Cooperation and collaboration were essential to their work. Coberly remembered, "…bandaging a patient and someone [was] holding things and holding the light and assisting me and finally I looked around and there he [was], a doctor who had gone over on the same ship with us, and he was on duty at Schofield [Hospital] and I said, 'Oh, I should be assisting you.' And he said, 'That's all right. You just go ahead. You're doing fine.'"[128] Professional boundary lines blurred as doctors, nurses, and corpsmen did all they could to help the wounded and each other.

Eventually two Red Cross nurses were sent to Hickam Hospital to allow for the other six nurses to rest. Second Lieutenant Coberly remembered only being able to go to quarters if she were escorted; and would bathe, pick up fresh clothing, and return to the hospital to work during the day and sleep in the radiology room at night.[129] Second Lieutenant Conter confided in one of the Army pilots, Lieutenant Phillip Sprawls that neither she nor any of the other nurses had rested in over thirty hours.[130]

Duty Before Fear

In addition to the physically and emotionally demanding work tasked to the Hickam nurses, they were also under constant psychological stress, fearing the Japanese would return and launch another air attack or invade the island.[131] The nurses were instructed to only give their name, rank, and serial number if the Japanese captured them alive.[132] During the initial attack on Oahu, Second Lieutenant Coberly was so frightened that she asked the hospital chaplain to baptize her during the raid.[133] Some of the nurses had designated a different medical officer to kill her if the Japanese were to invade and capture Hickam Field.[134] Each time a heavy door would slam shut, people would fall to the ground, momentarily thinking the loud noise was an explosion.[135] Despite their fears for their own safety, the nurses continued to do their duty at the hospital and provide care to their patients.

Everyone, including the nurses, was on edge, especially those guarding Hickam Field the night after the attack. The sounds of gunfire continued throughout the night, and the soldiers could not differentiate between the sounds of friendly or enemy aircraft overhead. Each time they would hear gunfire or an approaching plane, they feared the Japanese had returned. With each false alarm, patients and staff would run down two flights of stairs, clutching their gas masks and helmets, to the first floor where they believed they would be safer. Eventually, the patients and hospital staff just stayed the night on the ground floor, sleeping against the wall. By the next day, some private rooms in radiology were made available for the nurses to sleep at the hospital. Conter remembered, "I just kept my uniform on and took my shoes off because we expected the [enemy] to come back any minute…my heart was pounding so hard that the bed was

shaking."[136] Staff and patients were both apprehensive and fearful of more raids or a Japanese invasion.[137]

Coping with Tragedy

Although the nurses were both frightened and exhausted, they coped by talking about their experiences with family members back home and others who had lived through the bombing. Conter attempted to send a telegram the day after the bombing to inform her family she was safe, and followed it up with several letters.[138] In one letter written December 22, after detailing her experience during the air raid, she concluded with, "I do appreciate peoples' interest in my welfare. But tell everyone I wouldn't have missed it for anything. You know I always loved activity and excitement. For once, I had enough."[139]

Over the next several days, more minor cases of shrapnel injury trickled into the hospital for treatment, and the hospital began to function normally. By December 19, the nurses were able to move into their new quarters behind the hospital and resume eight-hour shifts, thanks to the Red Cross nurses sent to supplement their staffing.[140]

After Pearl Harbor was bombed, Oahu was placed under martial law, and the carefree days many had grown accustomed to became fond memories. As the days passed, the nurses, officers, and soldiers began to adapt to a new routine, as they adjusted to strict wartime rules and regulations. For the nurses, martial law meant censored mail, restrictions on drinking alcoholic beverages, and curfews. Conter recounted that reality, describing to her family the inability to wear her new clothes, not being able to drink any alcohol, the military imposed curfew after 5:30 p.m., nightly blackouts, and the shortage

of silk stockings on the island.[141] On December 22, Conter reported "we are able to take a deep breath once again, but you should really see me hurry and get into my uniform, helmet, and gas mask when the air raid alarm is sounded."[142] In a letter later published in the *American Journal of Nursing,* Conter succinctly described the change that came over Hawaii after the bombing. "The climate, flowers, scenery, nights, et cetera, are still just wonderful but instead of wearing hibiscus and leis, we are wearing little tin hats and gas masks."[143]

The Hickam Field nurses were able to provide emergency care and first aid to hundreds of soldiers during and immediately after the air raid. Instead of being caught up in the horrors of war she had witnessed, Conter focused on providing the best care she could to as many men as possible. In a letter home on December 17, 1941, Conter described her overall reflections about that day. "During my whole career, I have never had such personal satisfaction with my work as I did that day. All—everybody—put forth and with success."[144] Despite the trauma of that day, Second Lieutenant Coberly stated, "I saw many of my friends come in wounded. But it wasn't horrible to me—I was simply grateful that I could help them."[145]

Among those wounded in the Army, Hickam Field suffered the majority of the casualties, with a total of 139 men killed and 303 wounded.[146] The heroic and collaborative actions of the medical corpsmen, physicians, and six nurses saved hundreds of lives, and eased the suffering of those mortally wounded. The decision to evacuate patients to the larger Tripler General Hospital allowed nurses to focus on pain management, first aid, and controlling bleeding. On December 7, 1941, an American flag was prominently displayed on the front lawn of the hospital. After the Japanese dropped

their bombs, one Japanese plane returned and shredded the flag with its bullets.[147] This flag now serves as a reminder to never again be caught unprepared.[148]

The Nurses of Tripler General Hospital

Tripler Hospital was the primary Army medical facility on Oahu, and received all of the casualties from Hickam Field on December 7. The Army nurses at Tripler Hospital were soon inundated with casualties from Hickam, but luckily Tripler had been expanded and renovated, and was able to absorb the influx of the wounded. By December 1, 1941, Tripler Hospital had a bed capacity of 900, with the ability to expand to 1200 beds in an emergency. Despite the expanded physical space, the Army had not yet adequately expanded the medical staff. Even with the addition of over forty new nurses (over half of the nursing staff at Tripler), the seventy-six nurses working at Pearl Harbor in December 1941 was grossly under the 163 nurses authorized by the Army to staff a facility of this size.[149]

As the military presence in Hawaii continued to grow, Tripler Hospital had to be expanded to meet the needs of the growing population of troops. Tripler Hospital was established in 1907 to serve as the post hospital for Fort Shafter, located in northern Honolulu, with a clear view of Pearl Harbor about five miles to the west.[150] As the population of servicemen expanded at Fort Shafter, Tripler also had to expand to meet the medical needs of this growing population. The expansion process began in 1913, just six years after Tripler was originally constructed. Tripler needed at least 300 beds, so the original small structure was expanded to include a larger mess room, a new kitchen, and three additional wards. This expansion increased the size by sixty beds, but there was no staff added to cover the additional bed space.[151] In 1914, six additional buildings including a dedicated officers' ward and nursing quarters were added.[152] The quarters

were completed in May of 1916 and were large enough to house eighteen to twenty nurses.[153]

By 1930 the hospital had grown to three rows of buildings. The front line consisted of the clinic building, the administration building, the operating pavilion, a set of quarters for an obstetrician, the nurses' quarters and a double set of noncommissioned officers' quarters. The second line consisted of ward buildings, the mess hall, and the kitchen. The third row was the post exchange, noncommissioned officers' barracks, storage, and other hospital support services such as the linen room. Additional buildings, barracks, and wards were added and renovated throughout the 1930s, including additional patient wards, kitchens, operating pavilions, clinics, a dispensary (pharmacy), receiving office, laboratory, dental clinic, and more barracks. The lack of long-term planning is evident with the haphazard modifications of Tripler, as it was expanded mostly by additions to the side or rear of the hospital. By 1935, even more funds had to be invested to update and repair the hospital due to termite damage and unsanitary conditions.[154]

Another massive expansion and renovation project began in June of 1941. At its completion on December 1, 1941, twenty-eight new buildings were added, bringing the total number of buildings to fifty-five. The hospital complex included barracks, fifteen new wards bringing the total to twenty-eight wards (and 433 additional beds), a newly constructed recreation building, a receiving building for patients to be admitted to the hospital, and a new mess hall.[155] The recreation building was designed as a theater and could accommodate 300 people. Six wards were modernized, including the maternity ward where Second Lieutenant Verla Thompson worked, with new state-of-the-art venetian blinds and fluorescent lighting fixtures. The operating pavilion was remodeled

and fitted with three modernized operating theaters and the nurses' quarters were enlarged to accommodate the additional forty-three nurses added since April. Every inch of this new space would be needed on December 7.[156]

Despite these extensive and expensive renovations, Tripler was still described by one nurse as "an old, old, building."[157] The operating pavilion was still described as "cramped and inadequate," even with the modernization, and critics stated that the expanded bed space and "accommodations" were really porch space outside of the ward. Tripler also posed a significant fire risk as the hospital was mainly constructed out of wood.[158] Because of these identified shortcomings, an agreement was struck between the Superintendent of Buildings and the Army Medical Department to use nearby Farrington High School as an annex that Tripler could "use as a hospital in case urgent need should arise and all employees were notified to report for duty immediately in event of an emergency." As Farrington was more modern and made of concrete, it offered more protection against attack and fire than Tripler.[159]

"Early Morning Maneuvers" Gone Wrong

When the Japanese began their attack on Pearl Harbor, they did not attack Fort Shafter directly; Fort Shafter was not an air base and therefore not a priority target. Unfortunately, the attack was already well under way before the staff at Tripler realized what was happening five miles away at Pearl Harbor. Many assumed the planes were American planes practicing maneuvers, or the ever-present noise of construction, which many had grown accustomed to after all the renovations and expansions to Tripler.[160]

Second Lieutenant Anna Urda was actually a patient on the women's ward being treated for an infection in her cheek. As soon as she found out Hickam was under attack, she got up, put on her uniform, and reported for duty to Tripler's Chief Nurse, Edna Rockefeller. On the way down, she stopped by the maternity ward to tell Second Lieutenant Verla Thompson, who was busy preparing baby formula, the terrible news. Thompson assumed she was joking and continued her work.[161] When Anna Urda found Captain Rockefeller, she took one look at Anna's red face and sent her back to the women's ward, not to rest, but to take over care for her fellow patients and release the nurse assigned to the unit.[162] Second Lieutenant Gelane Matthews also ran into Captain Rockefeller on her way to her scheduled shift in the receiving ward. Rockefeller appeared "white as a sheet" and ignored Matthews when she greeted her as they passed. As Matthews walked into the receiving ward, she ran into a blood-covered corpsman, who told her, "They shot a sailor…the Japs [sic] are shooting them." When Gelane Matthews walked into the receiving ward, she quickly realized more than one sailor had been shot.[163]

Second Lieutenant Alma Deline, a surgical nurse taking courses in anesthesia, was also on duty that Sunday morning when she heard an unusual, distant rumbling. She, like many others, assumed the Navy and Army pilots were practicing "early morning maneuvers" near Pearl Harbor and Hickam Field, until the planes began to swoop deafeningly low over Fort Shafter and the smoke began to rise in the distance. A young Army officer informed her that Pearl Harbor and Hickam Field were under attack, and to alert the entire surgical staff of nurses.[164]

Second Lieutenant Betty Elmer was going about her normal routine on the ENT (ears, nose and throat) ward, taking temperatures, when she heard an explosion. Elmer too assumed the noise was only target practice. When she looked out over the balcony, she could tell the planes were not target planes, and could see the smoke rising from Pearl Harbor as the explosions continued. A few seconds later, she heard a radio announcement that Oahu was under attack. She stood in shock, slowly coming to the realization that the United States was at war.[165]

Doris Backinger recalled the beginning of the historic attack in her own words when she was assigned to the officers' ward, as was the duty of the surgical nurses scheduled to work on Sundays. "That quiet, beautiful day was suddenly noisy above us. Several patients and I stepped out onto the second story lanai overlooking Pearl Harbor and Hickam Field. One officer said softly, 'Looks like our Army and Navy Air Forces are practicing dog-fighting.' That opinion was quickly forgotten when fireworks and smoke rose from the harbor and the airfield. Just then, one small plane gained altitude over the hospital, brazenly displaying 'the rising sun.'"[166] She quickly realized that her services would be needed in surgery and immediately reported to the operating theatre.[167]

As it was Sunday morning, many of the nurses were not at the hospital, but were asleep in the nurses' quarters. Some nurses had just gotten to sleep after a long night shift at the hospital. Others were enjoying the opportunity to sleep late after being up until dawn at a party at the Hickam Officers' Club. Nurses such as Second Lieutenant Kathryn Doody tried to ignore the noise from the aircraft, but when the noise would not stop, she got out of bed to figure out what might be happening. She and some of the other confused nurses began to spectulate as to what was the cause of the disturbance.

The most popular theory was that the Army and Navy were doing maneuvers, or that perhaps a volcano was erupting. Doody walked outside and could see the anti-aircraft smoke and one of the corpsmen taking off in an ambulance. She assumed there had been some sort of training accident, and had still not realized the harbor was under attack. Finally, she turned on the radio and heard it announce the attack. At the same moment, she answered the ringing phone and was instructed to report to duty.[168] She put on her white uniform, cap, and shoes and walked outside.[169] The sweet smell of gardenias and hibiscus had been replaced with the toxic smell of sulfur and burning oil.[170]

When Second Lieutenant Alfhild Christophersen was told Oahu was under attack, a senior nurse told her to "get on down the hall, knock on all the doors to get the girls all out of bed and on duty."[171] Her reaction was priceless: "With that I decided to die clean, so I took a shower, dressed, and reported to my ward."[172] Christophersen had found herself in the middle of a warzone in a matter of minutes, knowing there was no way to ensure her safety or the safety of her fellow nurses. Rather than panic, she got dressed and reported to work. Others, including Rosemary Corrigan, had never seen war before and were morbidly fascinated by the Japanese planes, some of which exploded into a ball of fire.[173]

In the convalescent ward, the nurses and patients could see the planes flying overhead and the smoke billowing up from the harbor. Like others on the base, they too believed the Army was practicing maneuvers until they saw the rising sun on the planes and heard the machine gun fire. A bullet narrowly missed Second Lieutenant Nellie Osterlund. "I was walking down the middle of the ward," she said, "and we could hear, whirr, and a fellow said, 'nurse, down!'…and whammy, it came, then we saw where it

went out the other side." Unfortunately not everyone was so lucky. A couple of patients were hit by anti-aircraft shells or bullets, and were killed or injured while on the hospital grounds.[174]

Fortunately, the vast majority of the nurses assigned to Tripler were either already working at the hospital or were at the nurses' quarters and were able to report for duty safely and promptly. Had the attack taken place later in the day, nurses that were off duty and off base would have had a much slower response time. Second Lieutenant Patricia Dolan was on medical leave for the weekend and was scheduled to return to half-day duty on December 8. She was off base on Waikiki beach with some friends when she heard of the attack over the radio. Despite the traffic and chaos, she eventually made it to Tripler and she reported to the operating theater to resume her duties a day early.[175] By the time Dolan reported for duty at Tripler, the patients had already begun to line the hallways and porches as the casualties continued to arrive.[176]

Preparing for Casualties

Despite their lack of training in how to handle an influx of casualties from an attack of this magnitude, the nurses rapidly emptied their units and began to prepare for the arrival of casualties. All the patients on the convalescent ward were discharged and many reported for duty.[177] The maternity ward was consolidated and the delivery rooms were quickly repurposed as additional operating space for a civilian neurosurgeon and his surgical team.[178] In accordance with previous emergency plans, all ambulatory, non-infectious patients were rapidly relocated from Tripler to Farrington High School, which was a designated annex of Tripler Hospital and already had stored medical equipment on

hand.[179] Civilian volunteer nurses reported to Farrington High School and transformed classrooms into hospital wards.[180] All other medical and surgical cases were consolidated into three wards and cared for by medical service, allowing the surgical service to focus on the casualties.[181]

Second Lieutenant Ellison Wallace was on duty on one of Tripler's hospital wards when the doctor gave the order to evacuate the ward and open all of the beds. The beds filled with critically injured patients from the attack as fast as she could empty them of their previous occupants.[182] Second Lieutenant Osterlund described a similar scenario on the convalescent ward. The ward was transformed from a convalescent ward into a revolving surgical ward for patients awaiting and returning from surgery .[183] Instead of sending all her patients out to duty, Second Lieutenant Christophersen kept her last five patients, since by that time it was not safe to send them outside. Instead, as they planned to be discharged on Monday, she recruited them to be her corpsmen and help take care of the injured as they began to flow into the ward.[184]

Patients Arrive from Hickam Hospital

About twenty minutes after the start of the attack, patients began to arrive at Tripler Hospital in any and all available vehicles. These included Army ambulances, civilian ambulances, Coca-Cola trucks, private cars, laundry trucks, and even garbage trucks.[185] As the nurses were desperately needed in the hospital, none of the nurses were asked to help transport casualties to Tripler Hospital. However, some of the hospital corpsmen were sent out in Army ambulances to retrieve casualties from Hickam, and showed bravery and dedication in their work. The patients later told the nurses that the

corpsmen "walked [upright]---they didn't bend or stoop. They walked right straight out and the bullets were flying all over the place. They walked out."[186]

The Civilian Defense Force organized under the Hawaii Chapter of the Red Cross was also critical in the quick and efficient evacuation of casualties. In preparation for a possible attack, hundreds of civilians had received disaster training in order to care for the civilian population of Oahu in the event of an attack. In June 1940, the Red Cross started offering first aid and ambulance driving training to twenty female volunteers, and the number of volunteers continued to grow.[187] This group became known as the Women's Motor Corps, and they would train by taking Army and Navy convalescents on drives around Honolulu. A year later, several businessmen, including local car dealers and liquor distributors, donated vehicles to the Red Cross to be used as ambulances. Each driver of each vehicle had a list of specific assignments if Oahu were to ever come under attack.[188]

This able and ready group received calls for 100 ambulances to report to Hickam Field and other aid stations to transfer them to hospitals. Forty women responded for duty on the seventh, and five of them assisted in evacuating casualties to Tripler General Hospital, driving through the fire, chaos and congested the roads, and putting their lives in danger. Despite the images of "confusion, utter hopelessness, and horror" bombarding these women as they immersed themselves in their work, they provided vital services to those injured during the bombing, bringing casualties to Tripler Hospital where they could receive life-saving care.[189] In short, the civilian Emergency Medical and Ambulance Committee was pivotal in assisting with the evacuation of patients from Hickam Hospital to Tripler Hospital.[190]

The volunteers were not the only women shocked at the horror awaiting them at Tripler Hospital. By the time some of the off duty nurses arrived at Tripler from their quarters, severely wounded patients had already arrived at Tripler Hospital en masse. The hospital admitted patients from Hickam as well as anyone else seeking care—including Navy personnel and civilians.[191] When Second Lieutenant Harriet Moore arrived, ambulances were lined up at the entrance, bringing an unending stream of patients. Along the lanai of the hospital, emergency operating tables were being assembled and some were even in use for patients requiring immediate emergency surgery.[192] Second Lieutenant Osterlund remembered, "men were picked up where they were hit, put in the ambulance or whatever vehicle could be found, brought to the hospital, and put on a bed, with all the blood, gore, and everything."[193] No one had time to transfer the men from their litters or stretchers on which they arrived to the operating table before receiving surgery.[194] The nurses at Tripler soon ran out of places to put the wounded. Patients were placed in the halls, on the outdoor lanais on extra beds, or moved into temporary wards.[195] The bodies of injured men littered all available floor space of the wards and often ran out into the halls and corridors of the hospital. [196]

A constant flow of casualties poured into Tripler Hospital starting at around 8:15 a.m. until around 12:00 p.m. in the afternoon.[197] Nurses struggled to organize and prioritize the needs of the patients. Physicians and nurses began to work together to triage patients based on who had the highest priority of care, depending upon the kind and extent of their wounds.[198] The injured soldiers entered the hospital through the receiving ward, where physicians and nurses were available to help triage the casualties. Second Lieutenant Gelane Matthews was working in the receiving ward that day and

described the process. “The least injured went back to duty. Then we evaluated those who needed surgery, sending them to the operating room, and those with no recovery possibility, or DOA (dead on arrival), to the makeshift morgue.”[199] Those who were dead or dying were sent to the newly constructed Red Cross recreation building, which had been repurposed as a morgue instead of as a theater since the room could hold up to three hundred people.[200] Second Lieutenant Betty Elmer was told “a doctor would look at a patient, and if he decided [the surgeons] could do something for him, he’d point this way, and if there wasn’t anything or if they were already expired, he’d point the other way. This one patient was lying there and he was watching, and the doctor pointed the wrong way for him and he protested; so the doctor pointed the other way.”[201] Those that were not sent to the morgue were sorted based on who needed to go to surgery that day and those not requiring surgery immediately. Those needing surgery were sent directly to the operating theater, and the others went directly to the wards.[202]

After the initial confusion, the surgeons quickly took control of the casualty situation at Tripler. Physicians, including the expert trauma surgeon Dr. Moorhead, immediately responded to the needs at Tripler hospital. With the prompt arrival of civilian surgical teams, Tripler was able to triage and operate on casualties simultaneously. Eight civilian surgical teams went to work in the operating room while the military surgeons were “engaged in the essentially important triage, shock, ward work, and treating the walking wounded so that they might be discharged to duty.”[203] In the receiving ward, patients were identified (if possible), triaged, and given pain medications or tetanus immunizations, although some had already received this treatment at Hickam Field.[204] By the time Second Lieutenant Matthews arrived in the receiving

ward, it was already full of wounded patients on litters.[205] Matthews joined Second Lieutenant Edna Lynn and one other nurse, and set to work giving injections. The nurses filled two syringes, and gave each patient a quarter-grain (approximately 15mg) injection of morphine and a tetanus immunization, documenting their care with an M or a T written in marker on the man's forehead so others would know he had received treatment.[206] The nurses initially used luggage tags placed on the patient's toe to record their medication administration and any identifying information they got from the patient or their dog tags; however, they soon abandoned that practice, as there was not enough time to complete the paperwork.[207]

Between the first casualty arrival at 8:15 a.m. and the last at around 11:45 a.m., 482 battle casualties passed through the receiving ward. By 12 p.m., all severely wounded cases were receiving treatment. Casualties were triaged from the receiving ward to the shock wards, preoperative wards, general wards, or the operating pavilion at the rate of two per minute.[208] Although surgical triage was the responsibility of the physicians and surgeons, Corrigan was also triaging her patients, but not for surgery. She said, "The doctors were giving IVs [and] we were examining the people to see who had wounds and who should be done first. I got the chaplain and brought him to ones that we thought needed it right away, and then I moved out."[209]

Many patients were stoic despite their injuries, and put the needs of others above their own. Second Lieutenant Doris Francis was working among the wounded awaiting surgical treatment. She remembered, "One young man looked very pale. He was very, very young, and I bent over him. There was some bleeding. I lifted the blanket; his left leg was just hanging by a tendon at mid-thigh. But he looked at me and said, "Please

help my buddy, he's hurt worse."[210] Often nurses would choose which patient to treat next based on the request of their patient rather than assessing who needed care most urgently. Other patients just could not understand why this tragedy had occurred. Corrigan remembered, "one in particular had a terrific [grapefruit-sized] hole in his chest. He looked at me and said, 'Why nurse, why?" And I said I don't know what the answer is."[211] Both she and her patient had difficulty processing the scene unfolding before them. Amidst the overwhelming scene, nurses and chaplains moved among the injured men providing any physical, emotional, and spiritual comfort possible, drifting from patient to patient as efficiently as possible.[212]

Despite the best efforts of the Army Medical Department, hundreds of men were mortally injured and beyond the help of medicine. The dead were brought to the newly constructed theater, or recreation room. Second Lieutenant Elmer remembered whenever she would walk by the morgue she would breathe through her handkerchief as the odor from the dead bodies was overwhelming.[213] The process of identifying the dead and collecting valuables to return to the families was a long and arduous process lasting approximately one week.[214] A total of 133 men died at Tripler Hospital, 71 of which were so badly mutilated they had to be finger printed for identification. Unfortunately, most of the men were not wearing dog tags, or identification, the morning of the attack.[215] Some patients knew they were dying and would call for the chaplain to perform last rites or offer spiritual support.[216] One nurse reported hearing of a patient who asked for and enjoyed a final cigarette as he untied the tourniquet around his leg and bled to death.[217] Occasionally patients would be sent to the morgue that were not yet dead. One guard on night duty heard sounds from the morgue. The next morning, one of the medical officers

found a patient still living who suffered from a head wound, temporary blindness, burns, and a right arm fracture. The patient was treated on Second Lieutenant Harriet Moore's ward, eventually regained his sight, and was discharged from the hospital.[218]

Although there were many cases that medicine could not save, there were also cases requiring immediate intervention. These cases were sent directly to the operating room. Unfortunately, the number of patients requiring immediate surgery was more than the surgical service was able to handle. Patients were placed on ramps and open hallways between the operating pavilion and the receiving room, many of whom were in various stages of shock.[219] Second Lieutenant Leonore Foster and two other nurses staffed the ramps leading to the operating room and carried narcotics, plasma and intravenous fluids to administer to the men awaiting surgery."[220]

In order to treat shock effectively, the nurse or physician had to recognize patients in shock and initiate treatment quickly. Signs and symptoms of severe shock included cold moist skin, thirst, vomiting, restlessness, apprehension, and decreased sensitivity to pain.[221] Blocks were placed under the foot of the beds to elevate the lower extremities to help combat shock.[222] Unfortunately, many of the nurses had not previously cared for patients with traumatic injuries and were not familiar with assessing and intervening in cases of severe shock. Additionally, nurses were unfamiliar with sections of the hospital outside of their assigned wards, and were not cross-trained in other areas, including surgical nursing.[223]

Second Lieutenant Rosemary Corrigan recalled struggling to care for patients in shock due to a lack of education in shock and trauma assessment and treatment. In the stressful and chaotic environment at Tripler, the nurses focused on the tasks they were

comfortable with and trained to perform. "We didn't stop to think. All we could think about was cleaning that [wound] out, getting it packed…and we didn't stop to think about [shock]."[224] Sometimes there would be injuries that would go unnoticed because the injured patients could not always tell where they had been hit. For example, she remembered,

> This one in particular I know died of shock because there was this gaping wound on his leg that we really weren't aware of at first because we had this other one in his side…he was actually bleeding to death, yet he was laughing. I don't think he felt anything. The only thing he felt was his bed was wet…when we looked over there, we found this pool of blood where he had been shelled.[225]

The majority of patients were treated with warm blankets and IV fluids prior to surgery to prevent severe shock; however, this was not always the case. Corrigan reflected that one of her patients was still in shock when he was taken to the operating theater, and had not received sufficient fluid resuscitation prior to administering anesthetics and beginning surgery.[226] Although the treatment of shock and decision to take a patient to surgery lay with the surgeon, had nurses been better trained, they could have been more vigilant in the assessment and treatment of those in shock.

Nurses in the Operating Pavilion

The operating pavilion at Tripler had one common entrance, and the passageways and halls were lined with the seriously injured. Most had gaping wounds and fragments jutting from their body, and were triaged directly to surgery.[227] Patients continued to be identified and reprioritized for treatment in the hallways while awaiting surgery, but there was no place to separate those who first needed shock treatment from those who would most likely not survive surgery.[228] Once shock treatment was initiated and the patient

began to improve, those needing surgery were taken to one of three operating rooms to undergo surgery by one of the nine surgical teams sharing the three operating spaces.

An unusual number of physicians were available as they were in the middle of a conference lecture by Dr. Moorhead when the attack happened, and all reported to Tripler. [229] A neurosurgeon and his entire surgical team reported to the hospital and converted one of the delivery rooms into a neurosurgical operating room. As they brought their own staff and equipment, the obstetric nurse was able to continue to care for her female patients while the surgery team worked in the delivery room. [230]

Dr. Moorhead, an experienced war surgeon visiting Oahu as a guest of the Honolulu Medical Society, took control of the operating rooms at Tripler, at the request of Tripler's Commanding Officer, Colonel Alvin Miller. He and Major Spittler (Tripler's Chief of Surgery) acted as surgical consultants for the nine teams performing surgery.[231] According to Moorhead, he "briefly gave his staff of military and civilian surgeons technical instructions on the methods he wanted used, and all got to work with a fine spirit of cooperation."[232] Due to the volume of casualties, surgical teams shared their equipment between tables, sterilizing instruments when possible.[233]

Tripler nurses assisted the surgical teams by circulating between the various operating rooms, setting up surgical trays and instruments, sterilizing surgical instruments and gloves, and fetching supplies.[234] Second Lieutenant Betty Elmer was transferred from duty on the ENT ward to help with surgery, despite having no experience as a surgical nurse, except for that which she received as a student. She had never even seen the operating room at Tripler prior to reporting there for duty, and stated she was more frightened of assisting in surgery than of the Japanese attack. Despite the arguably

inappropriate duty assignment and lack of training, Elmer was willing and able to help the orthopedic surgeons on her team. Second Lieutenant Elmer assisted by irrigating the newly amputated limb with normal saline and pouring sulfanilamide powder into the wound, and quickly became absorbed in her work. She stated, "I don't know how much time had gone by because they would amputate one limb after another…they would amputate the leg and then send the patient out. I'd clear up the mess and they would bring another patient in and we would do another amputation and off they went to a ward."[235] Patients were not transferred to the operating table, but rather the surgery was performed on the stretcher.[236] Wounds were not dressed, but they were placed under a sterile sheet to be dressed on the wards. Second Lieutenant Elmer took immense pride in the work that she and the surgical team did, especially her personal contribution to protecting the amputees from infection. Eventually, the amputated limbs began to pile up in the operating room. Elmer carried the amputated extremities out the door as the lines of patients in the hall looked on. She quickly dumped them into the first garbage containers she could find before returning back to the operating room.[237] Elmer also assisted with bringing supplies, linen, and saline solution, and boiling sterile pitchers.[238]

When Second Lieutenant Kathryn Doody reported for duty, she was also told to go to the scrub room to prepare to assist with surgery. She remembered the operating rooms being crowded with three patients, one on the table and two on litters.[239] Surgical nurse Alma Eidsaa also assisted in the operating room that day in whatever role was needed. She served as a sterile scrub nurse, a circulating nurse, and even administered some anesthesia, even though she had not yet completed her nurse anesthetist training. She remembers halls full of the wounded, most of which were waiting quietly despite

their life and limb threatening wounds. She remembered walking by men with missing arms and legs, serious facial wounds, and "bodies full of shrapnel [which were] devastating to look at."[240] She administered anesthetics including nitrous oxide, ether, and pentothal, a newer form of intravenous anesthesia.[241]

As the dead and dying continued to stream into Tripler, the operating theaters became revolving doors for the 344 patients that would be admitted to the surgical service that day.[242] The mechanisms of injury for the majority of the patients were primarily gunshot wounds from machine gun fire, injuries from metal shrapnel ripped apart as bombs exploded, and crush injuries from being trapped inside the barracks when it was bombed and collapsed. Amputations, compound fractures, abdominal wounds and chest wounds kept everyone busy until late into the evening. The nine operating teams on duty operated continuously for eleven hours, and then began to work in shifts until all the casualties had been stabilized.[243]

Patients receiving care on the wards came from throughout the hospital, often with incomplete or questionable documentation. Those patients who did not require immediate surgery but required hospitalization were sent directly to the patient wards from the receiving ward. Hospital wards also received patients after surgery, many of whom remained in critical condition. Patients returning from surgery would come with anesthesia records and post-operative orders from the surgeon dictated by the nurse anesthetist.[244] Other surgeons wrote a number on the patient's chest with a red wax pen to assign an admission number.[245] Often patients from the receiving wards did not have any documentation, and the ward nurses had to speculate as to what, if any, treatment they had received.

Working on the Wards at Tripler Hospital

Although many of the severely wounded were sent directly to the operating pavilion, many of the patients sent to the wards were in critical condition and died shortly after their arrival. Second Lieutenant Harriet Moore remembered caring for some of the few patients with burns that came to Tripler. "My first three patients suffered burns over most of their bodies and shortly died…one patient expired from the time he left the admitting office and got to the ward. When I tried to swab one's arm with alcohol for an IV, his entire forearm skin came off. As I recall, my next three patients survived."[246] The next patients were placed in the beds so quickly the nurses often didn't have time to change the linen.[247] Second Lieutenant Mildred "Bonnie" Von Protz was in charge of the ENT ward and received a steady stream of casualties, some of which did not survive. She recalled, "We'd take a corpse out of the bed and put the wounded right in, dirty sheets and everything. In fact, the morgue filled up so fast that there weren't enough corpsmen to take the dead there. We just piled one on top of the other on carriers in the hallway to get them out of the beds, to put another patient in."[248] She and Second Lieutenant Christophersen who arrived shortly after the raid began assessed each patient to see "which was most acutely ill, so when a doctor did finally arrive, [she] could point out the most seriously ill first."[249] Second Lieutenant Hubertina Schepers was on duty in ward two, located right next to the receiving ward. Second Lieutenant Schepers helped to prioritize and organize her ward by first identifying the most severely injured and lining them up for surgery. The other patients were treated "using our discretion on what to do

for them and giving morphine and spirits as needed."[250] Instead of waiting for physician orders, the nurses took care of their patients using their own nursing judgment.

The convalescent ward became a holding area for patients awaiting surgery and those having just finished their surgery. Second Lieutenant Edge Sutherland also used her nursing knowledge in assessment and prioritization to organize the ward. She stated,

> As they came in we would see what was needed, write it down, and try to find a surgeon who would decide whether they needed to go to the operating room. If they needed to go to the operating room, we got them to the operating room and then after they repaired their wounds they came back. If they had wounds that just needed to be cleaned off, we gave them a shot if it was ordered and that kind of thing.[251]

The nurses and physicians worked in tandem to continuously assess and triage those whose needs were greatest. "The doctor gave priorities to those who were to have immediate care or those that could be delayed. There were some burn cases that couldn't live, and we had to leave them. That really bothered me that we couldn't do anything for them."[252] The nurses were completely immersed in the chaos and carnage that followed the attack, and without any training in triage or mass casualty management, it was difficult for the nurses to withhold treatment from patients that were too injured to be saved. Secondary triage on the various wards was a skillful collaboration between the nurse and physician, both providing their own skill and expertise in the stressful and emotionally challenging work.

As much as possible, the various wards were segregated based on diagnosis, which made nursing care easier as most of the patients had similar treatment orders.[253] For example, the ears, nose and throat ward had only patients that had ear, nose, and throat involvement.[254] This decreased the burden on the nursing staff as many nurses were caring for a population of patients similar to those in the pre-war era.

The physicians who were not triaging patients in the receiving ward, providing shock treatment, or in the operating room performing surgery reported to the wards and worked closely with the nurses and corpsmen.[255] The doctor would write the orders and the nurses would cooperate with the sergeant (lead corpsmen) on how to delegate each task.[256] The corpsmen helped the nurses undress the patients, make beds, answer phones, and bring supplies.[257] Nurses would complete and oversee the patient care such as feeding, bed baths, and medication administration. [258] They would also set up and assist the various physicians with post-operative dressing changes three to four days after surgery. Most wounds were dressed with 2x2 inch or 4x4 inch dressings with adhesive tape, and some larger wounds required larger dressing pads and a pressure bandage.[259]

Documentation was a challenge for the nurses due to the many other priorities competing with their time. Overall, the documentation process and timeliness varied greatly among the various units at Tripler Hospital. On some units, nurses initially wrote tickets with the patient's name, basic vital signs, and medications, and made regular charts at a later time.[260] Others like Second Lieutenant Christophersen, were able to make a chart for each of her patients on that day.[261] Many units relied on the night nurses to complete the documentation under blackout conditions and with little memory of the care that had been completed earlier that day. Harriet Moore recalls being asked to try and account for as much of the morphine that was given earlier in the day since it was mostly unrecorded, and many of the patients had still yet to be identified.[262]

Initial nursing documentation consisted of name, rank, and serial number of each patient. Next the nurse would add any vital signs, place of injury, what medications had been received, and eventually received standing orders for morphine administration.[263]

The process of organizing all of the patients' charts took several days to complete.[264] Nurses wrote any updates in the nursing notes and the physicians had an order book and progress notes they would complete in the maintenance records.[265] A complete chart consisted of the doctor's order sheets, temperature records, nurse's notes, laboratory records, progress notes, and any operative and anesthesia reports.[266]

The Availability of Supplies

The massive influx of almost five hundred patients began to take its toll on the hospital staff and supplies. The availability of supplies varied by ward and the type of supplies needed. Despite the Red Cross having stockpiled medical supplies, the nurses began to run out of important supplies such as syringes, needles, and IV poles.[267] Surgical nurses were often gathering supplies for the operating room, and there were temporary shortages of dressings, sulfa, and IV solutions that were eventually replenished.[268] In the lab, technicians created saline and glucose intravenous solutions as fast as possible, at a rate of twelve one-liter bottles per hour for the first forty-eight hours. Others worked on cross typing blood for those who needed whole blood transfusions.[269]

Nurses used what was available to them to complete their work rather than wait or search for the supplies needed.[270] Supplies such as gloves, syringes, surgical instruments, needles, and IV tubing were sterilized, repaired if needed, and reused.[271] Second Lieutenant Harriet Moore remembered running low on sulfanilamide tablets, and was instructed that if her patients vomited the sulfa tablet to have them take it again.[272] Second Lieutenant Nellie Osterlund remembered taking a 50cc syringe of concentrated

morphine and administering pain relief to each patient from the same syringe, but taking the time to change the needle between patients.[273]

Other nurses report they had adequate supplies, mostly thanks to the volunteers and corpsmen who diligently fetched supplies, sterilized instruments, and made more dressings.[274] As part of the war preparation effort, the Red Cross had stockpiled dressings, and 17,000 dressings were released to Tripler Hospital on December 7, 1941.[275] In addition to dressings, the Red Cross supplied toothpaste, toothbrushes, and writing materials.[276] Tripler also rationed some supplies in case another attack were to occur.[277]

Nurse Staffing

Tripler Hospital, along with the rest of the Army medical personnel, was short staffed in December 1941. Although seventy-eight physicians and 163 nurses were authorized for Tripler Hospital, only thirty-eight physicians and seventy-six nurses were actually present.[278] As the patient census was relatively low prior to the attack on Pearl Harbor, this was not a large problem. After the attack, the staff could feel the staff shortage acutely. Prior to the attack, there were two or three nurses per ward with staggered shift times. The most staff would arrive in the morning and the nurses would decrease for the evening shift and again at night.[279] After the bombing, nurses were routinely working twelve or more hour shifts, with head nurses overseeing several wards.[280] On December 7, many of the day shift nurses stayed on until 11:00 p.m. or later. The night shift nurses who had reported to duty when the attack began were sent home between 3:00 p.m. and 5:00 p.m., only to return and stay the rest of the night until

7:00 a.m.[281] More night shift nurses were needed than previously staffed, so many nurses that had been working day shifts switched to working night shifts.[282]

Some nurses did not get any relief and worked day and night, and were utterly exhausted by the time they got to rest. Second Lieutenant Edna Linn stated that she did not go off until Tuesday morning, which would have been a forty-eight hour shift. She was so exhausted, that she actually fainted while giving report to the oncoming nurse. She was given an intravenous solution infusion and rested in the hospital. Thirty hours later she was back at work as if nothing had happened."[283] Second Lieutenant Anna Busby heard that the night supervisor reported a nurse had fallen asleep in the nurses' quarters with a lit cigarette still in her hand.[284]

Despite their level of exhaustion, the nurses took pride in their work. Second Lieutenant Corrigan continued to help wherever she could with those waiting for surgery even after the chief nurse sent her home to sleep. Instead of going home, she disobeyed a direct order and stayed at the hospital and helped deliver supplies to the wards and operating theatres until all the casualties had been received that afternoon. Everyone worked long hours with little to no break, doing what needed to be done until every patient was given appropriate care.

Nurses worked in various parts of the hospital and were reassigned among the wards, the hallways, and the operating rooms to meet the most pressing needs of the patients.[285] Second Lieutenant Matthews, who normally worked in the receiving room, was sent to the storage tunnel at Fort Shafter to check on the women and children who had been evacuated. As medical transportation and communication were limited, she ended up delivering two babies in the tunnel.[286] According to the 1941 Annual Report of

Tripler Hospital, "changing of the nurses from ward to ward without notice resulted in confusion and inability to place as much reliance on the nurses for actual ward administration as we considered essential to maintain good surgical wards."[287] Had nurses been cross-trained with different specialties and on other wards, they would have been better prepared to care for the high number of surgical patients.

Volunteer Contributions

The shortage of nurses was alleviated by supplementing the staff with enlisted personnel, civilians, and volunteers. The enlisted corpsmen were well trained and performed many of the fundamental nursing duties such as undressing, cleaning, lifting, and feeding patients. The civilians of Oahu were also highly organized and ready to assist should the need arise. Trained and untrained volunteers, officers' wives, nurses, and doctors reported to the hospitals to volunteer their time. Some civilian nurses were quickly inducted into the Army Nurse Corps while others contracted their services as civilians in military hospitals.[288] Patients who were well enough to help as well as pilots that no longer had a plane to fly reported to the hospital to offer their assistance.[289] A large group of civilians from the Philippines came and assisted in the kitchen and with cleaning the wards, which was a large help to the nurses and corpsmen.[290]

One of the critical roles filled by the volunteers was sterilizing equipment and dressings. A room was furnished with two World War I era autoclaves and a large, long table for the officers' wives and dependents to work. As an experienced surgical nurse, Second Lieutenant Doris Francis was asked to instruct the volunteers on how to prepare

the necessary supplies. She taught them how to sharpen needles, powder gloves, make various dressings and wrappings, and load and use the autoclaves.[291]

At dawn the following Monday morning, there were over one hundred women waiting to get back to work, and after several days as many as three hundred people had volunteered to help.[292] She remembered many of these newly arrived volunteers had "painted, painted faces, and they were cheerfully talking, busily working away." The chief nurse implied in her comments that these women were prostitutes, and Francis replied, "well, there is more than one way to serve."[293] Prostitutes assisted alongside the volunteers preparing supplies as well as assisting on the wards. Other nurses commented that they were excellent workers, and some did not realize they were prostitutes until some men on the unit recognized the women.[294] According to several nurses, the prostitutes were very helpful on the units and would assist with essential patient care tasks such as bathing, cleaning, and feeding patients, as well as bringing luxury items like cigarettes, paper, razors, and shaving cream.[295]

Second Lieutenant Matthews also appreciated the help of the prostitutes, but thinks that their motives to help may not have been completely pure. She speculated that the prostitutes came to the hospital knowing it was a safe place, and with the blackout restrictions, their customer base was severely diminished. After a couple of days Matthews had to "get rid of them" when they tried to make some money at the hospital. The volunteers responded quickly to the need at the hospital; however, their numbers began to dwindle after three or four days.[296] The large supply of both skilled and unskilled volunteers was essential to the nurses' work, allowing the nurses to focus their

time on tasks that were unique to nursing and delegating other tasks to the corpsmen and volunteers on the unit.

The Blackouts

After the attack on Pearl Harbor, the whole island was under martial law. Mandatory blackouts were enforced for civilian and medical personnel. A curfew was strictly enforced, and the beaches were blocked with barbed wire.[297] All lights were dimmed by painting the lens blue or covering the lens with blue cellophane.[298] A rope was installed between the edge of the hospital and the nurses' quarters so the nurses could find their way home in the dark.[299] The nurses working overnight had difficulty with documentation, assessing injuries, and preparing medications.[300] In the operating room, the windows were boarded closed. However, they were not able to operate as they had not blacked out the elevator, and could not move patients in or out of the operating area until dawn.[301] The operating rooms and delivery rooms were some of the first to be blacked out, followed by the wards and the nurses' quarters several days later.[302]

The whole island was in total blackout, and gunshots and air raid sirens rang loudly in the darkness as everyone was on edge, and every unexpected movement was assumed to be the enemy. When night supervisor Second Lieutenant Corrigan returned to Tripler and started rounding on the wards, she herself was almost shot. There were no lights at all outside between the many buildings that made up Tripler Hospital, and she had been ordered to remove her nursing ensign from her uniform for fear it would reflect light. That night while she was walking in the utter darkness, three guards pointing rifles at her demanded that she stop and identify herself. Apparently no one had told the guards

she would be out after curfew to round on the hospital wards. "So there I was, no insignia on, a white dress in a military area, and I'm telling them that I'm a night supervisor, making rounds in the different wards. One of them said, 'let's shoot her,' and one was definitely against it, and the other wasn't so sure. They thought I could be a spy. I thought, I'll get very stern. So I said, 'Have you never heard of the Sergeant of the Guard? Well, why don't you call him and have me identified.'" She was eventually identified and released to continue her work that night, but the experience was infinitely more frightening than she let the soldiers believe.

As the windows of the nurses' quarters had not been covered, nurses that were off duty hung blankets over the windows so they could have a small amount of light. Some nurses played bridge to pass the time, and others chatted amongst themselves, sharing stories from inside the hospital and speculating about the Japanese.[303] The fires at Pearl Harbor still burned brightly, lighting the sky despite the blackout restrictions.[304] The nurses were on edge. Every time a gun would go off, they feared the Japanese had returned. Despite a tumultuous night, they all returned to the hospital the next morning, ready to continue their work.[305]

Lessons Learned at Tripler General Hospital

By Wednesday, all of the patients had been properly treated and the nurses began to settle into their new routine. A complete census of casualties in the hospital showed 482 patients, 138 of which were sent to the morgue, and 344 of which received surgical treatment.[306] Miraculously, of the 344 battle casualties admitted to the surgical service, there were only 13 deaths.[307] Other patients that were treated and released were not

accounted for or documented. As patients began to improve, they were discharged or transferred to one of the schools Tripler had annexed to increase their bed space. Surgical cases went to Farrington High School, medical cases to the Kamehameha School, and the ENT and psychiatric cases stayed at Tripler. [308]

Although the medical response at Tripler Hospital was truly heroic, there were several areas identified for improvement in preparation for another attack. A triage room was added next to the operating pavilion for the treatment of shock and sorting of casualties, and Second Lieutenant Anna Busby was in charge of stocking and checking the room every day to make sure it was ready.[309] Additional ward space was needed and created, including an expanded psychiatric unit for the needs of the severely traumatized soldiers.[310] Both the nursing and physician work force was supplemented by local civilians, many of whom joined the Army while others stayed on as contracted employees until April 1942.[311] The operating rooms were remodeled and relocated to better handle casualties.[312] By July 1942, the Army Medical Department realized that the old, wooden Tripler Hospital would not be adequate to care for and protect its patients. Plans for a new hospital were developed and the "Pink Lady," or New Tripler, was completed in 1944.

The Nurses of Schofield Hospital

Schofield Hospital

North Sector General Hospital, or Schofield Hospital, was located in Northern Oahu several miles away from Pearl Harbor, near the Hawaiian town of Wahiawa. In 1915, plans were created for a 250-bed hospital to serve the garrison of 6,000 men stationed at Schofield Barracks. As the garrison grew to over 14,000 men by 1941, the hospital also expanded.[313] Schofield Hospital was built at Schofield Barracks, adjacent to the Wheeler Air Field.[314] The hospital was an attractive two-story cement building, with separate sections of the building connected by covered walkways.[315] The nurses' quarters was a two-story building located next to the hospital, and the nurses were treated well. They had an old Army nurse as a "house mother," a large shared living and dining room, and Japanese and Filipino servants to clean their rooms and provide their meals.[316]

Nurses at Schofield arrived in similar fashion to those at Tripler and Hickam. Many of the nurses came in the six months leading up to the attack, and arrived on transport ships such as the *USS Grant* and the *USS Mariposa* from all over the continental United States.[317] Nurses at Schofield also did not receive much, if any, orientation to the hospital, and were assigned to duty as soon as they were settled in their new home.[318] When Second Lieutenant Rhoda Ziesler arrived in Hawaii in November 1941, she wrote in her journal, "ever since I was a little girl from the first time I studied geography my ambition was to go to Hawaii."[319] Ziesler would realize her dream of visiting Hawaii, but perhaps not in the fashion she had imagined as a child.

In peacetime, most of the hospital admissions were due to sports injuries, and the nurses had sufficient staff to care for their patients' needs as well as their own.[320] Under

the leadership of Chief Nurse Helena Clearwater, nurses worked eight-hour split shifts with an afternoon off per week and one day off per month. Nurses on night duty worked twelve-hour duty for one month.[321] For recreation, nurses in Northern Oahu would travel to the beach, enjoy a horseback ride through the mountains, go bowling, or attend one of the formal dinners and dances held several times per week.[322]

During the two weeks preceding the attack on December 7, Schofield Barracks was on alert against an attack, assuming sabotage from the resident Japanese population would be the most likely threat. The troops guarded all the bridges and roads leading to the base, and military personnel were not permitted to leave the base for more than half an hour at a time.[323] Second Lieutenant Ada Olsson heard Chief Nurse Helena Clearwater warn the nurses that war was coming, but "we were young and didn't believe her."[324]

Typically on Sunday mornings, only essential personnel staffed the hospital. Many of the physicians were off duty and planned to come in for rounds later in the morning. Some wards did not have specific physicians assigned during the weekend. On Saturday December 6, personnel were finally allowed to leave the base for more than a half hour.[325] Many of the nurses were off duty Sunday morning, and some had stayed up very late the night before enjoying one of several parties the island had to offer on a Saturday night. Second Lieutenant Alice Boyer was actually on the neighboring island of Molokai that morning, planning her wedding, and was due to return that afternoon for duty.[326] Nurses Watson, Olsson, and Ziesler were among the few nurses staffing the hospital on Sunday morning. Ziesler was giving a sponge bath and Olsson was working in the nursery.[327]

The Japanese Attack Northern Oahu

Second Lieutenant Myrtle Watson was working alone that morning on an orthopedics ward on her first shift off of orientation, thinking, "I hope nothing unusual happens today that I can't handle by myself, because I was going to be on my own."[328] As she and her patients watched a friendly football game from the porch, the scene began to change. "We heard the low sound of planes coming overhead. Some people on the ground and the porch began waving at the planes…The planes just kept coming…We just stood frozen in our places, staring at the sky as the planes made their runs. The effect was almost hypnotic."[329] The hypnotic spell was broken as soon as the planes began to fire upon Schofield Barracks, strafing parts of the hospital. The plaster started to fall off the walls, and the patients on the porch yelled, "Get us inside!"[330] Second Lieutenant Ziesler, on the medical unit, also watched the planes over Wheeler Field, and for half an hour she and her patients thought it was battle practice. As the planes continued to attack, she could not believe that it was a real battle, despite the sounds of crashing planes and machine gun fire, and seeing the Japanese emblem on the side of the plane. She and her patients continued to believe it was a practice battle, but they started preparing reserve beds, just in case.[331]

At the nearby nurses' quarters, the women were enjoying a leisurely Sunday morning. Some nurses were up and on their way to Catholic mass, enjoying a late breakfast, or sleeping in after a late night.[332] Second Lieutenant Mildred Irene Clark was off duty that morning and the sound of the planes over Wheeler Field woke her up.[333] Second Lieutenant Hedwige Kaczanowski left the quarters to go to mass as the attack was starting. She notified the chief nurse, Lieutenant Clearwater, who called Hickam

Field as well as headquarters, but was unable to verify the attack. Clearwater calmly addressed the nurses in the quarters and said, "…I think war's declared. Girls, you go to your assigned places."[334] As the off duty nurses rushed to their assigned wards at the hospital, Second Lieutenant Watson began to evacuate her patients off the porch, cut bedbound patients out of traction, and placed them atop mattresses on the floor.[335] She and the other nurses prioritized the safety of their patients by evacuating them inside the building and sheltering them from any stray bullets or debris as much as possible.[336] Watson could have become a casualty herself, but one of her patients pushed her away from an approaching strafing attack.[337]

The Japanese attack on Wheeler Field and Schofield Barracks was primarily directed against Wheeler Field as it was home to the Army hangers, planes, and pilots. According to Second Lieutenant Olsson, the Japanese strafed Schofield Barracks on the way to and from Wheeler Field, but only dropped bombs at Wheeler.[338] The majority of casualties came from a bomb, which hit the mess hall while many were eating their breakfast.[339] The hospital also received some strafing. Some nurses were angered that the Japanese had strafed the hospital, despite the hospital being clearly marked with a red cross.[340] Others rationalized that the attack on the hospital was most likely unintentional, and the Japanese were merely responding to the soldiers firing at the planes from the roof of the nearby barracks.[341]

Chief Nurse Clearwater soon arrived at the hospital and made her rounds of the wards, instructing her nurses to prepare for incoming casualties. Second Lieutenant Olsson was on duty in the nursery, and was frightened by the bombs, yelling, "We're all gonna [*sic*] die!" Chief Nurse Clearwater calmly responded, "No, we're not. If the

women in England can take bombing, you can too. Get to work."[342] Clearwater was most likely referring to the frequent German air raids against British cities. As this was the first time any of the nurses had been under enemy attack, it was only natural for them to fear for their safety. However, the nurses were expected to and were able to put aside personal fears and focus on their nursing duties.

All patients at the hospital who were able to "walk and carry a rifle" were quickly discharged to duty. The others were consolidated into a general ward to make room for casualties.[343] The men were more than willing to go; they wanted to go to war.[344] Those who could not be discharged stayed and helped as much as possible.[345] Babies were returned to their mother's care, and women and children at the hospital were evacuated to a nearby school.[346] Once the ambulatory patients were discharged, the nurses, corpsmen, and remaining patients changed the bed sheets and placed shock blocks around the beds closest to the nurses' station.[347] Nurses calmly and methodically began to get supplies and beds ready in the wards. One of the treatment rooms on the ward was converted into an additional operating space.[348] Clearwater sent half of the nurses to the operating room to assist the surgical teams. Despite never having practiced for an air raid situation, the nurses and staff prepared and executed their jobs without panic or confusion.[349]

Composure Amidst Chaos

Meanwhile, at adjacent Wheeler Field, the troops struggled to survive the worst of the Japanese attack. Wheeler Field had a medical dispensary that provided life saving first aid care. However, little is known about the care provided at this facility. Second Lieutenant Clark mentioned medical officers caring for men in the field and quickly

transporting these men from Wheeler to Schofield in ambulances.[350] In *7 December 1941: The Air Force Story* published by the Pacific Air Forces Office of History, the soldiers brought their wounded comrades to the dispensary for treatment from the medical officers and the chaplain. "When Chaplain Katt entered the dispensary, he saw the human wreckage of men whose faces were smeared with blood, their bodies torn by shrapnel and bullets…Kneeling beside the men, he softly repeated the words of the Lord's Prayer over and over."[351] Another soldier reported, "A line of men began to form in front of the dispensary, their arms in slings or heads and faces wrapped in bloody, temporary bandages. Bodies of the dead lay side by side on the lawn, covered with blankets."[352] Unfortunately, the dispensary was located in a converted hangar and was hit by a Japanese bomb, collapsing the sides of the building, and severely wounding those inside. Among the wounded were reportedly two nurses, however their fate is unknown.[353]

The stream of casualties began to arrive at Schofield Hospital from Wheeler Field soon after the air raid. Despite the medical department's best efforts, the casualties began to stack up faster than they could be processed.[354] Second Lieutenant Watson stated the influx of casualties was so overwhelming that they could not separate the living from the dead, and bodies began to pile up wherever there was space.[355] Ambulances were already arriving as the off duty nurses reported to the wards, and the scene at the hospital was overwhelming.[356] Despite patient litters lining the bloodstained halls, the nurses maintained a semblance of calm for the patients, "because if we weren't, they wouldn't [be calm]."[357] The nurses recognized that creating a safe, calming environment was important in controlling pain, physiologic shock, and mental shock in their patients.

Nurses attended to their duty first, despite a lack of exposure to the traumatic injuries common in war. Second Lieutenant Rhoda Ziesler was assisting on ward eight with a patient who had been shot in the chest, and the doctor told her to plug the hole in his chest with her finger, and she did. The patient looked up at her and said, "you have the most beautiful brown eyes I've ever seen," and then he died.[358] Ziesler was able to offer some comfort and peace by her presence in the patient's final moments. In her journal, she described her initial reactions from that day. "I know now what shrapnel wounds are. Some of those poor fellows looked like sieves, legs off, heads smashed in, and that awful ghastly color of shock and death…Truly it was not make believe. Already there were many boys brought in. They looked so ghostly. Most of them in shock, yet conscious. I never saw or hope to see again such casualties."[359]

Approximately 160 wounded were admitted to Schofield within the first two to three hours following the attack, and many more were seen and released back to duty.[360] Unlike Tripler Hospital, Schofield did not receive assistance from many trained or untrained volunteers. Schofield also did not have as many physicians available as Tripler Hospital. Second Lieutenant Marion Emmons reported she was one of eighteen nurses and twenty doctors on duty that day; however, the exact number of personnel is unknown.[361] Second Lieutenant Olsson estimates there were approximately twenty nurses on duty.[362] According to the Schofield Christmas photo, there were 70 nurses assigned to Schofield by the end of December 1941.[363]

Initial Treatment and Triage of the Wounded

Regardless of the exact number of staff, many of the physicians were unavailable to the nurses. Physicians were often busy in the operating room, treating shock in the wards, or treating and discharging minor injuries. As physicians arrived, surgical teams were immediately formed.[364] At least one physician was in front of the hospital triaging casualties. Private Joe Camacho, an enlisted soldier from Schofield Barracks, limped to the hospital after a relatively minor shrapnel injury to leg. He vividly remembered watching the injured and mortally wounded being triaged by the doctors and nurses. He recalled years later, "the death [*sic*] and the dying were so overwhelming, and they had limited resources and doctors—they only took the ones they knew they could save. The rest, even the ones that were alive that the doctors knew wouldn't make it, were sent straight to the morgue—many of these dying people heard their fate while they were still living." [365] Within the hospital, few physicians were available to sort casualties, leaving the task to the nurses. As the nurses had no training in the triage of casualties, nurses did as much as they could to provide timely and adequate care to the wounded. Second Lieutenant Marion Emmons was the head nurse of the officers' ward. She reported, "an entire section of our small hospital was set aside to check in casualties and my job, as an administrative nurse, was to sort out the dead from the wounded."[366] Second Lieutenant Bertha Gilmer was the head nurse of the receiving ward. She stated, "We didn't follow any procedures. We just put them to bed and got their names and started charts. But there was no special training."[367] Patients were placed in beds wherever available until the ward was full, rather than segregating serious and less serious cases. [368]

Second Lieutenant Rhoda Ziesler was also sent from her ward to help treat and sort the casualties. She explained her role in her journal:

> The injuries were very serious, dirty, bloody. More poor boys were dragged in. I can't describe the situations. We went from one bed to another, applying dressings, washing wounds. As soon as we got organized a bit, we started giving morphine ¼ [grain]. We triaged the boys. Some were already marked from Wheeler that they had had morphine. We checked to see if they had tetanus shots.[369]

Her use of the word "triage" in her diary at the time demonstrates that although the nurses may not have been trained in triage, they were at least familiar with the term and the concept. Ziesler's role was later described as "determining who needed surgery right away, who could wait, who was not going to live."[370]

As there were no doctors on the ward, Second Lieutenant Pauline Girard took charge of the casualties on her wards and began to sort casualties for treatment. She undressed and assessed her patients, revealing amputated toes, shredded testicles, or gaping shoulder wounds. By the time the physicians arrived, patients were undressed, sorted, and assessed.[371] Although it is uncertain whether doctors or nurses made the majority of the decisions in triage, the nurses used concepts in triage and disaster management ahead of their time, concepts that had yet to be formally introduced in the realm of emergency or trauma nursing.

The injuries at Schofield were similar to those seen at Hickam and Tripler, as the mechanism of injury was very similar. At both Hickam and Wheeler, men were injured from machine gun bullets, shrapnel, or had injuries from building debris falling and hitting them.[372] Consequently, there were many amputations, chest wounds, spinal wounds, abdominal wounds, and cranial wounds."[373] Second Lieutenant Ziesler was sympathetic to and impressed by the spirit of the wounded, yet angry with the Japanese for the attack. In her journal, she wrote, "Those poor kids, so patient and uncomplaining.

Such a young bunch of boys all shot to hell [*sic*] because those dirty Japs [*sic*] pulled a fast one."[374]

Once the physicians, nurses, and corpsmen were organized, they began to administer treatment to the wounded. Nurses were administering glucose, morphine, and tetanus. They cleaned and dressed wounds. Side tables were used to elevate the foot of the bed to help treat shock.[375] The patients were alternated head to toe, facing each other, so the nurses could more easily watch two patients simultaneously.[376] Second Lieutenant Olsson worked in a makeshift specialized severe shock ward. This allowed patients who were critical to be separated from the other patients. She would administer and monitor the IV infusions and provide pain medications. Many of her patients had abdominal wounds and did not survive.[377] The nurses worked together, checking on each other in various wards to see if they needed extra help. Second Lieutenant Alberta Knips commented on their teamwork. "Everyone went to their wards and everything that day, as if we had practiced for it for years. There was no confusion…if it wasn't busy on one ward, they went over to another ward to see if they could help."[378]

Surgical Care at Schofield Hospital

The operating room at Schofield Hospital was just as busy as Tripler. By the time Second Lieutenant Clark arrived at the hospital, there were already around thirty patients lined up along the hallway awaiting surgery, and ambulances continued to arrive. Those requiring immediate surgery had serious injuries, including severe abdominal wounds or mangled arms and legs requiring amputation, and they were often in shock. Any and all space and surgeons available for operating was functioning at full capacity. A total of

four surgical teams were operating as efficiently as possible.[379] As a trained nurse anesthetist, Second Lieutenant Clark immediately began to prepare the most critical patients for surgery. She quickly triaged and reprioritized which patients needed surgery first and began treating the other patients for shock. As one of only two nurse anesthetists at Schofield that day, Clark could not manage all the preparation and intraoperative sedation alone. Physicians assisted with anesthesia by giving IV anesthetics, spinal blocks, and blood products; however, only those specially trained in anesthesia were able to give inhaled anesthetics. Second Lieutenant Clark described her overall experience that day as extremely efficient. Nurses and physicians worked together as a team with some physicians prepping patients for surgery while others operated. Clark used her nursing expertise to prepare her patients both physically and spiritually for surgery. In addition to providing important therapies, she spent time talking and praying with her patients. She wanted to meet any needs her patient may have had, not just medical needs.[380]

The surgical team also attempted to maintain accurate patient records. When patients arrived for surgery, they were already tagged with identifying information including name and admission numbers. Prior to surgery, conscious patients signed permission slips for surgery. After surgery, patients returned to the wards with a chart containing the above information, and also a description and location of the wounds, medication orders, surgical procedural records, and anesthesia records.[381]

Post-Operative Care and Recovery

After surgery, the nurses provided the ordered post-operative care. Patients in critical condition would return to the ward and receive vital post-operative care from the nurses.[382] Unfortunately, in some cases the nurses were powerless to overcome the patient's life-threatening injuries. Second Lieutenant Myrtle Watson cared for a patient who returned from surgery with chest and abdominal wounds that continued to bleed. She placed a basin under the bed to catch the blood seeping through the mattress. She checked the dressings to see if she could stop or slow the bleeding, and as the patient watched her work, he noticed she was wearing nail polish. He whispered, "Who ever heard of a lieutenant wearing nail polish in the middle of a war?" and asked her to attend to one of his friends who was injured. [383] As the presence of female officers was new to the military, manicured nails on an officer was almost as shocking to the patient as the surprise Japanese attack. Second Lieutenant Watson honored the patient's last request to tend to his friends, and by the time Myrtle returned, the patient had died.[384] The feminine presence of the nurse was a welcome distraction to the soldier as he died from his wounds.

As many of the wards did not have physicians present, the nurses went to work and "did what had to be done," especially regarding patient care and documentation.[385] Second Lieutenants Gilmer and Girard were working together on one of the surgical wards. Together, they split the ward in half as they and their corpsmen verified and admitted the new arrivals, and segregated the pre- and post-operative patients. The nurses tried to keep records as time allowed, including information such as medical history, religious preferences, and the TPR (temperature, pulse, respiration) graphs.[386] Nursing care of these patients prioritized controlling pain, preventing infection, and

rehabilitation.[387] Second Lieutenant Watson remembered using whiskey to treat pain, and repurposed old vodka bottles to be hot water bottles.[388] Although morphine and codeine were more commonly used, Second Lieutenant Knips used a variety of non-pharmacologic methods to treat her patients' pain in addition to medications. She would change the linen, bathe patients, fluff their pillows, adjust their traction, give back massages, promote movement when appropriate, and verbally reassure her patients to keep morale high and their pain under control.[389]

The Army nurses also took pride in their involvement in direct patient care. As compared to the Navy, the Army nurses' role focused more on direct patient care, and Navy nurses routinely functioned in a more supervisory role with the corpsmen providing most of the direct patient care. The corpsmen at Schofield assisted the nurses by managing the supplies on the ward, keeping the wards clean, transporting patients, and assisting in basic patient care activities. The nurses participated equally in ward management chores as needed, and also provided basic patient care, changed dressings, gave medications, and supervised the prescribed physical and occupational therapy exercises.[390] The Schofield nurses reported a high level of nursing autonomy. Second Lieutenant Knips explained the trust between the doctors and nurses at Schofield.

> The doctors relied on us. They believed us. They listened to us…We (the nurses) did all the dressings. We did all the treatments…They expected us to. They relied on us, because they couldn't be there all the time. And we could talk to [the patients]. Of course, if something came up, we called them in. We could always call them in.[391]

Second Lieutenant Knips took pride in her ability to maintain trust between herself and the physicians as well as between herself and the patients.

Managing Limited Resources

In general, the nurses at Schofield Hospital did not have any major shortages of supplies; however, some important resources were lacking. Second Lieutenant Ziesler wrote in her diary that they sent emergency calls out for additional blankets and hot water bottles.[392] Dr. Hardaway, one of Schofield's surgeons, noted a shortage in dried plasma in treating shock.[393] The chaplain arrived with cigarettes for the men, and volunteer women arrived to help make additional dressings.[394] In general, the nurses reported an adequate supply of morphine, needles, dressings, and medications. Used needles, dressings and other sterile supplies were sterilized and returned for use.[395] Second Lieutenant Olsson reports running out of linen, and someone had to get it from the supply storage in a cave near the mountains. Unfortunately, the linen and medications from the storage was useless as the materials had degraded in storage. Instead, she used dirty sheets, rationalizing that the linens "weren't really soiled bad…it didn't matter; [the patients] were covered with dirt, anyway."[396]

Although Schofield did not have the volume of casualties that Tripler received, Schofield also did not have as many resources, especially in the form of physician or nurse volunteers. However, in accordance with emergency plans, several dentists in the Army Medical Department reported to Schofield and assisted the surgeons and performed general hospital duties.[397] Schofield did have some additional civilian nurses on contract at the hospital, and others called and reported to help after the initial attack.[398] Most nurses worked until late into the evening, many without a break to eat.[399] As there were only two anesthetists at Schofield, Second Lieutenant Clark worked until 6:00 p.m. without a break, stayed on until 4:30 a.m., and began more cases the next morning.[400]

She and the other anesthetist did not leave the hospital for three weeks.[401] Second Lieutenant Girard recalled the nurses, doctors, medical corpsmen, and volunteers worked long hours to ensure all of the patients were well cared for, despite being understaffed and having no breaks. "No one had to ask you to stay on. You just stayed on until your work was done…In the service, if you're needed, you're there. We don't have to worry about overtime, that's your job. We can work ten, twelve, fourteen hours and think nothing of it because [there] was something to be done."[402]

Several nurses reported that patients were a major source of assistance immediately following the attack. Able patients brought supplies to the operating room and were eager to help in any way possible. Second Lieutenant Clark commented, "Everyone worked so well and functioned such as I have never seen, truly a team. They knew what to do. They knew how to do it."[403] Second Lieutenant Alberta Knips remembered working very closely with volunteer patients to ensure care was provided promptly and adequately, regardless of whether or not she had adequate staffing for the unit. "We never had to ask patients to come and help us. When we came on duty every morning they were waiting for us."[404] She specifically described how patients would assist the nurses in bathing other patients. As the nurses were finishing changing the bed linen, the volunteer patient would bring a pan of water to the next patient so he could start to wash himself. The nurse and patient volunteer would go down the line, bathing patients and changing linen, while another patient in a wheelchair would collect the dirty linen and pile it on his lap.[405]

After the attack, each ward had approximately twenty patients, with one or two nurses and one or two corpsmen to manage the ward. The collaborative and helpful

environment was beneficial to the morale of the nurses, doctors, and patients, as everyone worked together to help one another, creating an environment of healing from one of tragedy, death, and destruction.[406] The nurses at Schofield also seemed to move between units more than those at Tripler. One nurse reports traveling to other wards to see who needed help on her own volition. She also reports physicians asking for the nurses' help in completing a variety of tasks around the hospital, and the nurses went where they were needed.[407]

The Aftermath

That night, darkness came early around 5:30 p.m., and the nurses' fear of attack or invasion intensified. Several nurses slept at the hospital, and others slept together in the common living room in the nurses' quarters. The arduous task of blacking out the hospital windows began with covering the operating room windows with blankets, and turning the operating room into a "steam bath" at night.[408] Second Lieutenant Ziesler wrote about the dark nights in her journal:

> No one has cracked yet, but these darn black nights give one the creeps…the nights are terrible. Sabotage all over. Shooting all the Japs before firing squads… God the nights are black. Couple fellows were shot here at hospital because they were in a restricted area. One died. A civilian was shot last night because he refused to dim his lights.[409]

The nurses feared friendly fire as much as enemy fire, as people in violation of martial law were likely to be shot. Everyone, especially the guardsmen, was on edge, and the nurses continued to treat casualties from friendly fire after the attack. Second Lieutenant Clark opted to sleep at the hospital for three weeks rather than risk walking outside at night in case she were called into the operating room.[410] Nurses would sleep in their

uniforms and change during the day so they would be ready if something happened in the night. Chief Nurse Clearwater warned her nurses, "we don't know if they're going to come back or not, and you people be ready."[411] Air raid alarms were an almost nightly occurrence, and the nurses could not go off post after 6:00 p.m.[412]

The first two or three days and nights were long for the nurses at Schofield, but by the middle of the week following the attack, the nurses settled into a new routine, and were prepared for another attack. Nurses were required to do twelve-hour duty more often; however, some still worked eight-hour shifts.[413] By December 12, Ziesler wrote the following in her diary. "Everything under control. All quiet. Helped in ward six today. Have it set up as a shock ward. Covered all mattress and pillows with rubber sheeting. Have IV stands between each bed. Also a chair at each to elevate for shock.[414]" In case of any future air raids or attack, the nurses had a shock ward ready to receive and treat patients quickly. Dr. Hardaway also had some suggestions to prepare for future attacks based on lessons learned from Schofield. He stressed the importance of good communication and application of what was learned in previous conflicts. He also emphasized designating a trained surgeon as a triage officer, having facilities and supplies to treat shock, the importance of available blood and plasma, and practicing together to prepare for any war emergencies.[415]

The medical team at Schofield Hospital worked tirelessly for several days following the bombing to provide the best possible care for those injured or mortally wounded in the attack. On December 7, a total of 38 men were killed and 121 were admitted for their wounds at Schofield Hospital.[416] Of those killed, twenty-seven were dead on arrival, nine died within the first twenty-four hours, and two others died later of

their wounds.[417] The care of countless others was undocumented as many were treated and quickly released back to duty. Although these casualties only represent a small proportion of the over 3,000 casualties on that day, the nurses, physicians, and corpsmen provided life-saving emergency care to those wounded in this surprise attack.

The Surgical Treatment of War Casualties at Tripler and Schofield Hospital

Triage

The first and arguable most important role of the surgical teams at Tripler and Schofield Hospital was to select which cases needed surgical treatment first. In general, head injuries, sucking chest wounds, perforating abdominal wounds, and extremities requiring amputation were selected first, with compound fractures and soft tissue wounds receiving a lower surgical priority. Unless an active hemorrhage was the known cause of the shock, shock was treated prior to surgery with warmth, morphine, and plasma. All injured persons received tetanus vaccinations, and as a result there were no cases of tetanus at Pearl Harbor.[418] About one-third of the total casualties received surgery during the first three days in the operating pavilion. Many were treated on the various wards initially, and what was lacking in surgical supplies was made up for by the generous application of local sulfanilamide.[419]

Anesthesia

Once the patient arrived in the operating room, the first challenge was to provide safe and adequate anesthesia. This was a challenge at the Army hospital facilities because of a shortage of trained nurse anesthetists at both Tripler and Schofield Hospital.[420] At Tripler Hospital, nitrous oxide and oxygen, open drip ether, and intravenous pentothal sodium were all used in the treatment of casualties.[421] Usually, the anesthetist would induce sedation using an intravenous agent such as pentothal sodium, followed by a gas-oxygen-ether sequence. Few cases using spinal, rectal, or local anesthesia were attempted.[422] Open drop ether was found to be the safest anesthetic to

use with patients in shock, and could be given by those with little training. Intravenous pentothal sodium was advantageous because it could be administered with little training; however, some patients with shock receiving IV anesthesia developed respiratory failure shortly after its administration.[423] Patients in shock also did not fare well with spinal anesthesia, and as it required a high degree of training to administer, it was also abandoned at both Tripler and Schofield Hospital.[424] One of the surgeons at Schofield Barracks Hospital noted a shortage in nurse anesthetists. He stated, "Anesthesia was a problem. Some of the debridements were done under local anesthesia. But general anesthesia was needed in many cases and the only nurse anesthetist was busy in the operating room."[425]

Wound Care

Wound treatment using secondary closure was a technique first introduced near the end of World War I. However, prior to December 7, the literature was unclear as to whether open or closed treatment of wounds after debridement and the local application of a sulfonamide powder in the wound helped prevent infection. In aseptic environments with ample amounts of time, wounds can usually be closed immediately after a thorough debridement and application of sulfa powder with good outcomes. Unfortunately, the surgical environment and volume of cases did not allow for the time and equipment required to perform debridements without contaminating the wounds. During Dr. Moorhead's lecture, the surgeons were taught to "do the best [they] could for the most patients," which in this scenario required an adequate, not thorough, debridement of the wound. Wounds were debrided by first cleaning the surrounding area with a thorough

scrub with soap and water. Next the surgeon would explore the wound for dirt and debris. Inside the wound, the surgeon would irrigate all tracts and cavities, tie off any bleeding vessels, remove any blood clots, open and debride any penetrating wounds, and remove any dead tissue or accessible foreign bodies. Between thirty to sixty grams of sulfonamide was placed in the wound cavity, and wounds (except for scalp and facial injuries) were left open and covered with a dressing. Large wounds were splinted and were checked twenty-four and forty-eight hours post operatively. Wounds were often closed on the third day if there was no concern for infection or gas gangrene.[426] Patients were given sulfathiazole, four grams per day, in divided doses by mouth for three or more days.[427]

Thanks to Dr. Moorhead's timely lecture on war wounds just days before the attack on Pearl Harbor, wounds were consistently treated similarly between surgeons and remained free of infection. According to a surgical report from the National Research Council, "practically all instances of infection which were noted in these two hospitals occurred in those patients who wounds had been closed, and infection occurred despite the fact that crystalline sulfanilamide had been placed in the wound before closure."[428]

Sulfa Therapy

One of the major advancements in surgical care tested at Pearl Harbor was the use of sulfa containing compounds pre-, post-, and intra-operatively to decrease infection risk. Under the advice of British researchers, Americans began to mass-produce sulfa, as they had been shown to stop bacteria from multiplying. These bacteriostatic "wonder drugs" allowed the immune system to defeat infection naturally, as penicillin was being

developed but was not yet available.[429] After Pearl Harbor, soldiers were given oral and powdered sulfa and were told to self-administer the medicine if they were wounded. However, later studies cast doubt on the efficacy of their local application, and soldiers were eventually instructed not to use the medication.[430] Another concern for the liberal use of sulfa was toxicity. However, there was only one case of possible sulfa toxicity from Pearl Harbor, and toxic reactions were generally very rare.[431]

According to an article published in the *American Journal of Nursing* in February 1942, the nursing care of patients receiving sulfa involved proper administration and documentation of the medication, monitoring for side effects, and reporting any unexpected findings to the physician. The medication was most often given by mouth, and patients were given a large loading dose, and smaller repeat doses every four hours to achieve and maintain adequate serum levels of the drug. The medication could also be given rectally, by lavage, intramuscularly, or intravenously; however, intravenous administration was the responsibility of the physician. Infected wounds were treated by using wet dressings saturated with sulfa, or "by blowing the drug in powdered form into the cavity" or applying a sulfa containing ointment.[432] Nausea, vomiting, benign cyanosis, headache, confusion, and dizziness were all known side effects of the medication. Nurses were expected to report any rashes, skin eruptions, or fever, as they were known signs of toxicity. Nurses were also expected to observe for signs of conjunctivitis or kidney complications.[433]

Neurologic Injuries

The majority of traumatic head injuries died soon after the injury, and in head injuries requiring surgery, survival was rare.[434] The majority of the head injuries seen were concussions, in which the patient was dazed or temporarily unconscious after the injury. The temperature, pulse, respirations, blood pressure, and level of consciousness were monitored, and patients were awakened every two hours to assess for changes in level of consciousness. Patients were prescribed bed rest for ten to fourteen days, aspirin for headaches, and were directed to lay with the head of the bed flat.[435]

Patients with lengthened or persistent unconsciousness were thought to have a more serious injury. Those with suspected increased intracranial pressure were treated using a variety of techniques. Subtemporal decompression, lumbar puncture therapy to remove cerebral spinal fluid, fluid restriction, and the use of hypertonic solutions were all accepted therapies used to decrease intracranial pressure in patients with prolonged unconsciousness. Other authorities advocated for conservative treatment through diligent nursing care and monitoring for changes in temperature, pulse, blood pressure, and neurologic status. Nursing care involved diligent monitoring of fluid intake, supportive nutrition, and controlling restlessness. Patients with head injuries were never given narcotics.[436]

Traumatic head wounds were mostly open depressed skull fractures. They were treated by removing all foreign material from the wound, carefully debriding all injured tissue and brain matter, arresting any bleeding with electric cauterization, and tightly closing the wounds without drains. Infection risk was managed through early operation, cleansing the wound, and local and oral sulfa therapy. Patients were also given two weeks of bed rest and prescribed sulfa and anticonvulsants.[437]

There were only two spinal cases, one of which had a machine gun bullet lodged in the spinal canal. A new locator was used to find and remove the bullet from the spinal canal. The locater used electromagnetic induction, similar to a metal detector, and was sterilely inserted into the wound to get an accurate estimate of the depth of the bullet so it could be removed without further damage to the area.[438]

Chest Injuries

The first aid treatment of chest injuries was extremely important, first, in the control of hemorrhage, and second, in the case of so-called sucking wounds. Patients were given anesthesia and pressurized breathing support, and wounds were debrided as much as possible. Foreign bodies were only removed if accessible.[439] Physicians treated tension pneumothoraxes by aspirating air from the pleura, or inserting a catheter between the second and third intercostal space, midclavicular line. The catheter was attached to a rubber tube and connected to a glass bottle with water to create a seal.[440] This was done to lessen the burden on nursing staff, as nurses would not be required to routinely monitor patients for a recurring pneumothorax. As there was a general shortage of nurses in Hawaii, this was an important practice. Patients were also monitored for signs of bleeding, shock, or accumulation of fluid in the chest. Blood aspirated from the chest was replaced with air, and any fluid removed was cultured for infection.[441]

Abdominal Injuries

Abdominal injuries at Pearl Harbor were highly fatal. In one fatal case, there were a total of twenty-one perforations of the jejunum and ileum after a machine gun

bullet penetrated the left lower quadrant and lodged itself under the liver.[442] Most men suffered from severe shock, which had to be treated prior to surgery.[443] As many men had recently eaten and had full colons, those with penetrating abdominal wounds often had large amounts of peritoneal contamination from food and fecal matter.[444] Entrance and exit wounds in the abdomen were treated the same as other contaminated war wounds.[445] The abdomen was opened by a separate surgical incision, and the entire contents of the gastrointestinal tract were surveyed for injury, starting with the colon, small bowel, stomach, and duodenum. Perforations were sutured and a small number of resections or colostomies were placed. Next, the spleen and liver were examined. The injured spleen was removed, and any liver lacerations were packed with gauze and rarely sutured. Drains for the gallbladder and bile duct were inserted, and the pancreas was treated conservatively by limiting repairs to stopping any hemorrhage. Next the genitourinary system was examined and the kidneys and ureters were repaired or removed if necessary. Bladder tears were sutured and an indwelling catheter was inserted.[446] Once the exploratory surgery was completed, the abdomen was closed tightly in layers, and powdered sulfa was applied as the surgeons worked their way out of the abdominal cavity.

Post-operative care for these patients was complex as they usually returned from surgery with complex dressings and drains, and had unique nutritional challenges. Intravenous fluids and morphine were given, and oxygen was often required. Oral sulfa therapy was delayed until the second post-operative day, as blood levels were adequate from peritoneal absorption.[447] Ten days post operatively, nearly all patients showed little to no abdominal distention and clean wounds.[448]

Extremity Injuries

The majority of injuries to the arms and legs were compound fractures, soft tissue injuries, and complete or partial amputations. For the many men requiring an extremity amputation, the procedure was fairly simple and could be completed relatively quickly. The affected extremity was amputated using a guillotine style technique, and the skin was sutured to the stump to keep it from retracting. Sulfanilamide was locally applied to the stump, and the wound was covered with a dressing and unsutured. Ten days later, most infections were clean and healing well. Amputations were closed in a second surgery after the casualties were evacuated to Letterman General Hospital in San Francisco.[449]

Compound fractures were treated similarly to other war wounds and soft tissue injuries, with thorough cleaning, irrigation, wound debridement, delayed closure, and the use of sulfa. Fractures were reduced and realigned manually without the use of plates.[450] Wire traction was used frequently, and complete plaster casts were rarely applied, however men were placed in full plaster casts prior to transport from Hawaii. Seven weeks post operatively, patients had well healing wounds with "as a rule good" bony alignment, and all were expected to make a full recovery. [451]

Unlike the Navy, the Army did not have many burn cases, and most of the soft tissue injuries were a result of shrapnel or bullets.[452] Casualties with uncomplicated soft tissue injuries received treatment after the more serious cases had been addressed. In order to keep these wounds from becoming infected, crystalline sulfanilamide was placed locally and given by mouth until they could be surgically debrided. These wounds

remained free of infection preoperatively, and were treated similarly to the other war wounds post operatively. [453]

Gas Gangrene

Several cases of suspected gas gangrene developed following the attack. A separate gas gangrene ward was established at Tripler on December 11, 1941, where Second Lieutenant Celeste Brauer was assigned.[454] A total of ten suspected cases were transferred to the unit, five of which were confirmed to have gas gangrene.[455] Only a few doses of gas bacillus antitoxin were given prophylactically, and cases were treated with proper wound care and radiation therapy.[456] Patients would receive radiation therapy twice a day, and were also encouraged to be outdoors to expose the wound to sunlight.[457] Adequate wound care involved daily secondary wound debridement, and local and oral sulfa administration.[458] After two and a half weeks, all cases made a full recovery without requiring amputation of the affected extremity. [459]

Surgical Outcomes

Overall, the surgical teams at Tripler and Schofield were highly successful in their treatment of casualties. The post-operative mortality rate at Pearl Harbor was 3.8%, compared to a rate of 8.5% in World War I.[460] This success is attributed to the prompt evacuation of casualties to the hospital, early shock treatment, the availability of plasma, thorough wound debridement, local and oral sulfa therapy, and secondary closure of wounds. Other factors unique to Hawaii including the warm climate, intense sunlight, and lack of flies, also contributed to the good surgical outcomes. Dr. Moorhead also

speculated that as the attack occurred on Sunday morning, men were mostly clean, healthy, and well rested prior to the attack. Finally, the post operative care provided on wards by the nurses and corpsmen promoted the healing and recovery of the casualties.[461] Dr. Ravdin and Dr. Long from the National Research Council were invited to perform a survey of the wounded at the request of the Surgeon General of the U.S. Army. In their report, they also cite the organization and preparation of the civilian medical forces and the availability of wet plasma as factors contributing to the success of the medical care at Pearl Harbor.[462]

In a paper published in February 1942, Dr. Moorhead commended the work of both the patients and the hospital staff. He stated, "The outstanding features in this initial outbreak of World War II were the morale of the wounded, the unusual skill of the surgeons and the devoted service of the nursing and other hospital personnel. It is a duty and a proud privilege to pay tribute to those who served, and no directing surgeon ever had better cooperation."[463]

Moving Forward After the Pearl Harbor Attack

Collaborative Care at Pearl Harbor

Much of the success of the Army Medical Department at Pearl Harbor is due to the collaborative relationships between the nurses, corpsmen, physicians, and patients. Second Lieutenant Clark thought, "everyone worked so well and functioned such as I have never seen, truly a team. They knew what to do. They knew how to do it… It was just a marvelous thing how they handled the emergency. We saved lives. It was something…they were just tremendous, and deserved to be recognized for their extraordinary work and efficiency."[464]

Several of the nurses commented on their ability to work well with the corpsmen on the unit. The corpsmen were described as respectful, nice, and hard-working. Even though the nurses did not have direct authority over the corpsmen, they respected the nurses' rank and authority on the wards.[465] The patients were also very respectful and did not harass the nurses.[466] One nurse remembers a patient not doing as ordered, and she was well supported by the officer of the day who disciplined the patient appropriately.[467] Another nurse recalled feeling treated like a sister or mother by the patients. "Whenever patients would go on their pass or something, they always brought something back to the nurse. She was like their sister or their mother—the only female in their life really for the patients when they were over there."[468] The nurses also respected the patients and provided them the same care regardless of the patient's rank.[469]

One of the most important professional relationships was that of the doctor and the nurse. The nurses had a high respect for the skills and expertise of the physicians.[470] The physicians worked alongside nurses in the care of the patient, and were appropriate

in their delegation of tasks to nurses during the crisis. When nurses were asked to do tasks outside of their scope of practice or training, rather than becoming cross, the physicians would help the nurses or find another person able to complete the task.[471] Physicians would also listen to and honor requests from the nurses, when possible. If he were unable to honor the request, the doctor would explain why it could not be honored rather than act dismissive.[472]

Definitive Care for Pearl Harbor Casualties

After the world-changing attack on Pearl Harbor, the Army nurses of Oahu were forced to become accustomed to the daily challenges of living in a war zone. As the United States was now at war with Japan, the medical facilities of Hawaii were critical in the treatment of the wounded in the war in the Pacific. As the medical facilities on Oahu were heavily taxed with the sudden influx of patients, it was imperative that the hospitals could increase their bed capacity, as more casualties would be expected throughout the war. As early as December 11, patients were discharged back to duty. Second Lieutenant Ziesler at Schofield Hospital wrote in her diary that day. "Sent thirteen of my patients to duty. Some are not able but anyone that can stand on two feet is being discharged. Poor kids. Wonder if I'll ever see them again."[473] After the heavy losses suffered at Pearl Harbor, it was imperative that men were available as soon as possible to resume their duty and to prepare for the escalating conflict with Japan. The role of the hospitals in Hawaii was to stabilize casualties enough to be transported back to the United States for further treatment, or to return those with less serious injuries to duty. Of the 331 surviving casualties at Tripler, approximately 135 were anticipated to return to

duty.[474] Second Lieutenant Hawes remembers caring for patients injured on December 7 and later discharged, only to return after being injured again in the war.[475]

Unfortunately, many of the patients could not be immediately returned to duty and required long-term care or rehabilitation. In the Army, amputees and other patients suffering major injuries made up the majority of the group requiring long-term rehabilitation or further surgical intervention. On December 24, the steamship *Lurline* left Hawaii for San Francisco full of women, children and wounded men to be evacuated to the mainland.[476] Ambulances lined up in front of Tripler and Schofield Hospital to transport patients to the docks.[477] At Schofield, the nurses brought Hawaiian leis for the men who were being transferred to the states. "All the personnel would sign a little card and everything and we'd have a regular little ritual ceremony, you know. Put the leis around the boys' necks and kiss them good-bye."[478] Three nurses joined the wounded on the *Lurline* to provide care during the transport. As the ship was not a hospital ship, it was not well equipped with the medical supplies needed for transport. The nurses improvised and used recycled tin cans from the galley as wash basins, and repurposed the bar as a sterilization station.[479]

Separating Fact from Fiction

Rumors grew and multiplied across the Army bases. Due to limited access to information and censorship, the nurses had difficulty separating fact from fiction. The nurses had heard some rumors that Japan would return for another attack and others that they had already invaded the island. Several nurses reported trouble sleeping, and rumors about the Japanese permeated across Hawaii. Initially, rumors spread that the Japanese

living on the island had contaminated the water.[480] Other rumors were that Japan would return for another attack, or that they had already invaded the island and were in hiding. Specifically, many believed the Japanese had landed at nearby Diamond Head and had planted explosives. Second Lieutenant Ziesler wrote in her diary about what she had heard about the Japanese. "So much sabotage. Two Japs caught trying to poison water at Wheeler. They were put before firing squad. Another Jap was operating radio receiving and sending set at Bellows Field. He too got the gun…All homes on Diamond Head are being evacuated. That hill is planted with enough explosives to blow this rock below the ocean." [481]

Some of the patients offered to shoot the nurses if the Japanese invaded the hospital so they would not be taken captive by Japanese, as many believed being captured was a worse fate than death.[482] Others planned to fight to the death with golf clubs, or walk out to sea.[483] Other nurses carried pocket knives, not to defend themselves, but to slit their wrists if captured.[484] Some discussed hiding out in the caves or going to prison together with their friends for support.[485] Not everyone believed the rumors were true; however, it was difficult to separate fact from fiction after the Japanese had successfully launched an attack that many thought was impossible.[486]

Racial Tensions Grow on Oahu

Following the attack on Pearl Harbor, tensions were high between the Japanese and the others living on Oahu. As the patients lay injured in the hospital, many talked about wanting to get out of the hospital as soon as possible so they could have their revenge on the Japanese.[487] One man on his deathbed at the Wheeler dispensary said to

the chaplain, "Those dirty devils, we'll pay 'em [sic] back. All I'm waiting for is to get outa [sic] here and get at 'em [sic]!"[488]

Tensions were also high between the Japanese cook and Filipino staff at the Schofield nurses' quarters. As the Japanese had bombed and invaded the Philippines, some Filipinos were highly resentful and even aggressive towards the Japanese. It was rumored that the son of the Japanese cook was in the Japanese Imperial Navy. The cook and his family were eventually moved off post, and even though they were not suspected of spying or sabotage, the Army had difficulty trusting anyone of Japanese descent following the Pearl Harbor attack.[489] Some nurses worked with some physicians that volunteered to help after the bombing with mixed reactions. Second Lieutenant Harriet Moore worked overnight with a physician of Japanese descent. She stated she stayed close to her corpsmen that night, as they could not trust the physician.[490]

Second Lieutenant Rosemary Corrigan expressed resentment towards the Japanese for using American made products. As they watched man after man enter the hospital cut to pieces from shrapnel, they were reminded of the Japanese freighters that would pass through Pearl Harbor full of scrap metal from the United States. "It horrified us, just finding the Bethlehem Steel, you know, stamped on some of these things that were taken out of them."[491] Despite the anger, she still felt compassion toward a Japanese pilot as she watched his plane explode in the air outside of the hospital window. She stated, "even if there were enemies up there, they were human beings."[492] Corrigan had a positive experience with a physician of Japanese descent. She stated they worked alongside the rest of the team being as helpful as possible to the other doctors and nurses. She recalled:

> When you first looked up and you saw the slant eye, it really took you back a little bit. And then you realized here is someone coming to help, and they were most understanding. They introduced themselves—'I'm doctor so and so. What can I do? What are you doing that I can do?' And you seemed to feel their sincerity because you realized they were probably just as American as you, it's just that they looked like the now enemy.[493]

Second Lieutenant Thompson used almost the same words as Corrigan when she discussed working with Japanese women in the nurses' quarters. "They were lovely girls, and I don't think there was anything they did against the United States. I think they were as much American citizens as anybody was.[494]"

Corrigan and Thompson's humanist reflections were echoed by other nurses. One of the nurses cared for a patient of Japanese descent who was injured in the attack. Some of the other patients threatened to kill him and the nurse had to remind them "we're here to heal, not kill."[495] The patient left the next day, as it was not safe to stay on the wards with the hostile soldiers.[496] Despite any personal negative feelings towards the Japanese after the attack on Pearl Harbor, the nurses continued to prioritize the safety and needs of their patients, regardless of their nationality, and were able to separate the individual Japanese men in their care from the Empire of Japan at war with the United States.

Resiliency

Although Army nurses at the various Army hospitals had unique experiences during and following the bombing, the nurses were resilient in their ability to continue to perform their duties despite the physical, mental, and emotional exhaustion that followed the attack. Despite their exhaustion, the nurses stayed busy in their work and some even thrived in the post-attack hospital environment. The following will address how the

Army nurses met the physical, mental, emotional, and societal challenges that followed the attack on Pearl Harbor.

In all three hospitals, the nurses mentioned prioritizing their work above any fear related to the attack. Several nurses stated they were so busy during and immediately following the attack, they did not have time to think about the gravity of the situation. They did not have time to think, fear, or panic. The nurses prioritized their duties to their patients over their own emotions, relied on their knowledge and training, and focused on the work to be done.[497] Second Lieutenant Moore explained her feelings, which echoed the thoughts of other nurses. "I remember so well that the sense of shock and fear that I at first felt suddenly disappeared and I began functioning with all senses fully alert to the needs of the moment and with no feeling of any personal involvement, an attitude so essential in performing efficiently in a crisis."[498] Both Second Lieutenant Oberson and Olsson soon learned that their fiancés had been killed during the attack. Not allowing themselves to become overwhelmed with grief, they continued to perform their duties at the hospital, grateful for the distraction afforded by their meaningful work.[499] One nurse stated, "We did the work that was supposed to be done and nobody was upset."[500]

Several nurses described that "everyone just knew what to do," and did their job with superior performance. Second Lieutenant Clark commented, "There is something that gives you added strength and ability to function. It's beyond us…I don't remember fatigue."[501] This statement implies not only did the nurses function well, but beyond their recognized abilities. Overall, nurses describe the work of the entire medical department as calm, quiet, directed, collegial, tremendous, marvelous, and deserving of

recognition.[502] Despite a lack of training in disaster care, the Army nurses were an essential piece of the health care team.

However, there were some nurses that did not react with the calm and dedication of their peers. They needed (and received) some "tough love" from colleagues to get through the day. Second Lieutenant Knips remembers finding one of her nurses crying in the dirty linen room. Knips asked her, "What's the matter, are you scared?" She answered, "No…I'm crying because wouldn't it be awful if they bombed Baltimore?" Knips replied, "They're putting them in your back yard. What are you worrying about Baltimore for?"[503] Second Lieutenant Knips reminded her colleague to focus on the work at hand rather than her home. Second Lieutenant Dolan had to use drastic measures to refocus one of the nurse anesthetists at Tripler Hospital. "Sirens were going off constantly, and rumors were rampant that the Japs were returning for another attack. This made everyone nervous, and one anesthetist became hysterical. I was circulating nurse and I had to slap her hard to bring her around to continue the anesthesia."[504] Other nurses were distracted by thoughts of worried family members at home. Although some nurses were able to send word quickly, others waited weeks for the opportunity to tell their families that they were unharmed.[505]

After the initial shock and adrenaline from the attack wore thin, the nurses still had to cope with the long hours and difficult work that followed. Several reported that the gravity and significance of the situation did not set in until weeks later, and the team tried to maintain a positive attitude.[506] As soldiers and sailors diligently worked to restore the damaged ships, planes, and hangars, the nurses labored to restore the human losses from the attack. As Tripler was constructed from wood, the blood from the

casualties had seeped into the wood and the hospital smelled of blood for weeks. The smell was a constant reminder of the horrors they had just witnessed.[507] The fun-loving, carefree nurses of December 6 were replaced by war-hardened women, serious about their work and its contribution to the war effort. Second Lieutenant Girard reflected on the post-attack environment. "We really had heartaches. We couldn't even go to the beach for a long time after that. We stayed on and worked and everybody just chipped in and did all we could and didn't even go to the club for a long time. We stayed right there. Everybody took it seriously and everybody worked."[508] The nurses also took solace in the fact that they were present during a moment in history, and part of a team that improved the outcome of the Pearl Harbor attack.[509]

Once the nurses left the hospital and returned to their quarters after an exhausting day, many were no longer required to or able to remain calm and collected. No doubt worn down by exhaustion, Second Lieutenant Osterlund remembered going off duty and being so frightened that all she could do was lie in her bed and quiver. Overwhelmed by exhaustion, fear, and grief, Second Lieutenant Barron reported that after working for almost twenty-four hours continuously at Tripler, "about 5:00 a.m., we all sat on the floor and cried."[510] Second Lieutenant Barron admitted to crying in her quarters, grieving for the tremendous loss of young life.[511] Many nurses reported difficulty sleeping after the attack.[512]

To cope with the trauma, some of the nurses attended religious services at the hospital with the patients.[513] Others shared stories and bonded over their shared experience. Second Lieutenant Corrigan reflected, "When you have an experience, you have a closeness that you don't have I think in the other…areas. That's why the people

we had at Pearl Harbor were so special because we were in the same boat."[514] Many nurses would use humor and tell jokes to stay the fear of attack or invasion.[515] Nurses Anna Busby and her colleague Elma Asson relied on their faith to stay calm during the numerous air raids and false alarms over the following days. The nurses would head to the basement in the nurses' quarters until the "all clear" signal was given. Anna clung to her cross and rosary, recently blessed by Elma's priest.[516]

Eventually, the nurses' work began to settle into a routine. All patients had received surgery and proper care, and Tripler had opened additional space at two nearby schools to alleviate the strain on the hospital. However, the memories of that day stayed with the nurses as they struggled to cope with what they had experienced. Second Lieutenant Corrigan could not look at another wound for a long time afterwards and would feel weak and nauseated at the sight of even a small wound. She feared she would have to give up nursing entirely. Others reported feeling cold or instinctively hiding anytime they heard a fire siren or ambulance, which reminded them of the frequent air raid drills and constant fear of attack in the days following December 7.[517]

Although the haunting memories of December 1941 remained with the Army nurses at Pearl Harbor, the majority of the nurses felt fortunate to have been a part of such a monumental moment in history. Second Lieutenant Doody summarized the reflections of many of the nurses when she stated, "I have always felt that I saw what a wonderful response human beings have to emergencies. And I just wish we could be more that way on a day-to-day level. Where we are willing to help in small situations, in day-to-day situations, rather than wait for a big catastrophe to come along to make us realize that we are human beings, and…to respond."[518]

The Army nurses of Pearl Harbor used their nursing expertise, clinical judgment, and unfailing commitment to their patients to contribute to the medical response at Hickam, Tripler, and Schofield Hospitals. Their calm attitude in crisis set an example for the patients, corpsmen, volunteers, and others that came into contact with the nurses. Despite inadequate disaster or trauma training, they provided a high standard of care to all of their patients, setting an example and providing valuable lessons to the Army Nurse Corps in the preparation and training of American nurses for foreign service.

Chapter 4: The Navy Nurses of Oahu

On December 7, 1941, the Navy Nurse Corps had exactly forty-two nurses serving in Oahu; twenty-nine of whom were at the Naval Hospital Pearl Harbor, and the other thirteen were serving aboard the *USS Solace.*[1] This chapter argues that Navy nurses were also called to unprecedented levels of duty and service to their county on December 7. The chapter addresses the themes of preparedness, triage, collaboration, and resiliency as it applies to the Navy nurses at Pearl Harbor prior to, during, and following the attack. A list of all of the Navy nurses included in this account is available in Appendix C.

Joining the Navy

In the months leading up to the attack, the nursing staff had slowly increased at Naval Hospital Pearl Harbor to accommodate the growing fleet and Navy personnel stationed at Pearl Harbor. When Navy nurse Ruth Erickson arrived in Hawaii in the spring of 1940, there were only nine nurses stationed at Naval Hospital Pearl Harbor.[2] By December 7, there would be twenty-nine Navy nurses stationed at the naval hospital.[3]

Genevieve Van de Drink joined the Navy Nurse Corps in 1937, and after her initial assignment in San Diego, transferred to Hawaii in 1940.[4] As global tensions rose through the late 1930s, Van de Drink joined the Navy because she felt compelled to participate in the growing war effort.[5] Lenore Terrell knew of the war in Europe when she joined the Navy in 1939, but thought it would not affect her in Hawaii.[6] Phyllis Dana was one of the newest Navy nurses and joined the staff at Naval Hospital Pearl Harbor in September 1941.[7] Already living in Hawaii as a Naval Reserve Nurse, she was an obvious choice to place at the Naval Hospital as her first assignment in the Navy.[8] Helen

Entrikin joined the Navy in April of 1936, as the pay was almost double what she was earning as a civilian.[9] She transferred to Hawaii in July 1940 at the insistence of her sister. Helen's twin sister, Sara Entrikin, was an Army nurse at adjacent Hickam Field Hospital, and both Helen and her sister were on duty on the morning of December 7.[10] These nurses would soon become accustomed to the challenges of war nursing.

Life as a Navy Nurse

The culture and expectations of Navy nurses in 1941 differed from their colleagues in the Army. Most significantly, the Army Nurse Corps had relative rank in the Army, but the Navy nurses did not. In the Army, nurses were given the rank of Second Lieutenant, while Navy nurses were addressed as Miss. Navy nurses were not considered enlisted personnel or officers, and practiced in an environment of ambiguity.[11] The nurses were responsible for overseeing the corpsmen, but had no legitimate authority over them. They socialized with Naval officers, but yet were not part of that group.

In general, there were fewer Navy nurses than Army nurses, but more Naval corpsmen than Army corpsmen. Together, the Navy nurses and corpsmen provided patient care under the direction and supervision of the Navy nurse. Each nurse reported to the ward medical officer and was responsible for the maintenance and appearance of her ward and the supervision and instruction of the corpsmen.[12] When a new Navy nurse began her first assignment, she was placed with an experienced Navy nurse so she could learn the details of managing a Navy ward and become familiar with Naval regulations.[13] A Navy nurse described her duties in an article published in November 1941 for the *American Journal of Nursing:*

> Except in unusual cases, all nursing care is given by hospital corpsmen, boys who have received a limited training in a school for that purpose. Therefore, the greatest and most important problem that faces the Navy Nurse is the careful bedside instruction of these boys in the care of the sick. She must instill in them the feeling of responsibility for their work. These same boys, often with as little as two years' experience, may be given charge of the sick on board ship. If the principles underlying the technics of nursing, along with a sense of carefulness and reliability, have not been thoroughly instilled in them, it is, in a way, due to laxity on the part of the nurse if they do not give proper nursing care when left to their own devices.[14]

Routinely, the day shift nurses would report to the hospital at 8:00 a.m. each day. The hospital staffing pattern was similar to the Army; two nurses per ward would cover the morning duties, one would go off duty at noon and the other would cover until 3:00 p.m. The evening nurse would work from 3:00 p.m. to 10:00 p.m., and the night nurse would go on duty from 10:00 p.m. to 8:00 a.m.[15] Unlike the Army, the Navy nurses would routinely work in different wards throughout the hospital, and were familiar with the work flow and patient populations across the hospital.

Although their daily routine on the wards may have differed significantly from the Army nurses, Navy nurses enjoyed many of the same social activities as their Army counterparts. The Navy nurses enjoyed the sights and diversions of tropical duty as much as their colleagues in the Army. Two of the nurses at the Naval Hospital had vehicles, and those off duty would often borrow them to drive around the island. In addition to scenic drives, the young women enjoyed dates with the aviation officers attached to Ford Island, dancing, tennis, swimming in the ocean, and having ocean-side picnics. In the evening, the nurses could often be found at one of the large Waikiki hotels dancing to soft Hawaiian melodies under a warm, starlit sky.[16] On December 6, Genevieve Van de Drink attended an elegant formal dinner and dance aboard the festively decorated deck of

the *USS Arizona*.[17] Little did she know that the lives of those stationed aboard the *Arizona* would change forever the very next day.

Pearl Harbor Attacked

The Japanese attacked Pearl Harbor shortly before 8:00 a.m. on the morning of December 7, 1941, completely surprising the Army and Navy. The entire island of Oahu was under attack, including Army, Navy, and Marine bases; however, the majority of the attack was focused on Pearl Harbor. Pearl Harbor was the home to the strength of the U.S. Pacific Fleet, including eight battleships, seven of which were aligned alongside Ford Island and one (*USS Pennsylvania*) was in dry dock. The *USS West Virginia* sank first, followed by the *USS Oklahoma,* which turned completely upside down prior to sinking.[18]

At 8:10 a.m. a bomb struck and ignited the forward ammunition magazine of the *USS Arizona*, causing a massive explosion. The *Arizona* quickly sank to the bottom of the harbor with over 1,000 men trapped below deck. During a pause in the attack around 8:30 a.m., the damaged, yet functional *USS Nevada* attempted to escape the harbor and head to sea. Before she could clear the narrow channels, the second wave of 170 Japanese planes arrived and focused their fire on the *Nevada*, hoping to sink the ship in the channel. Rather than sinking in the channel and blocking the way into and out of the harbor, the *Nevada* elected to run aground at Hospital Point.[19]

From the very beginning of the attack, the nurses began to mobilize and prepare for the incoming casualties. Nurses aboard the *USS Solace* and at the Naval Hospital Pearl Harbor reported for duty and awaited the arrival of casualties.

The Nurses aboard the *USS Solace*

The *USS Solace* was one of two Navy hospital ships in the U.S. Naval Fleet in operation in 1941.[20] The *Solace* was a fully equipped, floating 432 bed hospital. The *Solace* was constructed with the latest medical technology available, and was home to her own bacteriological laboratory, pharmacy, physiotherapy department, plaster room, and diet kitchens. The *Solace* also had a variety of clinical wards including a surgical ward; orthopedic ward; medical ward; isolation ward; genitourinary ward; eye, ear, nose and throat ward; contagious ward; and a sick officer's ward. The *Solace* carried a one-year stock of medical supplies, and over a year's worth of provisions. With two operating rooms that could host as many as five surgical teams in an emergency, the *Solace* was prepared to handle any war emergency that might come her way.[21]

Aboard the *Solace* was an able-bodied crew of 340 men, and a medical staff of eleven medical officers, 128 corpsmen, and thirteen nurses. Of the thirteen nurses, three had received special training in dietetics, nurse anesthesia, or physiotherapy.[22] The nurses served under the leadership of Chief Nurse Grace Lally, who was no stranger to wartime nursing. By December 1941, Lally was already an experienced Army nurse from World War I, and had served the Navy in the Philippines and in China during the 1930s. Miss Lally, who was described as a, "handsome, gray-haired Irishwoman, as ready with a quip as a smile" held the Navy Nurse Corps' record for sea duty, and was well suited for leadership. [23]

In August of 1941, the *USS Solace* was commissioned in the New York Navy Yard, and Lally and the rest of the crew departed for Pearl Harbor, Hawaii, arriving on October 27, 1941. On their way to Hawaii, the nurses prepared bandages, sheets, and

sponges to prepare for what might be ahead, never dreaming they may need the supplies so soon after their arrival.[24] The newly-painted *Solace* was the only hospital ship in the Pacific fleet, and was clearly identifiable as a hospital ship among all the battleships docked in Pearl Harbor, with its white exterior accented by obvious red crosses.[25] In December 1941, the *Solace* was floating peacefully in Pearl Harbor next to Battleship Row, on the opposite side of Ford Island as Hospital Point, as shown in Appendix B.

Many of the patients aboard the *Solace* had minor complaints such as athlete's foot. This allowed the nurses plenty of time to enjoy leisure activities both aboard and ashore.[26] The *Solace* nurses would often go ashore and picnic with other military nurses, go shopping in Honolulu, swim at the beach, and attend dances at the Royal Hawaiian Hotel or the Moana Hotel in Waikiki.[27]

The Attack on Pearl Harbor

Sunday morning in Pearl Harbor was peaceful and quiet, as many were enjoying the opportunity to sleep late or attend Sunday morning mass. A group of medical officers aboard the *Solace* were enjoying a relaxing breakfast until they heard several explosions around 8:00 a.m.[28] Meanwhile, Miss Grace Lally was in her cabin waiting for mass to start aboard the ship when she heard the sharp percussive sound of a machine gun outside. She looked out her window and watched in horror as a Japanese plane zoomed down above the deck of the *Nevada* and opened fire on some of the men fishing off the side of the deck. She left her quarters and went into the wardroom.[29] Above her on deck, the medical officers had abandoned their breakfast and watched in awe as torpedoes and

bombs dropped from the Japanese planes and accelerated towards the battleships and the Naval Air Station on Ford Island.[30]

Miss Anna Danyo was suddenly awakened by a nearby explosion, thinking the boiler might have exploded on one of the ships. Simultaneously, Miss Ruth Cohen happened to look out toward the *Arizona* at 8:10 a.m., when a bomb hit and ignited five hundred tons of gunpowder. She described the sight "as though a million Roman candles had suddenly been set off on the gray battleship which I knew was the *Arizona*—flaming pinwheels, unimaginable starry patterns of light."[31] The nurses and men aboard the *Solace* watched as the *Arizona* sank to the bottom of the harbor in a pool of burning oil.[32]

Nurse Agnes Shurr awoke to the call of "command battle stations." She and the rest of the personnel aboard the *Solace* braced for incoming casualties as they tried to communicate through the deafening noise of the bombs and anti-aircraft fire surrounding them, praying they would not be targeted or accidentally hit with anti-aircraft fallout.[33] Miraculously, the *Solace* emerged entirely unscathed from the attack. At 8:50 a.m., the *Solace,* seeking to create a safe distance between herself and the targeted battleships, re-anchored across the harbor.[34]

Once the crew of the *Solace* realized the Naval fleet was under attack, they immediately began to prepare for casualties. The nurses and corpsmen quickly set up an additional fifty beds in the officer's lounge. Bandages, dressings, dried plasma, tannic acid solution, saline solution, and other medical supplies were opened and prepared for immediate use.[35] Over 140 men were immediately discharged from the hospital ship, and bed bound patients were moved to the upper bunks to make more room on the lower bunks for casualties.[36] All thirteen nurses were aboard that morning, however the

commanding officer, the executive officer, and the senior medical officer, were all ashore and had to be picked up and ferried to the *Solace*.[37] Despite the lack of senior leadership, the nurses expertly attended their battle stations with little direction from Miss Lally. As she made her rounds of the wards, she found the ward nurses were already clearing the wards and the surgical nurse was setting up sterile supplies and dressings.[38]

Rescuing those Aboard the *USS Arizona*

Throughout Pearl Harbor, small rescue boats searched the waters for sailors who had abandoned ship. Oil on the water near damaged ships made swimming tiresome for the men overboard, especially those who were already injured.[39] Corpsmen from ships throughout the harbor rescued as many men as they could under continuous fire from the Japanese.[40] One corpsman reports rescuing forty-six people from the water in four hours, some of them dead. To make room for the living, the dead were attached to the boat by a rope around their leg and towed behind the boat.[41] Those rescued from the harbor were taken to the sick bay aboard the docked *USS Argonne*, to Landing C near Hospital Point, or aboard the *Solace*.[42]

The *Solace* launched its own rescue boats less than fifteen minutes after the start of the attack.[43] The boats rescued those in the water and headed for the *Arizona* as it continued to sink below the water. Corpsmen jumped onto the deck of the *Arizona* to help the injured off the sinking battleship. Despite the advancing flames, the *Solace* motor launch waited alongside the hull of the ship until those critically injured could come aboard.[44] One of the men who was rescued called the *Solace* "a welcome beacon and a haven for our wounded."[45] Men continued to be rescued from the wreckage for

days. Dr. Carleton, one of the physicians from the *Solace,* was on duty around 2:00 a.m. on Tuesday morning, when men were rescued from the capsized *Oklahoma* after treading water and oil for almost two days. They were brought to the *Solace* for treatment and were released back to service shortly after their rescue.[46]

Receiving Casualties Aboard the *Solace*

By 8:20 a.m., less than thirty minutes after the bombing began, the *Solace* began to receive casualties.[47] The crewmen lifted the wounded men out of the small boats onto the gangway.[48] Most men were filthy and covered in black oil and blood, making it difficult to quickly identify injuries or quantify the extent of the burned skin.[49] Chief Surgeon Captain George Eckert recalled, "Many were so seriously burned as to be unrecognizable. Those who were conscious tried to mumble their names, but no one whimpered." The second wave of attacking planes brought even more burned and blackened casualties, "with fuel oil matting together scraggly clumps of singed hair, clothing charred or completely gone, hands and forearms denuded of flesh, dark and claw-like."[50]

A medical officer and nurse worked together to triage the patients on the ship's quarterdeck. The physician would assess the patient's injury while the nurse wrote the information on the casualty tag. Severely injured patients were given morphine from pre-mixed "syrettes" immediately upon arrival.[51] From the quarterdeck, the patients were sent to the various wards, and a running census was maintained in the receiving room so no ward would be overwhelmed and patients could be more evenly distributed.[52] Twenty-three patients were placed in the fifty bed emergency ward, and the rest were

distributed throughout the ship. The collaboration between the doctors, nurses, and corpsmen in assessing, identifying, and assigning casualties while providing immediate treatment upon arrival was highly efficient and effective. Specifically, the use of syrettes to quickly administer morphine expedited the triage process and provided much needed relief to the injured sailors as soon as possible.[53]

Nursing Care Aboard the *Solace*

When the attack completed later that morning, the *Solace* had received over two hundred casualties. In total, 133 patients were admitted, twenty-six of which died within the first twenty-four hours, ten more died on the second day, and one additional man died on day three.[54] Approximately eighty patients received treatment and were released back to their ships.[55] The majority of casualties were burn cases, and many had complicating injuries from shrapnel or bullets in addition to their burns.[56] Patients with severe wounds requiring surgery were taken immediately to an available operating room.[57]

As soon as patients were received in the wards, any remaining clothing was removed and shock treatment was immediately initiated. However, establishing intravenous access on a patient with severe burns proved difficult, and most patients required the physician to cut down through the skin to visualize and access a vein. Once intravenous access was established, plasma and supplemental saline and glucose solutions were given to combat shock. Tannic acid was applied as soon as possible to the burn to prevent fluid loss through the injured skin, and plasma was given to replace what fluid had been or would be lost. The tannic acid served as a tanning agent, which created a thick leather-like eschar which covered the burn and prevented further fluid loss.

Patients in shock aboard the *Solace* were to be kept flat or with their head lowered, given morphine, and kept warm.[58]

Another initial challenge for the nurses and corpsmen aboard the *Solace* was the removal of fuel oil covering most of the casualties. The oil had to be removed prior to the tanning process in order for the eschar to form properly. This tedious and painful procedure was best accomplished with "the use of tincture of green soap and water." Captain Eckert also observed that the fuel oil alone could cause shock. He reported uninjured patients who were completely immersed and covered in fuel oil showed signs of shock despite having no signs of injury. Once the oil had been removed, the patients began to stabilize and returned to their original state of health in a few hours.[59]

Over seventy percent of the casualties aboard the *Solace* suffered from burns.[60] Most burns were considered "flash" burns, which occurred after a short exposure to high intensity heat, in this case from being close to an explosion. This caused mostly first- and second-degree burns, and only exposed areas of skin were affected. Twenty-six men were severely burned, with fifty to seventy-five percent of their body surface area burned. Two unfortunate cases were completely burned except for the small area covered by their shorts. Many others suffered from burns on their faces, so severe that they could not be recognized.[61]

The treatment for burns aboard the *Solace* began with treating shock and removing the fuel oil as explained previously. Some burns were treated with dressings dipped in a mixture of mineral oil and sulfa medication, but the majority received tannic acid dressings.[62] Fresh tannic acid solution was mixed in the pharmacy and distributed throughout the hospital ship wards and operating rooms. Burns were not immediately

debrided except for the removal of fuel oil, and sterile precautions were not practical given the number of casualties. Instead, tannic acid dressings were immediately applied to all burned areas including the face and hands, and moistened every hour for the next twenty-four hours. The dressings were removed on the second day once the eschar had formed, and patients were placed in heat cradles.[63] Heat cradles were frames placed around the patient to keep linens away from the skin. Overtop of the frame would be a blanket, and underneath the frame was an incandescent bulb which provided a dry heat source to keep the burned patient relatively clean, warm, and dry. Ideally, after three to four days, the eschar would begin to separate from the healthy new skin below, and could be carefully removed with Vaseline.[64]

Nursing care for the burn patients was labor intensive and difficult. In addition to the wound care and shock treatment described above, nutrition and hydration were critical for burn patients. Water or juice was offered at least once per hour by the nurses and corpsmen all day and through the night.[65] The floors in the wards were sticky with tannic acid, and the nurses and doctors continued giving plasma to those with persistent shock. Although most wounds involved burns, men on the *Solace* also came aboard with severed limbs, compound fractures and shrapnel wounds requiring surgery. The nurses in the operating rooms sterilized instrument trays and provided anesthesia while the surgeons amputated, set fractures, and removed shrapnel.[66] The nurses provided and directed the nursing care for the many injured men aboard the *Solace* following the attack.

Preserving Morale

One of the major challenges of being aboard a hospital ship was being isolated from resources, especially extra staff. The nurses worked straight through the afternoon, stopping only long enough to eat sandwiches and drink some much needed coffee. The nurses were so busy and engaged with their work they did not become distracted by thoughts of the situation between the United States and Japan.[67] Fortunately, in the afternoon the Red Cross sent between four to twelve nurses aboard the ship to augment the nursing staff, some of whom had not nursed in years.[68] They stayed on board for a few days, providing care and relief to the primary nursing staff. Medical and non-medical personnel helped in any way possible. The mess attendants kept up a constant supply of hot coffee and cold sandwiches.[69] The supply officer came through the wards with toothbrushes, towels, and toothpaste. The chaplain stayed and helped spoon feed water to patients able to swallow. The crew kept the wards clean and uncluttered as they brought in fresh water and removed soiled clothes and dressings.[70]

That night after the attack, the *Solace* used flashlights covered in blue cellophane to adhere to the blackout orders, despite the flaming *Arizona* lighting up the harbor like a torch.[71] At 9:10 p.m. on December 7, the air raid alarm sounded and everyone feared the worst. The planes could not be identified, and all around the *Solace* the anti-aircraft guns opened fire on the approaching aircraft.[72] Depth charges exploded beneath the water with reports of submarines in the harbor. Every time a light would shine in the harbor, people feared the Japanese had landed and were invading the island.[73] Inside the ship, the nurses put life preservers on the patients and mobilized them to abandon ship, if necessary. Although many of their patients could not sit up much less swim or move to abandon ship, the patients believed the nurses would help them to safety which offered them

comfort amidst the chaos.[74] To comfort both patients and staff, Miss Lally poured hot coffee and opened a can of cookies to share. These small comforts helped calm everyone's nerves and Grace Lally ordered the cook to always have cookies and coffee available in the wardroom for alerts.[75]

Life returned to normal relatively quickly aboard the *Solace* as the nurses continued to care for their patients. Despite the dreary circumstances, the nurses were committed to maintaining good morale aboard the ship. The nurses smiled, told stories, and laughed at the patients' jokes, even when they were not funny. Miss Lally, known for her sense of humor, led the nurses in this effort to keep spirits high, maintain a sense of security and safety, and assure the men that life would continue. It also helped that many of the men could not see the burning harbor outside the windows of the ship. "The harbor… was so full of black oil and charred wreckage that it would have been mass murder to drop a lighted match overboard."[76]

The injured men received comforting letters from home and shared them with the nurses. One man received a letter from his mother with words of encouragement, and shared the words with his nurse, Miss Agnus Shurr. "When you think your troubles are terrible, you need to put on a tight pair of shoes, and you'll forget about your other troubles." Miss Shurr doubted the young man could even put on any pair of shoes, but her patient smiled at the words, which reminded him of home.[77]

The nurses supported the patients and each other aboard the *Solace.* The nurses made a rule not to talk about their work in the nurses' quarters and fostered resiliency through smiling and joking together, sharing light-hearted stories, putting on make-up, and making themselves feel beautiful.[78] These rituals were as much for themselves as for

the patients; they wanted to be physically and emotionally available to provide a nurturing environment where the men could rest and recover.

On Christmas Eve, a tree was placed on the mast of the *Solace*, and the patient's burns had finally begun to heal.[79] The Red Cross had provided Christmas presents for the sailors, and the nurses added their own special touch with angel food cake and butter-pecan ice cream for two of the patients who craved a taste of home. As patients from the Naval Hospital ashore were discharged and transferred to the mainland, men from the *Solace* were sent to the Naval Hospital to await transport to San Francisco and eventually home. By February of 1942, the *Solace* was ready to leave Pearl Harbor and followed what remained of the Pacific fleet into the South Pacific.[80]

The Nurses of Naval Hospital Pearl Harbor

Naval Hospital Pearl Harbor is the primary Naval facility where nurses cared for the casualties suffered on December 7, 1941. Naval Hospital Pearl Harbor was located on the western shore of the harbor in an area known as Hospital Point. By 1941, the hospital originally constructed in 1915 had expanded to add additional buildings, and had been modernized to meet the needs of the fleet. Naval Hospital Pearl Harbor was the only permanent hospital structure for the entire Pacific fleet, and the biggest of the foreign Naval Hospitals.[81] The 250-bed Naval hospital was well equipped and well staffed in 1941; however, relative to the number of naval personnel in Hawaii and the preparation for war, the hospital was too small. The *USS Solace* and Mobile Hospital Number Two provided temporary additional medical support. The mobile hospital had just arrived and was in the process of being assembled, however it had not yet been unpacked.[82] Construction had begun on a new site for the Naval Hospital in Aiea Heights, which was further back from the harbor and offered more protection from attack than Hospital Point.[83]

In 1941, the Navy was renovating the nursing quarters at Naval Hospital Pearl Harbor, and the nurses were temporarily living in a one-story E-shaped building, across the street from the hospital. The old nurses' quarters still stood as an empty shell of a building and would be completely demolished in a matter of days.[84] On Sunday, December 7, the abandoned building would serve an important role during the attack on Pearl Harbor.

December 7, 1941

The early hours of Sunday morning, December 7, were like those on any other weekend morning in Hawaii. Many nurses relaxed in their quarters eating breakfast, which had been prepared by their staff in the nurses' quarters. Phyllis Dana was excited about her planned picnic later that day. Ann Davidson was on duty in the sick officers' quarters and was checking to see if the corpsmen had started making the beds.[85] After Genevieve Van de Drink's late night aboard the *Arizona*, she slept in that morning, until she awoke to unexpectedly loud noises outside.[86] As Ruth Erickson enjoyed her breakfast and coffee with two or three others on her Sunday off, she and her fellow Navy nurses heard planes roaring overhead. Believing it was training, they promptly attributed the sound to the "fly boys" on Ford Island, located in the middle of Pearl Harbor. Once she heard the foreign sound of ammunition flying and bombs dropping, Erickson knew something was amiss. She dashed to the nearest window, where she clearly saw a low-flying plane with the rising sun painted under its wing, so close she could see the pilot's goggles.[87]

The phone in the nurses' quarters rang and was answered by Chief Nurse Gertrude Arnest. When Arnest heard the news, she dropped the receiver and called to the nurses, "Everybody in your uniforms and over to the hospital."[88] Rosella Nesgis heard her and quickly reported to the hospital.[89] Arnest woke the remaining nurses, including Freda Connie, and made her way towards the hospital, through a hailstorm of fire and anti-aircraft shells, raising the alarm as she went.[90] Catherine Richardson and Frances Sonsalla had risen early that morning and driven to Honolulu for early Sunday mass. Assuming it was practice warfare, Richardson was highly irritated when a shell fragment splintered the windshield of their car. They arrived at the nurses' quarters for breakfast

when Eva Antonelli exclaimed, "The Japs [sic] are bombing! Come on over to the hospital." Richardson, still upset about her windshield and determined to have her morning coffee, ignored her. A moment later Antonelli's words registered in her mind and she jumped to her feet, her hand shaking violently with fear.[91] Both Richardson and Sonsalla changed quickly and rushed to the hospital.

At the hospital, nurses and corpsmen continued to complete their routine activities until they too noticed the strange activity outside. Valera Vaubel, the nurse dietician, was serving breakfast when she looked out the window and saw a bomb strike one of the airplane hangers on Ford Island.[92] Lenore Terrell was making rounds with the officer of the day and could hear the planes flying directly over the hospital. Although the rising sun on the side of the plane meant nothing to her, she knew something was wrong.[93] As planes never flew directly over the hospital, she knew they were under attack and went to notify the nurses still in quarters.[94] Charles Prather, one of the corpsmen, was getting ready to pass out the medications on his ward when the attack began.[95] As the bombs continued to drop, Helen Entrikin could hear glass breaking and see the lights swaying back and forth inside the hospital.[96] Regardless of whether the nurses were on duty or in their quarters, they quickly realized that Pearl Harbor was under attack, and their services would be needed immediately at the hospital.

The Japanese planes arrived flying low over Hospital Point, no higher than the flagpole sitting in front of the hospital.[97] The approximately twenty planes passing over Hospital Point did not open fire on the hospital, instead they presumably used all of their strength to cripple the Pacific fleet.[98] Approximately ten minutes after the attack began, a flaming Japanese plane hurtled out of control through the air, headed directly towards the

hospital. The plane swerved to the left, missing the hospital, but hitting the corner of the laboratory building and setting this building and the adjacent Chief Petty Officer's quarters ablaze.[99] Freda Connie watched as the plane crashed. She fought the desire to laugh, thinking of her father in Kansas, who had assured her she would be safe in Pearl Harbor because, "it was one of the best fortified places in the world."[100] The hospital fire department arrived and quickly extinguished the flames, and the only casualties were the two Japanese men who died in the crash.[101]

Preparing for Casualties at Naval Hospital Pearl Harbor

When it was clear that Pearl Harbor was under attack, the staff of the Naval Hospital immediately began to prepare for the arrival of casualties. The officer of the day was on the phone calling everyone to duty.[102] All patients ready to be discharged to duty were released.[103] One naval officer cut his cast off and hobbled towards his ship. A medical officer recovering from surgery got out of his bed and began to treat the incoming casualties.[104] Patients were quickly evacuated from the main hospital to make room for casualties.[105] Terrell remembered a patient, with both of his eyes bandaged, crawled under his bed with a just a blanket, so the bed space could be used for the wounded.[106] Those who were able to walk assisted with the evacuation of those who were bed bound.[107] The patients were moved into two old frame buildings and five tents that were being erected behind the main hospital building.[108]

Within half an hour, every Navy nurse was on duty at the hospital.[109] The nurses immediately began to prepare the dressing stations in the hospital to receive casualties. Ruth Erickson opened the orthopedic dressing room and began to draw water into

containers, in case they lost the water supply. She also set up the instrument boiler so they would be able to sterilize their surgical instruments.[110] Ambulances and fire-fighting equipment were dispersed throughout the area to avoid total destruction of their resources in case of a hit. Chief Nurse Gertrude Arnest assigned her nurses to the various emergency stations.[111] All dressing stations were staffed and ready by 8:15 a.m., and as medical officers arrived from their homes off base, they were sent to various stations.[112] Four operating teams were assigned to the operating suite and were ready to receive casualties.[113] The nurses made sure all beds were open, set up first aid kits, and had extra blankets available.[114]

Sorting Casualties

The first casualties started arriving around 8:30 a.m., and men were swarming the hospital by 9:00 a.m.[115] Similarly to Hickam Field, patients were transported by all possible means. Civilians drove the wounded to the hospital in their cars.[116] Other injured sailors came strapped to all-terrain vehicles, in the back of food delivery trucks, or in ambulances. Rescue boats swarmed Landing C, the small dock on Hospital Point. Men who were just discharged from the hospital returned carrying their friends and stayed to help care for them.[117] Burned men who had run aground aboard the *USS Nevada* off Hospital Point swam through the oily waters to the shore.[118]

By 9:15 a.m. the entire staff of the hospital had reported for duty.[119] The original plan was for the nurses and corpsmen to undress, bathe, and dress the wounds in the examining room as the men entered the hospital, to then be sent to the wards. After the first person cleared through the dressing room, the idea was abandoned and men were

brought immediately to the wards for care.[120] The senior medical officers at the hospital decided that a receiving ward would cause a "hopeless bottleneck" and was not used.[121] Instead, the Commanding Officer and Executive Officer at the hospital began distributing casualties to various dressing stations and wards as they arrived.[122]

The ward dressing stations, critical to the triage process, were crowded yet surprisingly efficient. Mattresses were laid on the floor, and Freda Connie and other nurses assisted the medical officers and corpsmen in the care of the wounded.[123] Men arrived with burns and fractures, many of who were wearing tags stating the amount of morphine they had received and any other treatment provided prior to their arrival at the hospital.[124]

At the receiving stations, doctors would examine the wounded and nurses gave morphine for pain and provided first aid treatment. Other nurses would bring more morphine and switch out the supply of used needles for sterile needles.[125] Nurse Phyllis Dana was working at another receiving station in Ward A and trying to save two men who had suffered multiple gunshot wounds. Although there was little she could do for them in the moment, the chaplain encouraged her to get their information so she could write to their families. Days later, Dana eventually wrote those letters, providing what little comfort she could to their families. She wrote that these men had died in a hospital, and were receiving care when they died.[126]

The nurses also helped to re-prioritize patients for surgery. Vaubel wandered from ward to ward, helping where she could, when she happened upon a young man. She noticed a small puncture in his abdomen and realized he had been shot in the abdomen and needed surgery. It appears the triage officers had initially missed the wound and

errantly sent him to the ward instead of the operating theater. Vaubel ran to the operating room and he was the next patient to receive surgery.[127] Although her training as a dietician had not prepared her to assess war casualties, she was able to immediately recognize the seriousness of the patient's injury and redirect his care accordingly.

Those with severe wounds, compound fractures, or other injuries requiring surgery, went immediately to the operating room.[128] Those with minor injuries were sent to the old nurses' quarters, which had been arranged as a receiving station. These patients were quickly treated and released back to their ships.[129] The rest of the casualties went to one of the twelve wards with available beds. Medical officers attempted to segregate burn cases to the medical wards and surgical cases to the surgical wards, but in reality all wards received a variety of patients.[130] By the afternoon of December 7, the Naval Hospital Pearl Harbor had received over four hundred casualties.[131]

Like other hospitals, admissions records could not be kept initially. Men were tagged with critical information when possible. None of the patients were wearing metal identification tags, and information such as name, next of kin, religion, or health history was deferred to be collected much later. Some men who arrived unconscious died without being identified.[132]

Casualties of varying types and severity arrived at the hospital. Men suffered from a range of injuries from simple contusions to gunshot wounds, and the majority were covered in oil and extensively burned. Nurse Valerie Vaubel remembered the faces that were so badly burned that "you couldn't see their eyes and their nares were closed and even their mouths were just slits."[133] Almost half of all the casualties that day had burns, many of which were complicated by shrapnel and gunshot wounds to every part of

the body imaginable. Almost all the patients were in shock.[134] As on the *Solace,* the burns were primarily first or second degree, resulting from flash burns or swimming through burning fuel oil.[135]

Several corpsmen were injured and killed at Pearl Harbor, and nurses occasionally cared for men they had worked with in the hospital. Van de Drink was on her way to get supplies when she heard her name called from a gurney. She looked over and recognized one of her hospital corpsmen with serious internal injuries and several limbs missing. She remembered spending his last moments with him, being present in his suffering: "I have never forgotten the fear in his eyes as I held his good hand and tried to comfort him. He died within minutes, but not without prayers of peace."[136]

Operating Beyond Capacity

While some nurses worked in triage and on the wards, others were busy in the operating room. The four surgical teams working in a two-team relay, worked in the main operating suite continuously for three days and nights. [137] Other surgeons performed minor procedures in the ward treatment rooms. [138] Despite their best effort, surgical cases lined the corridors, patiently waiting for surgery despite their critical injuries. Patients would voluntarily give up their place in line to others they thought were more critically injured.[139]

The Naval Hospital Pearl Harbor was quickly overloaded. Routinely, it had twelve wards, which accommodated approximately twenty-five patients each. Even with the evacuation of all of their existing patients, it was not enough space. With over 400 admissions in less than three hours, the hospital struggled to accommodate all of the

casualties. Eight wards were dedicated to burn patients.[140] The operating rooms were crowded and men lined the halls. Entrikin was assigned to an orthopedic ward, and to relieve some of the cases in the operating room, she and the orthopedist set up a mini-operating room in the orthopedic dressing rooms. This was used for suturing, setting broken bones, and other procedures that did not require general anesthesia.[141]

In total, 452 casualties were admitted to the 250-bed hospital that day, and 313 were taken to the hospital morgue.[142] Patients that died in the hospital were quickly moved to the morgue and another patient took the bed before it had a chance to become cold.[143] The majority of the patients arrived within the first three hours, but ninety-three additional patients were transferred from ship sick bays, nearby plantation hospitals, or first aid stations throughout the afternoon and evening.[144] By midnight, the hospital census had reached 961 patients.[145]

Managing Supplies

Despite the large influx of casualties, for the most part, the nurses had sufficient supplies, despite depleting three months of medical supplies in one day.[146] The supply officers promptly addressed calls and requests from the wards for needed supplies.[147] To augment their supplies, the Red Cross released almost 20,000 dressings to the Naval Hospital. These dressings were critical in the care of burn patients.[148]

Some shortages did occur however. Hospital personnel reported a shortage of tannic acid and plasma, which could have been predicted given the unprecedented number of burn cases.[149] To stretch the tannic acid supply and save time, flit guns were repurposed and used to spray tannic acid on the burns to keep the dressings moist.[150]

Plasma arrived from the plasma bank in Honolulu as soon as it was available.[151] Morphine also ran low. Helen Entrikin went to get more from the locked cabinet and found the door open and the cabinet empty. The Chief Nurse found more and nurses were able to continue their critical work relieving the suffering of the burn cases.[152] There was also a shortage of oxygen masks. On ward B-1, they had a number of asphyxiation cases in need of oxygen. There were not enough oxygen masks, so corpsmen John Kevin "went from one patient to another giving a little oxygen to each of them."[153]

Burn Care at Naval Hospital Pearl Harbor

Patients with major burns were grouped together as much as possible. The influx of new burn cases were placed in newly-prepared temporary wards.[154] Almost half, or approximately 250 patients, were admitted with burns.[155] Of those surviving the first few hours, nearly half of those with burns (125 patients) were categorized as serious. These men had only a sixty to seventy percent chance of survival under ideal circumstances.[156] Due to the high number of critical cases, the staff was unable to thoroughly clean and debride each burn using aseptic techniques. The appearance and extent of the burns was something the nurses had never before experienced. Nurses Phyllis Dana and Ann Tucker were assigned to a forty-bed burn unit. Dana recalled, "looking up and seeing a graying man standing in the doorway and thinking, 'Why is he gray?' It turned out he was nude and burnt gray and still walking into the hospital."[157]

The pattern of burns at Pearl Harbor was unique and memorable for the nurses. As even light cotton clothes were enough to protect the underlying skin from a flash burn,

the explosions burned only exposed skin. Freda Connie stated she could always tell what the men had been wearing when they had been burned. Author Page Cooper precisely depicted the appearance of these men later, writing about them in *Navy Nurse*.

> Those who were in shorts and no shirts were a total mass or burns - back, chests, and abdomens - all except on their thighs; on some the broiled flesh on the arms stopped at the line of the cap sleeves of their undershirts, making their arms look as though they were encased in mottled hideous sixteen-button opera gloves, while those who were wearing shirts and trousers escaped with singed hair and blistered hands and faces.[158]

Another author described the men as "photographic negative[s], their absent clothing printed on their bodies in white."[159] Had the tropical uniform of the Navy been more substantial, the extent of the burns could have been minimized.

The patients had orders for a variety of different treatments for their burns at the Naval Hospital. Similarly to the *Solace*, tannic acid was commonly used to "tan" the burned skin. Corpsmen used flit guns to spray tannic acid solution over the burned bodies. Oils mixed with sulfa were also used to protect and sooth burns.[160] Others caked the sulfa powder directly onto the burns, or used other tanning agents such as boric acid or gentian violet spray.[161] Each of the eight burn wards used a different treatment plan for the burns, as the gold standard for burn care had yet to be established, and the medical officers used this tragic opportunity to research the efficacy of a variety of treatments.[162] Occasionally, the same patients would receive two different burn treatment regimens, one for the left side and the other for the right side. Doctors Ravdin and Long from the National Research Council arrived in Pearl Harbor with a new product to treat shock—crystalline albumin, from Harvard University. The nurses administered the albumin to severe burn cases as ordered. However, to properly measure its effect, patients receiving albumin required frequent blood chemistries and blood draws, which was not feasible for

the overworked laboratory staff.[163] Although the ethics of this impromptu research project were questionable, physicians were able to learn a great deal about the best treatment for burns.

The nurses and corpsmen on the burn units were constantly busy providing care for the burn patients, especially in the first two to three days after the attack. When patients arrived on the burn wards, clothes were promptly removed and any fuel oil on the skin was quickly washed off with soap and water. Most patients required intravenous therapy in the form of plasma or saline solution to prevent shock. Corpsmen John Kevin worked alongside a volunteer civilian nurse in Ward G. Together they went from patient to patient placing IV catheters anywhere they could find a vein.[164] The carpenters on the base made makeshift IV poles out of wooden sticks with nails on the top to hang IV fluid or plasma.[165] The initial supply of two hundred flasks of plasma from the plasma bank was quickly depleted. However, thousands of island residents lined up at Queen's Hospital to donate plasma, and the blood bank was able to provide an additional 700 flasks of plasma in one week to all of the medical facilities on Oahu, including the Naval Hospital.[166]

Critically ill patients with burns had to be frequently repositioned in order to keep the burns clean and dry. Repositioning often required several staff members and was both a difficult and delicate task. Patients were lifted off the sheet, and often the burned skin would come off with the sheet. The new sheet was oiled to try to prevent it from sticking to the skin and the patient was placed on the new sheet. Vaubel was assisting with this procedure, holding a patient's leg, and felt the lower leg separate from the knee

as she was holding it. She barely kept from fainting, and told the physician what had happened before she left to continue with her other duties."[167]

Keeping burns clean and dry was the main priority for the nurses. Heat cradles were also an important nursing intervention to prevent infection and facilitate healing of the burns. Bed cradles were wooden or metal frames placed over the body and covered with a blanket or sheet. This allowed the patient to stay warm while avoiding the contact of the blanket with his skin. Heat cradles added a light bulb under the frame to produce extra heat and to dry out the burns. For those with burns on both the chest and the back, patients would lay on sterile sheets soaked in sterilized mineral oil and sulfadiazine.[168]

The burned skin healed slowly as the nurses and corpsmen continued to perform the intensive nursing work required for their patients. Every day, dressings would be changed. Dead skin would be removed when the skin sloughed off, or by cutting the skin off surgically. Intravenous catheter sites had to be changed frequently as the initial sites did not last long under the circumstances. Patients continued to receive plasma, saline, and glucose solutions for days after the initial burn.[169] Pain was relieved with morphine and phenobarbital.[170]

Nutrition was also essential in the recovery of burns. As veins were difficult to access, drinking fluids by mouth was an important way for burn patients to stay hydrated. Unfortunately, the stench of charred skin killed any appetite the men had and many did not want to eat or drink anything. Patients persisted on a diet of juice, water, and gelatin. Fortunately, the Coca-Cola company donated a large supply of Coca-Cola to the hospital. Although Coca-Cola may not be the best nutritional choice, Vaubel, the nurse dietician, was finally able to get her patients to take fluids by mouth.[171] The cola offered both

hydration and sugar to provide calories to the healing patients. To combat the smell of the burned skin, some of the nurses kept a perfumed handkerchief in their pockets and would sniff it while feeding a patient. One patient asked if he could smell her handkerchief also, because the smell of the burned men was overwhelming him as well. The patient was then able to eat and drink more, and he began to heal and recover.[172] After that, the nurses routinely offered perfumed handkerchiefs to their patients, which helped them to eat and drink.[173] Diets high in protein, vitamin C and vitamin B1 were encouraged as much as possible to promote healing.[174]

In addition to the physiological impact of burns, the nurses also had to consider the psychological impact of the burns in their care. Faces were frequently burned and unrecognizable to even the closest friends and relatives. One patient burned in the harbor stated that his own brother was unable to recognize him due to his burned face. "My brother came in on Wednesday after the attack looking for me. And he said he finally found a group of us all lined up and they had tagged my toe already. That's how he identified me. But he said even he didn't know me. He said we looked like roast turkeys lined up. But I didn't even know he was there."[175] Patients were also understandably angry because of their severe burns. Rosella Nesgis remembered ironically hearing the song, "I Don't Want to Set the World On Fire" on the radio while working in the full burn ward on the day of the attack. One of the patients bitterly yelled across the ward, "Lady, you're too late. It's done been set."[176]

Processing the Dead

Although the medical department worked tirelessly to save as many lives as possible, hundreds of men were killed and their bodies brought to the hospital. With the arrival of over 300 dead sailors on December 7, the Naval Hospital struggled to find places to store and identify the bodies. Bodies were stacked in the passageways between the wards and the toilets until they could be relocated.[177] The basement of the old nurses' quarters was converted into a temporary morgue, and was constantly under guard.

As early as 11:00 a.m., a team of medical officers and corpsmen began the difficult work of identifying and preparing the dead for burial.[178] Some men wore clothing marked with several names, and most were not wearing identifying tags, further complicating the process.[179] In other cases, the bodies were burned and mutilated beyond recognition or fingerprinting, or only part of the body had been found and brought to the morgue.[180] Many of the men were unable to be identified. Phyllis Dana remembers looking outside the ward window on December 8 and seeing many green bags piled around the outside of the old nurses' quarters. She did not immediately recognize what was in the bags, but was shocked when she later learned they were bodies.[181]

Each body was labeled and recorded and placed in an appropriately labeled casket.[182] Interments started the next day on December 8 at the Oahu Cemetery and were continued at the Halawa Cemetery. The bodies were later transferred to the Punchbowl National Memorial of the Pacific."[183] Unfortunately, the nurses could not be released from their duty to attend the funerals.[184] On December 9, the Navy Medical Department established a new temporary morgue on a small dock on the harbor, since the majority of the bodies found would be from the water and not from the hospital.[185]

Night Duty at Naval Hospital Pearl Harbor

The days were long and hard for the nurses, but the nights were even worse. Rosella Nesgis dreaded night duty, as it seemed like most patients would die between 4:30 a.m. and 5:30 a.m. She recalled comforting the men during their last moments: "Many a time, I'd sit by the bed of a young man, boy, who was burned, as he died talking about his family…You'd hold their hands and talk to them about their families."[186] Nurses were present with patients as they died, providing comfort and reminding them of their home.[187]

Inside the hospital, nurses worked by the light of dimmed blue lights as the hospital windows were sealed and covered during blackouts.[188] The operating room and one medication room were blacked out first so they could continue to be used throughout the night. Sealing in all light also meant sealing in the odor and heat, and without air circulation, the stench of charred flesh and death was almost unbearable.[189] In this environment, the nurses calmly continued their work, continuously rounding on their patients, putting blue cellophane over the lights of the heat cradles, and changing or reinforcing dressings with mineral oil and sulfa powder as needed.[190]

Approximately twelve hours after the Japanese attack, the air raid alarms sounded, gunshots exploded in the night, and everyone within the hospital was on edge. As there were nineteen diagnosed cases of "shell shock" (neuropsychiatric trauma) reported at the hospital (and probably many more cases that were undiagnosed), the nurses provided comfort to these men.[191] Despite their own fear, the nurses moved to comfort their patients, who were no doubt terrified of another Japanese attack. Ruth Erickson vividly recalled those moments. "My knees were knocking together and the

patients were calling, "Nurse, nurse!" The other nurse and I went to them, held their hands a few moments, and then went on to others."[192] The raid was over relatively quickly as the planes were American, not Japanese; however, the fear associated with the threat of another attack was very real.[193]

Helen Entrikin described the "aura of fear" present throughout Hawaii in the days that followed. No one knew if or when the Japanese would return, and few nurses had time to contemplate what would happen if they did, for they were too busy with their work.[194] Rumors and stories of the Japanese spread in whispers throughout the hospital, though no one had any legitimate information to discern between fact and fiction.[195] However, the nurses were too exhausted and distracted by their work to sit and contemplate the likelihood of a Japanese invasion.

Volunteers and Reinforcements Arrive

The medical staff at Naval Hospital Pearl Harbor worked to the point of exhaustion for the weeks following the bombing. For the first twenty-hour hours, many nurses worked continuously.[196] Others were sent home late in the afternoon only to come back and cover a shift that evening.[197] After the first day, the nurses worked a grueling schedule of eight hours on, four hours off, for the next two weeks. [198] Many of the nurses stayed and slept at the hospital for ten days, going back to the quarters only to change clothes or bathe during their little time off.[199] When Valerie Vaubel returned to the quarters to quickly change clothes, she noticed the nurses' clothes on the clothesline outside had holes in them from the attack. [200] Nurses who stayed at the hospital slept in the basement with some of the Navy dependents. Others tried to rest on mattresses on the

floors of the women's bathroom.[201] Nurses would put mattresses on the floor and sleep where and when they could, usually for only two hours.[202]

Although the nursing staff worked as efficiently and enthusiastically as possible, it was impossible for them to care for all of their patients indefinitely. Under normal operations, the 250-bed hospital staffed almost thirty nurses. With an almost four-fold increase in capacity, a proportional increase would be needed to supplement the nursing staff. Between eight and ten volunteer nurses who were wives of sailors reported throughout the day to offer assistance.[203] However, the most substantial aid was provided by the Red Cross, which supplied 114 registered nurses to the Naval Hospital, with as many as twenty-six nurses on duty at one time.[204] The Red Cross's prior recruitment and organization of nurses in Hawaii was critical for staffing the hospital after the attack.

Other volunteers from the area reported to the hospital to help. Medical corpsmen and physicians reported to the Naval Hospital from their damaged battleships. Two surgeons assigned to Mobile Hospital #2 reported for duty at the hospital, and a physician recovering from renal surgery at the hospital also assisted the other doctors.[205] Additional volunteers were found from among the patients and servicemen. Men from the crippled battleships came to the hospital to help feed their friends and boost their morale.[206]

Transferring Casualties

On December 19, the first transport back to the mainland was scheduled to leave Pearl Harbor. Nurses Ruth Erickson, Catherine Richardson, and Lauretta Eno were selected to travel back to the United States with the first transport of casualties from

Naval Hospital Pearl Harbor. These nurses accompanied those well enough to travel that would need more than three months of hospitalization. The three Navy nurses and additional Red Cross volunteer nurses aboard the *SS President Coolidge* were responsible for the 125 patients aboard the ship, with one Navy nurse covering each shift.[207] The transport ship reached San Francisco on Christmas Day, 1941, and the patients were evacuated to the mainland hospital.[208]

Auxiliary First-Aid Care

In addition to the excellent care provided aboard the *USS Solace* and at the Naval Hospital Pearl Harbor, men injured also received care at a number of first aid stations, medical dispensaries, plantation hospitals, and aboard hospital sick bays. A total of ninety-three patients were transferred from these facilities to the Naval Hospital throughout the evening following the attack. Mobile Hospital Number Two, which had not yet been assembled, was an important asset to the medical response. The corpsmen and medical officers assigned cared for 110 casualties, and four medical officers reported to assist at Naval Hospital Pearl Harbor after the bombing.[209] Aboard the ships, first-aid supplies, dressing stations, and sick bays were staffed and supplied to provide first-aid care to the wounded men.[210] Men injured on the Marine base at Ewa were treated in medical tents and the local plantation hospital prior to their transfer.[211] The tents were abandoned because they caught on fire during the attack, offered no protection from machine gun fire, and much of the equipment and supplies were damaged in the attack.[212] Naval airmen on Ford Island received life-saving care at the dispensary. Supply and personnel shortages caused the medical staff to use liquor to wash the oil off the burns and other creative measures to provide first aid care.[213]

Although the Navy nurses were not assigned to any of these areas, the care provided prior to being transferred to the Naval Hospital or the *Solace* was invaluable. The decentralization of medical care in the Navy reduced bottlenecks at the hospital, allowing for a more constant flow of casualties rather than an immediate surge. It also allowed many of the patients to receive prompt treatment for shock, initiate care for their

burns and other wounds, and receive pain medications prior to transferring to the hospital. This decreased the initial workload for the nurses and other staff at the Naval hospitals immensely, given the tremendous influx of casualties and shortage of trained nurses relative to the number of patients.

Fluid Resuscitation

Blood plasma was used throughout the medical facilities in Oahu after the Japanese attack; however, it had particular importance in the care of burned patients.[214] Plasma differs from whole blood in that plasma has had the red blood cells, white blood cells, and platelets removed. Plasma, when available, was a first-line treatment against shock at Pearl Harbor in addition to heat and saline solution.[215] Unfortunately, wet plasma was not widely available at the Naval hospital until days after the attack, and nurses and physicians quickly depleted their supply.[216] A total of 175 liters of plasma were administered at the Naval Hospital, which amounts to less than one liter of plasma per burn patient.[217] This supply fell short of one Naval physician's recommended range of one to six liters of plasma for severe burns over the first two to four days.[218]

To compensate for this shortage, nurses and corpsmen administered saline and glucose solutions; however, these often worsened the edema and were believed to further dilute the blood by washing plasma protein out of the blood and worsening shock.[219] As evidenced-based guidelines regarding fluid administration had yet to be standardized, orders regarding fluid resuscitation varied between physicians and were based on clinical judgment. Some physicians roughly estimated that equal parts of saline and plasma should be used following a substantial burn, but as plasma was scarce, this was often

impossible.[220] Dr. Ravdin and Dr. Long, experts from the mainland, offered a formula to estimate the amount of plasma required based on cell pack (hematocrit) and total serum protein. However, due to the number of cases, it was impossible to get baseline or repeated lab values for patients in order to guide treatment.[221] Due to a lack of plasma and limited science in the fluid resuscitation of burns, patients were often given erroneous amounts of fluid or plasma to their detriment.

Burn Care

Sixty percent of casualties from Pearl Harbor suffered from burns. Many of these burns were eighty percent surface area or greater, and were mostly first (redness) or second (blistering) degree burns.[222] Of the 254 burn cases admitted, twenty-five died in the first twelve hours, and an additional thirty-seven died within the following three days.[223] Of the remaining 192 burn cases, half of them suffered from forty to seventy percent surface area burns. At the time, the expected mortality of severe burns was between fifteen to twenty percent, and the mortality rate at Pearl Harbor was about thirty percent.[224]

As previously stated, most burns were categorized as "flash burns" from exploding bombs, or were burns from fuel oil. Burns were predominately limited to exposed skin.[225] Unfortunately, many were wearing shorts and short-sleeved shirts, as that was the Navy combat uniform at the time, exposing their arms, legs, and face to the heat.[226] Hand burns were common from sliding down ropes while abandoning ship, beating down flames off clothing, or grasping searing hot metal ladders or rails.[227] Multiple shrapnel wounds additionally complicated many of the burn cases.[228]

Initial treatment for burn patients was relatively standard among the physicians at both Naval hospitals. Clothing was first removed and fuel oil was ideally removed from the skin.[229] Shock treatment with morphine and blood plasma was initiated as soon as possible, however it was usually only needed for those with burns of twenty percent surface area or greater.[230] Removing the oil was both difficult and painful, and the nurses and corpsmen used a variety of products including ether, tincture of green soap, petroleum jelly, mineral oil, and copious amounts of soap and water.[231] In many cases, the nurses and corpsmen did not have time to clean off the fuel oil and the burn treatment was applied over the oil.[232]

As the majority of the burns were first and second degree burns, nerve endings in the skin were still viable, causing the burns to be excruciatingly painful. Liberal use of morphine and occasionally anesthesia was needed to properly treat and debride burns without causing the patient absolute agony.[233] At the Naval Hospital, one group of doctors and nurses was dedicated to giving morphine to burn patients with an initial dose of a half grain (approximately 30mg) and follow up doses of a quarter grain as needed. The morphine also helped ease the anxiety, emotional tension, and shock of the patients suffering from burns.[234]

Various methods of tanning, or hardening, the skin were used on burn patients aboard the *Solace* and at the Naval Hospital Pearl Harbor. Tanning was an important step in the treatment process as it helped to quickly dry the burn, preserving plasma within the body and defending against persistent shock.[235] Different tanning agents including tannic acid, picrate solution, triple dye, and gentian violet were all used to tan the skin at Pearl Harbor, with tannic acid being the most common agent.[236] Wounds should have been

completely debrided and sterilized prior to tanning the wound; however the nurses, doctors, and corpsmen did not have the time or resources to do this for the hundreds of burn victims arriving for care. Arresting fluid loss and preventing death from shock was prioritized above creating an aseptic wound. Often silver nitrate or sulfanilamide powder were mixed in with the tanning agents to help prevent infection; however, infection beneath the tanned skin was common at Pearl Harbor.[237]

The nurses and corpsmen applied tanning agents to some men by soaking dressings in the tanning solution and applying them to the burned skin. The dressings had to stay moist during the tanning process, and nurses and corpsmen walked up and down the wards with sterilized flit guns, spraying tannic acid, gentian violet, and triple dye onto the dressings every thirty to sixty minutes until the tanning process was complete.[238] All burns including those on the face, hands, and feet were tanned, and only the eyes were protected from the tanning solution.[239] For the majority of patients, dressings were not applied and the tanning agent was sprayed directly on the skin and left open to air.

For patients with dressed wounds, dressings were left undisturbed except for being repeatedly moistened and checked at twelve, eighteen, and twenty-four hours to ensure the underlying tissue was not damaged. For those without dressings, nurses used heat cradles and oiled sterilized linen to keep the wounds clean, warm, and dry, and to prevent the skin from sticking to the linen as much as possible.[240] Once the skin turned brown and the eschar had formed, the tannic acid dressings were removed using fresh tannic acid solution or an oil-based ointment. The advantages of using tannic acid were that once the tannic acid was exposed to air and heat, a leathery surface would form over

the burn, desensitizing the skin and preventing fluid from seeping out of the wound. The hardened outer layer formed a scaffold for the growth of new epithelial cells beneath, and gradually separated from the new skin.[241] Given the large number of burn cases, tanning quickly provided an eschar for the burn cases, significantly reducing the nursing time required per patient. Tanning also had major disadvantages. When applied to the fingers or toes, the eschar constricted the extremities, decreasing blood flow and causing necrosis.[242] Scarring could also be severe, and for this reason, tanning of the face was not recommended. However, Captain Eckert, a physician aboard the *Solace*, reported no scarring on the face or hands of his patients with only first or second degree burns.[243] The major disadvantage to tanning was the high incidence of infection beneath the eschar, mostly due to the lack of debridement and sterilization of the wound prior to applying the tanning agent.[244]

Preventing infection is one of the most important goals in burn care. Although all physicians agreed that careful debridement and aseptic technique were the best ways to prevent a burn from becoming infected, this was not always possible on December 7.[245] One physician went as far as to condemn early debridement of burns, as he believed it worsened shock.[246] In burns that did become infected, sulfa powder mixed in mineral oil, oral or injected sulfa therapy, or moist boric acid dressings were applied.[247] Sulfa applied directly to the wound was not recommended as it would often cake or stick to the healing skin and would not dissolve into the wound. If infection was found beneath the tanned eschar (which is often was), the eschar was removed, the skin cleaned, and the wound dressed with sulfa and saline or mineral oil dressings.[248]

In the days following the attack, burned patients were bathed daily, wounds were debrided and treated as needed, and plasma and other intravenous fluids were administered.[249] Debridement began three days after the attack, and most of the results were the same regardless of the different forms of treatment over the past three days. Serious, critical and mild cases were segregated by ward, and corpsmen were trained by the nurses and physicians to properly debride the burns. Wounds were cleaned and debrided using sulfanilamide powder, mineral oil, Vaseline gauze, gentian violet, and boric acid dressings as needed.[250] The crust was removed as it separated from the skin, which began anywhere from three days to two weeks after the initial burn.[251] Nurses and corpsmen kept careful records of therapy, forced oral fluids, changed the bed linens, managed their patient's pain, and administered plasma and fluid as needed and as availaible.[252]

Surgical Wound Care

Although the majority of Naval casualties from Pearl Harbor were from flash burns, shrapnel and bullets also injured many Naval men, causing injuries similar to the majority of those seen in the Army. As with the Army hospitals, the Navy also practiced delayed closure of wounds. The large influx of casualties prevented the surgeons from debriding all wounds within the six-hour standard, and many wounds had to wait three to four days before receiving proper debridement.[253] It was believed that the bacteria present in the wound remained on the surface for the first six to eight hours, and mechanical cleaning could adequately disinfect wounds. After six hours, risk for infection increased as the bacteria would have migrated deeper within damaged

tissues.[254] Patients with delayed debridement were initially treated with local anesthesia (injected Novocain), grossly contaminated or dead tissue was removed, and sulfanilamide powder and a Vaseline or plain sterile dressing was applied.[255] Wounds debrided immediately were not always covered in sulfa and one physician reported operating on twenty-four cases without the use of sulfa and without any post-operative infections.[256] Post-operatively, nurses anticipated those with war wounds would require oxygen as needed, sulfonamide drugs, and frequent turning to prevent post-operative atelectasis.[257]

Soft Tissue Injuries

Simple and compound fractures were a relatively common injury for the men wounded during the Pearl Harbor attack. Fractures were treated similarly in both the Navy and Army, with a few exceptions. Traction was not often used in the Navy at Pearl Harbor as it prevented patients from quickly evacuating the hospital or ship, and was bulky and cumbersome to transport aboard a ship. Instead of traction, the Navy opted for open operation with plating or reduction of the fracture.[258] Both Navy and Army care emphasized tetanus immunizations, shock treatment, debridement, reduction of the fracture, delayed wound closure, and using sulfanilamide to reduce the risk of infection.[259]

The Army delayed placement of or did not use full plaster casts, but they were used extensively in the Navy. Plaster casts completely immobilized the effected extremity, which was believed to decrease muscle spasms, decrease swelling, evenly distribute pressure over the wound, and would confine any infection to only the wound, keeping it from spreading to the bone or adjacent soft tissues. Post-operatively, wounds

were covered with sterile Vaseline gauze, and wounds involving extensive soft tissue injury or compound fractures were placed in a plaster of Paris cast as soon as possible. When dressings were changed, the cast was removed, dressing changed, and a new cast applied.[260]

Effective communication between the orthopedic team and the x-ray department expedited treatment for these patients. The extremity was quickly x-rayed, and the position of the bone fragments was drawn onto the plaster cast.[261] The films were punched, marked with baggage tags with identifying information, and attached to the patients' bed. Once the patient had been given the medical attention required, his bed tag was marked with a large red "X" to prevent redundancies in care.[262] These measures improved the communication between nurses and physicians, especially once patients were evacuated to a mainland hospital.[263]

Blast Injuries

A unique type of injury seen primarily in war is referred to as a "blast" injury, which had been well-documented and described by British physicians treating victims of the German blitz attacks.[264] Blast injuries were caused by the enormous pressure increase from a detonating bomb, and caused damage to air-filled spaces due to the sudden change in pressure. Many dead bodies found near the detonation site appeared to have no external injuries; however, the autopsy often found micro-hemorrhages in the brain, lungs, adrenal glands and other organs containing air space. Those who survived would initially appear relatively healthy except for acting dazed or confused, and without obvious changes in blood pressure or pulse indicative of shock and severe injury, but

would begin to become ill soon after the blast.[265] There were twenty cases of blast injury diagnosed at Naval Hospital Pearl Harbor, fifteen of which recovered fully.[266]

Depending on the severity of the injury, patients often had symptoms of shock, shortness of breath, chest pain, cough, and restlessness.[267] Symptom onset was usually delayed anywhere from hours to days after the blast.[268] Those subjected to a blast in a confined space (such as below deck on a battleship) were more susceptible to these injuries.[269] It was advised to treat all soldiers located near the blast zone as having the potential for a blast injury, as early treatment and recognition was paramount to recovery.[270] Oftentimes, blast injury was confused with psychic trauma; however, the injuries and treatment of the two differed immensely. Treatment included strict bed rest, shock treatment, hydration therapy (both orally and intravenously), morphine for pain and restlessness, and continuous high-flow oxygen. Pneumonia was a common complication, and many patients were given prolonged sulfa therapy. Uncomplicated cases would recover in four to fourteen days.[271] General anesthesia was strongly contraindicated two to three days after a blast injury, as it could often be fatal.[272]

In addition to the respiratory and circulatory systems, the brain could also be affected by blast injury. In minor cases, patients usually exhibited loss of consciousness without retrograde amnesia and neurologic changes that resolved after several days. In severe cases, persistent coma, subarachnoid hemorrhage, and increased intracranial pressure were common. It was thought that although the brain was susceptible to blast injures, the skull offered protection to the dramatic pressure change and the brain was more resilient than the chest or other hollow organs.[273]

Mental Trauma

Mental trauma, also referred to as neuropsychiatric trauma or "shell shock," was recognized as a potential hazard to the recovery of the patient.[274] This was especially true aboard the *Solace* as the patients were still floating in the harbor, amidst the burning ships. For the nurses and many physicians, Pearl Harbor was their first exposure to patients suffering from mental trauma. Dr. William Carleton, a physician aboard the *Solace* remembered caring for a man who "you could stick pins in all over and he [did not] feel it."[275] Dr. Eckert, another physician aboard the *Solace*, attributed mental trauma as the cause of death for the otherwise unexplained passing of two of his patients:

> Two patients with rather mild shrapnel wounds, with very little loss of blood, were operated on the night of December 7. They were, according to all our present standards, in excellent shape for operation…Several hours after operation, both suddenly went into shock and despite all the measures previously described, they died in the next two hours. We were at a loss to account for these deaths except in the following manner. One must consider these patients as having sustained some physical trauma but also a very definite severe mental trauma. Added to this is the fact that they are aware that the attack is still in progress or that another is quite likely to take place at any moment.[276]

Dr. Eckert believed mental trauma was just as important as physical trauma in a patient's recovery, however it was most likely underdiagnosed and there was no known treatment.

Many patients felt significant anxiety after the attack as they believed they would likely be attacked again and probably killed. Nurses gave morphine as ordered for both pain and "to take the edge off the so-called psychic trauma."[277] Nineteen cases of shell shock were reported at Naval Hospital Pearl Harbor, although the actual number is likely much higher.[278] Navy nurses recognized that their work involved both the healing of human bodies and "of unsettled minds and emotions."[279] Night, especially aboard the *Solace,* was difficult. Even patients with minor injuries "went into delirium or shock

when the anti-aircraft guns sounded…The shock of seeing their friends blown to shreds before their eyes left them so stricken that they could not make the effort to recover."[280] Patients wanted all the doors removed from the ship, as they feared they would be trapped aboard if the *Solace* were attacked.[281]

Lessons Learned from Pearl Harbor

After two hours of Japanese fire, the attack ended shortly before 10:00 a.m. on December 7. Twenty-one ships, including all eight battleships, were sunk or damaged, and hundreds of planes belonging to both the Navy and the Army were damaged or destroyed. In total, 2,403 were killed and 1,178 were wounded on December 7.[282] The Navy lost more men on December 7 than it had during the Spanish-American War and World War I combined, totaling 2,008 deaths.[283]

As a result of this tragedy, Navy nurses and physicians learned many valuable lessons regarding the safety and medical treatment of sailors in World War II. The supply of available plasma aboard ship sick bays and in hospitals was increased.[284] Standard practice for burns was adopted using mineral oil and sulfa dressings after cleaning the wound, or spraying tannic acid if tanning was indicated. First-aid material and personnel, including pre-mixed and ready to administer morphine "syrettes" and water barrels, were dispersed throughout ships. These measures protected valuable medical resources in case the sick bay, medical personnel quarters, or primary dressing stations should become damaged or inaccessible during an attack. First-aid training was provided to all members of the ships' crew. Gasmasks, flashlights, and lanterns were

widely distributed below deck. Finally, and perhaps most importantly, the tropical combat uniform was recommended to change from shorts and a short-sleeved shirt to anti-flash clothing with long sleeves and long pants to cover as much skin as possible.[285] Many lives may have been saved had the Navy uniform been more substantial and protected the men's skin.[286]

Moving Forward After the Pearl Harbor Attack

December 7, 1941, was the first time a hospital ship was present in the middle of a major Naval battle, and the medical team and crew proved to be an invaluable resource to the men injured during the bombing. In an editorial published in August of 1943 in the *American Journal of Nursing*, Miss Grace Lally commended the excellent work of her team and the volunteer nurses aboard the *Solace.* "There never was a finer group of women anywhere. The excellent care they gave to the patients and their unselfish and uncomplaining devotion to duty deserve the highest praise."[287] The *Solace* nurses had characteristics common to many of the nurses on Oahu that day including grace under fire, tireless work ethic, and prioritizing the patient's needs before their own.[288]

In a disaster like Pearl Harbor, priorities can shift and people are often able to pinpoint what is most important. Several nurses asserted that their patients were their number one priority, and they did not worry about their own safety.[289] Normal barriers between classes were ignored. Officers and enlisted men were treated exactly the same, side by side. Patients were only segregated by injury, not by rank.[290] Chaplains were available for days to meet the spiritual needs of those sick or dying in the hospital, and also officiated over the funeral services.[291] These services were essential to the mental and emotional healing of those surviving Pearl Harbor. Helen and Sara Entrikin, twin sisters serving as nurses at the Naval Hospital and Hickam Field, respectively, worried about each other's safety. At 10:30 p.m. that night, Sara was finally able to get through to Helen to tell her she was unharmed, and four days later Helen sent a telegram to their parents. They wouldn't see each other for another two weeks.[292]

In general, the staff and volunteers at Naval Hospital Pearl Harbor deserved to be commended. Entrikin later reflected, "I don't think the doctors and nurses and the rest of the medical personnel could have done a better job considering the overwhelming circumstances."[293] Thanks to the combined efforts of the Naval Hospital staff and volunteers, they were able to provide the best care possible to their patients. Corpsmen John Kevin had nothing but praise for "those wonderful civilian nurses who came to help us, they certainly did a great job."[294]

As expected, the difficult work assigned to the nurses eventually took a toll on their own mental health. Occasionally, a nurse would take a few moments to herself to walk outside and look upon the blazing ships in the harbor, take a deep breath to clear her nose of the smell of burned flesh, and return to her duty.[295] Long after Pearl Harbor, memories such as the sound of moaning men or the smell of burned flesh would continue to haunt some of these nurses.[296] Others, like nurse Winnie Gibson, were unable to talk about their experience in any great detail even fifty years later.[297]

However, the nurses tested at Pearl Harbor that day walked away from the experience, knowing they could survive and handle themselves in an emergency.[298] Captain Reynolds Hayden, the commanding officer the Naval Hospital Pearl Harbor was proud of the work provided by the nurses and hospital corpsmen on December 7.

> I was proud of them, especially of my nurses and hospital corpsmen. Many of these were youngsters doing their first hitch. But they stood their baptism of fire well…Their first thought was to care for their patients and to get ready for those who they knew would soon be coming. After the raid, all hands worked until they dropped. You never had to keep them at it.[299]

Terrell stated, "as awful as it was, it was also one of the most wonderful experiences in my life. I got the chance to see man's humanity to man in a way unlike I had ever seen

before or since. It was a turning point in my life…I know in a pinch, I could do anything. We are better people, I think, because of Pearl Harbor."[300]

Chapter 5: Analysis and Conclusions

During World War II, more than 59,000 American nurses served in the Army Nurse Corps, bringing nurses closer to the front lines than they ever had before.[1] Over forty percent of all active registered nurses volunteered for military service in the Army or Navy. Starting in World War II, nurses cared for soldiers under fire in field hospitals, evacuation hospitals, hospital trains, hospital ships, and as flight nurses on medical transport planes. The skill and dedication of these nurses contributed to the extremely low post-injury mortality rate among American military forces in every theater of the war. Overall, fewer than four percent of the American soldiers who received medical care in the field or underwent evacuation died from wounds or disease.[2]

The purpose of this study was to examine the experience of military nurses during December of 1941, with a specific focus on the nurses' work after the attack on the Army and Navy bases of Oahu. The casualties of December 7, the "day that would live in infamy," included 21 of 90 ships anchored in the harbor; 157 damaged and 188 destroyed aircraft; and 2,403 dead and 1,178 wounded Americans, including both civilian and military losses.[3] Nurses played a major role in the disaster response at Pearl Harbor; however, their critical role has been largely overlooked in the historical accounts of Pearl Harbor.

In chapters two, three, and four, this dissertation research identified and described the state of military nursing training in the United States in the early 1940s; the role of the nurse in the care of soldiers injured during the Pearl Harbor bombing; the nurses' response to the traumatic events; and the impact of race, military rank, and gender in their ability to prepare and respond to this disaster. This chapter begins with an analysis of the

above research findings. These findings will inform the answers to the following research questions: (1) how did the level of medical disaster preparedness for Pearl Harbor affect preparedness throughout the rest of World War II?; (2) how did nurses forge their own space within the evolution of triage?; and (3) how was nursing scope of practice affected by a disaster situation?

The level of preparedness for some and unpreparedness for others shaped the military's ability to provide care for those injured in the attack. This chapter argues that better training in disaster response, trauma care, or triage could have improved the nurses' ability to contribute to care in the initial phases of the arrival of casualties; however, the detailed plans, preparations, and collaboration between the civilians and military during the attack was truly unprecedented and had a profound impact on the success of the nurses and physicians in the Army and Navy Medical Departments in December, 1941. After Pearl Harbor, the military recognized the need for better military training for nurses prior to deployment into combat zones.

This chapter also argues that even though triage was outside of the skill set of nursing at that time, the nurses successfully utilized principles and techniques of triage to prioritize the nursing care and first aid they were able to provide. Occasionally, nurses were asked to make triage decisions in the formal sense, sorting casualties alongside physicians.

Finally, this chapter argues that in disaster situations, traditional boundaries between race, class, and gender can be redrawn, and practice boundaries between physicians and nurses are blurred. Differences in background, training, or birth become

less significant in the setting of an overwhelming task to be completed, and those in the midst of chaos cannot afford to be constrained by social norms.

Military Training for Nurses after Pearl Harbor

Chapter two detailed the state of military training prior to the bombing of Pearl Harbor. In short, both the Army and Navy nurses had little, if any, military training when they joined the Nurse Corps. For example, Monica Conter, a nurse at Hickam Hospital, did not learn what shrapnel or strafing was until after the bombing, and another nurse had never heard the term "casualty" before December 7.[4] Conter remembers feeling "helpless" and "inadequate" when casualties began to arrive as she had never been trained to handle a mass casualty scenario.[5] The nurses had no formal military training provided by the military in the management of casualties, nor did they know how to prioritize the care of trauma patients. In addition, they had little knowledge of the treatment of shock, or fundamentals of assessment in trauma. The nurses could only rely on their training and experience as student or civilian nurses, which for most nurses was extremely limited or non-existent in relation to trauma care. Without the skills to identify and prioritize the immediate conditions first, the nurses cared for those that caught their attention, providing the best care they could for the patients in that moment.

Following the attack on Pearl Harbor, military training for nurses began to change. In 1942, nurses belonging to a station hospital would occasionally receive military training with their hospital unit if they were allowed or invited by the hospital commander. Training remained unstandardized as thousands of newly recruited nurses flooded the military hospitals, which were often too pressed to offer extensive

orientations. Often, chief nurses knew little more about military life than their staff nurses. Since experienced nurses had been quickly sent forward into the warzones, experienced head nurses in the civilian world were often directly appointed into chief nurse positions in the Army.[6]

In late 1942, the Surgeon General of the Army finally issued a formal training guide for Army Nurses. Nurses were to complete a four-week course containing "military courtesy and customs; uniform regulations; dismounted drill; physical training defense against chemical, mechanized, and air attacks; Army and Medical Department organization; military administration; first aid, field sanitation, and communicable disease control; ward management; and routine hospital procedures."[7] However, nurses were expected to complete this intensive training while working sixteen-hours per week in the hospital. As a result, nurses were often trained at different times than the rest of their medical units. Moreover, many nurses were sent oversees with incomplete training.[8]

In 1943, training began before the nurses were deployed into the warzone. At that time, it was also required that all nurses under forty-five complete the training program. Nonetheless, patient care still took precedent over training, and nurses were still unable to receive the adequate training needed to maximize their usefulness as part of a medical unit. By late 1943, basic training for nurses was instituted. It was considered mandatory prior to assigning the nurses to hospital duties, or being sent overseas.[9] By instituting training prior to serving on the wards, the Army assured that

all nurses were equally prepared for service in the Army without competing with nursing schedules at the hospitals.

The Army nurses in Pearl Harbor received some training after the attack. Oahu became the site of the Medical Department Concentration Center to give field training to medical units of doctors, nurses, and corpsmen going forward into the Pacific. One of the nurses was assigned to this training center to help the chief nurses of each medical unit acquire the clothing and medical supplies needed for deployment.[10] Other nurses (those not assigned to the training center) also eventually had some extra training as well. Nurse Elizabeth Elmer reported practicing military drills and learning to march about one year after the attacks.[11] Other nurses reported learning about the detection and treatment of gas casualties.[12] Still other nurses received specialized training in anesthesia delivery; the shortage of nurse anesthetists was discovered during the Pearl Harbor disaster.[13]

The lack of training prior to the attack on Pearl Harbor was detrimental to the nurses' ability to respond. Nurses were unable to maximize their usefulness while responding to a mass casualty situation as they had never practiced or learned about their role in such a situation. However, after the attack, the Medical Department quickly realized the need for better, more standardized training. In short, the Pearl Harbor disaster changed policies and protocols for nursing related to military training prior to entering a combat area.

Analyzing the Role of the Nurse during Pearl Harbor

Nurses provided important technical expertise during the Pearl Harbor attack due to their training as a registered nurse. Caring for hundreds of burn patients required incredible expertise in the care of burns including: complex wound care, managing fluid requirements, monitoring a patient's liquid input and output, and adequate pain management. Preventing and treating shock in multiple patients with severe traumatic wounds with little to no physician supervision required critical thinking, prioritization, and teamwork between nurses, corpsmen, and physicians. The expertise of the specialty trained nurses, especially surgical nurses and nurse anesthetists, was critical following the attack, and the military nurses were able to use their advanced training and fulfill a role uniquely suited to their knowledge and skills.[14] Nurses, including those who were and were not given advanced training, were able to provide care to the full extent of their training during and following the bombing of Pearl Harbor.

At Pearl Harbor, nurses were never the "handmaiden of the physician," but were recognized as an integral part of the medical department. Their peers, medical colleagues, and the military recognized the Army and Navy nurses as integral members of Pearl Harbor forces. The Navy nurses at the Naval Hospital and aboard the *Solace* received citations from the Commander of the Pacific Fleet. These were the first of over 1900 honors awarded to the Navy for Pearl Harbor. In 1942, all the nurses who were on duty in Pearl Harbor that day received a citation from President Franklin Delano Roosevelt that read, "you are the bravest of the brave with a devotion to duty and to mankind that will be forever unmatched."[15] First Lieutenant Annie Fox, Chief Nurse at Hickam Field, was the first female ever to be awarded the Purple Heart. However, as she

was not injured in battle, the Purple Heart award was withdrawn and she was instead awarded the Bronze Star on October 26, 1944.[16] The citation reads:

> . . . For heroic and meritorious service in military operations against the enemy during the attack on Hickam Field by Japanese forces on 7 December 1941. During the attack Lieutenant Fox, in an exemplary manner, performed her duties as Head Nurse … In addition, she administered anesthesia to patients during the heaviest part of the bombardment, assisted in dressing the wounded, taught civilian volunteer nurses to make and wrap dressings, and worked ceaselessly with coolness and efficiency, and her fine example of calmness, courage, and leadership was of great benefit to the morale of all with whom she came in contact. The loyalty and devotion to duty displayed by Lieutenant Fox on this occasion reflected great credit upon her and the military service.[17]

Lieutenant Fox's public military recognition adds to the many other citations and awards given to other nurses at Pearl Harbor. The collective recognition for the varied contributions of the nurses demonstrated their value to the disaster response at Pearl Harbor.

Responding to Trauma

Experiencing mental trauma or fear after a stressful or traumatic event was not uncommon for the younger nurses at Pearl Harbor, especially for those unaccustomed or unprepared for the realities of war. Nurses knew there was a war in Europe, but they never dreamed they would be in danger living on an isolated island far from both the Germans and the Japanese. Veteran nurses such as Chief Nurse Helena Clearwater at Schofield Hospital could sense the mounting tensions and warned her nurses accordingly, but most did not believe her.[18] After the attack, no one had trouble identifying the fact that they were part of a war, but most chose not to turn their thoughts towards the danger of war, preferring to focus on their work instead. Nurses at every hospital put their duty before their fear, and their work ethic and stamina surpassed all expectations the male

officers and corpsmen had of these women. Rather than becoming distracted or disabled by fear, the vast majority of the nurses were able to perform their duties above and beyond what was expected, and reserved time for reflection and debriefing through humor, religion, or writing, in their few moments of rest between shifts.

Social Constructs of Pearl Harbor: Race

As previously stated, the American military, in general, was very homogenous with respect to race. At Pearl Harbor, the military personnel overwhelmingly consisted of white men and women. This contrasted with the civilian population of Hawaii, the majority of which was Japanese or Pacific Islander. Before the attack on Pearl Harbor, the military population and Japanese population co-existed without major incident. However, after the attack on Pearl Harbor, the attitude of the American military personnel changed dramatically towards the Japanese. As is evident in chapter three, tensions were high between the Japanese and Americans, with many Japanese being accused of sabotage or spying, and punished accordingly. Wounded men talked of revenge, fights erupted between Japanese and Filipino workers, and some, including the Schofield nurses' cook, were forced to leave due to their heritage.

The nurses' opinions on the Japanese varied; some were afraid, others felt anger, and some even felt compassion. In the months following Pearl Harbor, Second Lieutenant Gelane Barron at Tripler Hospital cared for some of the Japanese prisoners, and thought about what to do with her patients if Hawaii were bombed again. "Do I leave them here to be hit or do I take them somewhere to safety? Of course, I was told I was to march them over to the guardhouse. My corpsmen said, 'Well, they'll be the last ones

who'll march.' But, they were still human beings and they weren't the ones who caused the war."[19]

At Pearl Harbor, there were few African American soldiers and no African American nurses. Due to an intervention by Eleanor Roosevelt in the early 1940s, the Surgeon General stipulated a quota of fifty-six African American nurses could be commissioned as officers in the Army Nurse Corps.[20] Prior to this change, they had been completely excluded by racial prejudice from joining the Army Nurse Corps. In April 1941, forty-eight black Army Nurse Corps nurses were equally divided between Fort Bragg, North Carolina and Camp Livingston, Louisiana. After the attack on Pearl Harbor and declaration of war with the Axis Powers, the Army needed more nurses quickly. The attack on Pearl Harbor increased the quota and increased the number of African American nurses accepted; however, black nurses were still grossly under-represented in the military.[21] By 1943 there were over 200 African American nurses serving in the Army Nurse Corps; however, the United States was recruiting an additional 30,000 nurses that year, but made it clear that no further African American nurses would be recruited.[22] Although African American nurses were still grossly underrepresented in the Army Nurse Corps, these nurses served their country both abroad and at home throughout World War II.[23]

Social Constructs of Pearl Harbor: Military Rank

During and immediately following the attack, rank and military status were ignored, and patients were treated and segregated based on injury, not rank. The officer's ward was used as a general ward, and all who sought care at the hospital were treated.

This policy extended to civilians and service personnel from other branches of the military. Soldiers pleaded with nurses to check on their commanding officer, and officers were more concerned for their men than themselves. Cases remained segregated by wound or treatment, not by rank. Officers and enlisted were giving equal treatment, and priority was given to the most ill, not the highest-ranking officer. As officers in the Army, nurses were given the respect due to their rank by both the enlisted and their superiors. Navy nurses were not officers; however, corpsmen, patients, and physicians treated the nurses with respect.

Social Constructs of Pearl Harbor: Gender

Trained female nurses in the Army and Navy Nurse Corps, were, at the time, the only women serving in the armed forces. An article published in 2013 by Jane Brooks analyzes the role of British military nurses serving in North Africa in World War II, and their role as therapeutic agents within a warzone. Adequate medical services, including an ample supply of trained female nurses, were essential to the morale of those fighting in the war as they needed to believe they would be well cared for should they be injured. Scholars argue that nurses' become engaged in war for a variety of reasons: a desire to contribute to the war effort, personal or professional recognition, or as seen in the example of the Pearl Harbor nurses, a chance to broaden their experience through travel and a new environment. Despite historical resistance to placing women close to the line of combat, the skill and presence of trained nurses were invaluable to the recovery of the injured men, requiring the recruitment and deployment of thousands of female nurses to the frontlines of battle.[24]

The nurses at Pearl Harbor were therapeutic tools that improved moral and gave comfort to the men. The mere presence of female nurses among the wounded supported the comfort and healing of the patient, or the peaceful passing of those unable to recover.[25] Nurses at Pearl Harbor often sat at the bedside of those dying, bringing comfort in their last moments. They would fulfill last requests, which were often to take care of another man in his place. Even in their dying moments, men recognized the femininity of the nurses in their appearance, and saw them as comforting female figures in their life like their mother or sister.[26] The nurses took pride in this role, as they enjoyed wearing lipstick or being an attractive female presence amidst their suffering.[27] Hedwige Kaczanowski, an Army nurse at Schofield Barracks hospital, described the importance of being feminine in the Army:

> We girls tried to look pretty because the first thing that patients would see [when he looked at us] would be the girl back home, the sweetheart of somebody they left behind. We were there to take their mother's place, their sweetheart, their wives, and we also had dependents. So Army nurses had to look chic. I think at that time the Army had beautiful women.[28]

Being one of relatively few females at Pearl Harbor, the women felt empowered by their gender as being not only necessary on the frontlines, but also desired, and provided a comforting feminine presence which would otherwise be absent.

The interactions between race, gender, and rank prior to the attack on Pearl Harbor differed significantly during the attack. Gender and rank barriers were ignored during the disaster yet prejudice against the Japanese intensified dramatically. Although it was highly unlikely the Japanese in Hawaii were in any way involved in the attack, they were still feared, blamed, and isolated from the rest of the population. Blaming a specific race or group was a common, yet unfortunate, trait of human nature seen

throughout history, and Pearl Harbor was no exception. The nurses expressed fear of the Japanese as a racial group when gossiping in their quarters, but when interacting with specific Japanese patients they reacted professionally and treated the patient with compassion and respect.

Successful Medical Preparedness Prior to Pearl Harbor

Despite the nurses having been excluded from disaster preparedness planning, the medical departments of the Navy and Army, as a whole, were well prepared for the bombing of Pearl Harbor. Much of this success was due to the unprecedented and historic level of cooperation between civilian and military leadership and resources.

Within twenty minutes of the attack, the staff at the civilian defense headquarters began notifying and mobilizing first-aid units and the emergency ambulance fleet. Being a Sunday morning, most volunteers were at home and could respond quickly. The first-aid units dispersed throughout Oahu treated over 2,000 people for injuries or illnesses that day, diverting thousands of people from the hospitals, allowing the nurses, doctors, and corpsmen to focus on the severe casualties without becoming overwhelmed by the large number of "walking wounded." The emergency ambulance fleet was able to supplement that of the Army and Navy and transport critically ill patients to Tripler Hospital, Hickam Hospital, Schofield Hospital, and Naval Hospital Pearl Harbor. This influx of resources likely saved many lives as drivers were able to provide first aid care on scene, and the additional vehicles shortened the overall evacuation time for casualties.[29] This also lessened the burden on nurses, especially those at Hickam

Hospital, as patients were quickly transferred out of Hickam to Tripler, allowing them to tend to the casualties newly arriving from the field.

Months of intensive preparation between the military and Office of Civilian Defense prior to the attack on Pearl Harbor proved its worth during and following the attack on Oahu. One of the key preparations was seventeen surgical teams consisting of a surgeon, his assistant, an anesthetist, a trained nurse, and surgical attendants had been previously assembled.[30] These teams were immediately available following the attack and were dispersed to the various military hospitals, with nine teams reporting to Tripler alone. This freed the military physicians to provide direction to the nurses assisting with triage, the initial treatment of casualties, shock treatment, and post operative care on the wards. Civilian nurses also reported to the hospitals to help, alleviating the tremendous shortage of nurses at the hospitals.[31]

In the days following the attack, the civilians of Hawaii continued to offer critical aid to the military installations on Oahu. A centralized dispatch station was used to track and dispatch doctors throughout the day and night in response to both military and civilian needs. The Red Cross Canteen Corps provided hot meals to all medical volunteers, officials, ambulance or truck drivers, guards, and emergency police at all hours of the day and night. They also provided bedding to those who needed to sleep near their jobs.[32] Nurses benefited from this assistance as many at the Naval Hospital slept on mattresses in the hospital.

Another key factor in the preparation and response to the Pearl Harbor disaster was the previous establishment of a blood bank in Hawaii. The bank had only 263 units of plasma available on December 7, which was depleted within the first hour. Following

the attack, the blood bank processed five hundred blood donors per day, every day, until December 23. Less than one hour after a plea for blood donors on the radio, a line of hundreds of people had already formed outside of the blood bank in Honolulu with volunteers waiting for hours to donate blood. Civilian defense workers, exhausted after a long day, stopped by the hospital to donate blood before sleeping and heading back to work the next day. Mothers waited in line with their small children. Among the civilian donors was the entire crew of the Dutch freighter *Jagerfontein* who disembarked to donate blood to their American allies before heading back to sea.[33] Following the attack on December 7, over 4,000 pints of whole blood and 2,000 units of plasma were supplied to the Army and Navy by the blood bank.[34] Nurses were able to administer plasma and whole blood to those suffering from the most severe injuries and burns.

During the congressional investigation of Pearl Harbor in December 1945, the Red Cross reported, "the fact that civilian affairs ran so well on December 7 was definitely due to the intensive preparations of the Disaster Council with all of its ramifications. There was no panic or any semblance of one. It is remarkable that throughout all of the training period there was no friction, but only a pull-together and get-ready spirit."[35] During that same investigation, Alfred Castle, head of the Hawaii Chapter of the American Red Cross commented on the important and historic collaboration between the military and civilian communities:

> Probably no community in the United States has been more closely geared to the activities of the Army and Navy throughout its entire history than has the community of the Territory of Hawaii, and more particularly, the Island of Oahu and the City and County of Honolulu. It is believed that the Territory of Hawaii was among the very first, if not the first, integral part of the United States to realize that war with Japan was becoming inevitable and that the civilian population would not only be vitally affected by the war, but should organize

> themselves to take care of as many civilians as possible without calling on military authorities and Army troops to help."[36]

On December 7, the civilian population did more than meet their own needs; they were able to meet the needs of the military as well. Never before or since has such collaboration been seen between the U.S. military and the surrounding community. This unique relationship was essential to the success of the entire medical department of the Navy and Army during and following the attack on Pearl Harbor.

Deficiencies in the Medical Preparedness of Pearl Harbor

Although many assume Pearl Harbor was the first time American nurses had been caught in an air raid, this was not the first time that U.S. Army nurses had been under attack. Nurses serving in Great Britain during World War I experienced air raids from German planes. During World War I, nurses were first recruited and trained by the Red Cross, and later inducted into the Army Nurse Corps once the United States officially entered the Great War; however, nurses were not given any rank or position within the Army itself. Base Hospital Number Five in London came under fire and some of the orderlies were killed. The nurses at Base Hospital Number Twelve developed a protocol for air raids where all patients, nurses, and men able to walk would evacuate to the trenches outside, and those unable to move were "flattened."[37]

The nurses of Pearl Harbor, having achieved relative rank as part of the Army after World War I, were the first female officers to be under enemy attack. However, it seems as though the Pearl Harbor nurses (now officers) were less prepared and informed of how to handle an air raid than those Americans nursing in Great Britain during World

War I. This could be due to differences in training prior to entering the war zone, or the mentality of the nurses working in these theatres. The nurses serving in Britain left the United States with the understanding that they were entering a war zone, whereas many of the Pearl Harbor nurses (as well as the rest of the United States) believed that Hawaii was a tropical safe haven that was invincible to Japanese attack.

Although the nurses performed admirably, there are some specific instances where proper training could have improved the nurses' contribution to the disaster response. At Tripler Hospital immediately after the attack on Pearl Harbor, many nurses were sent to the operating room or hallways to care for the patients awaiting surgery, unsure of their role except to treat shock and give pain medication. As a result, some nurses did not properly prepare patients for the operating room. In fact, some patients entered the operating room still dressed, and without the benefit of preliminary wound or skin cleaning. Had the nurses been better trained or prepared, they could have properly undressed and bathed patients while they were waiting for surgery in the halls, reducing the work for the surgeons in the operating room.[38] Additionally, nurses had no training in trauma assessment, and often times they would only treat the most obvious wound or problem and could miss severe bleeding on the back or other parts covered with clothes or blankets. The nurses had no experience with shrapnel, how it caused injuries, or common locations of these injuries.[39] Perhaps had this knowledge been known, the nurses might have prevented shock from patients bleeding from wounds unseen.

Improving Medical Preparedness after Pearl Harbor

Once most of the patients had stabilized at Hickam Hospital, the Army Medical Department began offering mandatory training to medical personnel in case of a second attack. Fearing the potential for chemical warfare similar to that of World War I, the Army provided a multi-day training in the recognition and treatment of gas casualties within months of the attack. Decontamination showers were set up at the rear of the hospital to bathe patients in the event of an exposure to harmful gases. Nurses were also trained to recognize the different gases by their scent, as well as how protect themselves from the noxious fumes.[40] In the event of an emergency, the hospitals had alert calls where the staff would have to report to their duty station.[41]

Given the resources at hand, the Army Medical Department was well prepared to respond to the Pearl Harbor disaster; however, necessary improvements were identified after the attack, especially to Tripler General Hospital. Tripler Hospital's wood construction offered little protection from air raids. Some patients were even killed, and bullets managed to find their way into the wards. Nurses would evacuate into the basement during the initial aid raid drills, however better shelter was needed. Afterwards, the Army dug slit trenches and built nine splinter proof shelters to offer better protection to the staff and patients at Tripler. [42]

With the influx of casualties from Pearl Harbor and the subsequent casualties that would soon be evacuated to Tripler from the Pacific warzone, Tripler desperately needed to be expanded with respect to staff and facilities. Tripler Hospital was operating close to capacity, but with only fifty-nine percent of their medical officer positions filled, which included nurses. The 1941 report of Tripler Hospital stated, "the services of the nurses have been satisfactory, but the number on duty is absolutely insufficient for this hospital.

This unfavorable state of affairs should be rectified at the earliest practicable date."[43] As Tripler Hospital was now staffing the main hospital facility plus additional schools that had been repurposed as hospitals, the need for nursing staff was immediate.

The civilian medical community provided much needed assistance during the shortage."[44] Clara Marz, a civilian volunteer nurse, was assigned to Farrington High School, an annex of Tripler Hospital, after the attack until April 1942. She reported one Army nurse was the Chief nurse, but the rest of the nurses were all civilians. Marz worked at Farrington almost every day for five months alongside four or five other civilian nurses. By April 1942, enough Army nurses had been recruited to replace the civilian nurses, and Marz was released from her contract with the Army and was able to return to her civilian duties.[45]

Additional modifications were made to Tripler Hospital. As most of the patient's had been moved to safer locations such as Farrington High School or the Kamehameha Schools, some of Tripler's wards were repurposed. The operating room was remodeled after December 7 as it was found to be inadequate to process casualties at the rate they were admitted. The new genitourinary ward with florescent lighting and concrete floor was converted into an operating suite, and the old operating pavilion was used only for elective procedures.[46] Three wards were converted into an officer's assembly hall, officer's mess, and an emergency operating room. Adjacent to the operating room, the medical department added a fluoroscopic room with two fluoroscopes to be used to locate foreign bodies in casualties.[47]

On the other side of the new operating room, a triage room was established with the purpose of treating shock and sorting operative cases.[48] Two nurses, including

Tripler nurse Anna Urda Busby, were in charge of checking supplies each day to ensure the room was ready if another attack were to occur.[49] Kathryn Doody, a surgical nurse at Tripler, remembered receiving training after the attack about how to handle casualties. Patients would be brought to the triage room, undressed, showered, and then triaged.[50] This process would allow for better visualization of any wounds, decontaminate the patients from any poison gas, and would also quickly bathe and undress patients to prepare for surgery.

The need for additional bed space was also identified after the attack, specifically for psychiatric beds. Tripler nurse Elizabeth Elmer commented that many of her patients had nervous breakdowns, especially those caught in the Hickam barracks when it collapsed.[51] Farrington High School, which was commandeered by Tripler after the attack, provided space for an additional five hundred beds, some of which were dedicated to psychiatric beds.[52]

Despite their best efforts, Tripler Hospital's flimsy construction and unsafe location made it an unfit facility for a hospital. In July 1942, the Army Medical Department began plans to abandon Tripler Hospital in its present location.[53] The "Old Tripler" hospital was closed and patients were moved exclusively to the schools on loan from Honolulu. Construction began on the "New Tripler," which was completed in 1948.

The facilities at Naval Hospital Pearl Harbor were also found to be insufficient for the number of casualties after the attack. Although plans were already underway for a new Naval Hospital in a safer location with improved bed spaces, the attack on Pearl Harbor validated the need for better Naval medical facilities on Oahu for the coming war.

Pearl Harbor and the Evolution of Triage in Nursing

As the casualties poured into the hospitals in Pearl Harbor, nurses and physicians struggled to organize and prioritize the needs of the patients. Physicians and nurses began to work together to sort, or triage, patients based on their injuries. Those with the most severe yet still salvageable injuries received the highest priority of care. The practice of organized triage began in the eighteenth century thanks to military surgeon Baron Dominique-Jean Larrey, chief surgeon of Napoleon's Imperial Guard. Initially, the primary goals of triage were to treat and evacuate those needing urgent medical attention immediately, rather than waiting several hours or sometimes days for the battle to end. Larrey clearly stated that those who were most severely wounded should receive treatment first, regardless of rank or distinction, and those with less severe injuries should wait for treatment.[54]

This process was later refined in 1846 by British Naval Surgeon John Wilson, who argued that the treatment of those who are severely wounded and unlikely to survive should also be delayed, and only those who are likely to recover after treatment should receive first priority. By World War I, the practice of triage was widely known and practiced by military surgeons. However, with the introduction of machine guns, poison gases, and air attacks, the potential for large numbers of non-fatal injuries increased tremendously, and the concepts of triage were further reformed within the context of mass casualty scenarios. Recognizing that hospitals may become overwhelmed with cases, the principle of "the greatest good of the greatest number" became the general rule. In practice, this meant that those requiring urgent treatment for a complicated, yet treatable condition should wait. This provided more resources for those with urgent but

uncomplicated injuries, allowing more lives to be saved overall, but at the cost of the lives of a few complex cases that may have been saved under a different situation.[55]

Literature concerning triage in the 1930s and 1940s exists entirely in the context of quickly evacuating casualties from the frontlines of battle to evacuation hospitals and eventually to base hospitals.[56] There is also a substantial body of literature in the British Medical Journal, criticizing and theorizing the best way to handle air raid casualties in a large city, namely London.[57]

The attack on Pearl Harbor was a unique fusion of both of these scenarios. The vast majority of casualties were to the military, however, there were some civilian casualties as well. As Pearl Harbor was a military base, it was not set up with casualty clearing hospitals or a chain of evacuation, as patients were evacuated immediately to the base hospitals nearby. At clearing hospitals, patients would have received life-saving first aid, treatment for shock, and even some emergency surgery prior to arriving at the base hospital at a hospital closer to the battle.[58] Ship sick bays, medical dispensaries, and first aid stations served the role of the clearing hospital at Pearl Harbor. However, as the battle was on the base at Pearl Harbor, triage to determine the evacuation of casualties was largely unnecessary, as the patients would all be evacuated to the base hospitals rapidly. At the base hospitals, triage was closer to the modern practice of triage in hospitals, where decisions are made over who requires hospital resources, such as shock resuscitation or operative care, most emergently. This new environment of triage put the nurses in a situation they had yet to experience: nurses triaged patients.

The primary triage of arriving casualties was, for the most part, performed by trained surgeons. At Tripler Hospital, the civilian surgeons staffed the operating rooms

so the military surgeons could perform triage. Aboard the *Solace*, a nurse and physician together triaged and assigned casualties to wards as they came aboard. At Schofield Hospital, there was a shortage of surgeons, and most were in the operating room, requiring the nurses to triage. Nurse Rhoda Ziesler, in a journal entry written just days after the attack, stated, "we triaged the boys." Her use of the word "triage" in her diary at the time demonstrates that although the nurses may not have been trained in triage, they were at least familiar with the term and the concept. Ziesler's role was later described as "determining who needed surgery right away, who could wait, who was not going to live."[59] This is congruent with a report from Dr. Ravdin and Dr. Long on the triage of casualties at Schofield Hospital. They reported, "As soon as the casualties began to arrive [the hospital's commanding officer] selected a triage officer to divide the casualties into three groups: (1) hopeless; (2) requiring immediate shock therapy and subsequent operations; (3) injuries no requiring immediate therapy."[60] Ziesler and Drs. Ravdin and Long described the same three triage categories. While it is highly unlikely that Ziesler was the delegated triage officer, she was likely instructed by the triage officer and assisted with the triage and sorting of casualties.

Nurses also performed their own triage and prioritization of cases under their care. At all military hospitals, nurses had to decide who should receive pain medication first, which wound to dress first, which patient required the ward's limited supply of plasma the most, or who most needed the chaplain. This experience was not unique to the nurses in Pearl Harbor. During World War II in North Africa, the British nurses also performed this type of triage, "Often we picked out men who seemed especially sick or in great pain and these would go through to the wards straight away."[61]

Triage remained within the scope of practice of the expert military surgeon for many years following World War II. With the rise of American emergency departments and the specialization of emergency nurses, triage began to emerge within the realm of nursing. Triage did not appear in the emergency nursing literature until the mid 1970s, and slowly gained popularity within the realm of emergency nursing research.[62] Today, nurses provide the majority of triage decisions at civilian hospitals on a daily basis; however, in the case of a mass casualty event on the battlefield or the home front, surgical triage remains the job of a trained, expert physician.

Breaking Down Boundaries in a Disaster

In the Pearl Harbor disaster, practice boundaries between physicians and nurses were blurred, and differences in title and training became less significant. The nurses and physicians worked together to get the job done, paying little attention to traditional roles or schedules that may have limited the team's effectiveness. Professional boundary lines blurred as doctors, nurses, and corpsmen did all they could to help the wounded and each other. Physicians assisted the nurse anesthetist by giving IV anesthetics, spinal blocks, and administration of blood products to patients awaiting surgery.[63] Nurses in the receiving wards just administered morphine and tetanus, not waiting for a written or verbal order from physicians. They cleaned and dressed the wounds that needed attention. They provided blankets and fluids, and elevated the foot of the bed for those suffering from shock.

With the physicians overwhelmed and busy sorting or operating on casualties, nurses on the ward were often without a physician for hours, and left to care for their

often critical patients without orders. Second Lieutenant Pauline Girard took charge of the casualties on her wards. She undressed, assessed, and sorted her patients, and was able to give the physician a full report on each patient's injuries and treatment thus far when he arrived.[64] The doctors and nurses were able to trust each other's judgment and expertise with the knowledge that each doctor or nurse was doing everything he or she could for the patients. Alberta Knips at Tripler Hospital stated, "The doctors relied on us. They believed us."[65]

Volunteer patients also supplemented the staff of corpsmen and volunteers available to the nurses on the wards. In both Navy and Army hospitals, nurses told stories of how ambulatory patients would help other patients. Ambulatory patients would help evacuate those that could not walk. Those who were less disabled would help feed or bathe other patients without complaint. The bombing of Pearl Harbor united the patients, nurses, and corpsmen under the premise of national pride and a military community. Instead of the traditional model where nurses care for the patients, an unspoken agreement was reached where everyone took care of everyone to the best of their abilities. The trust and teamwork between the physicians, nurses, and corpsmen was critical to the success of the medical team. Had the nurses waited for orders or physicians insisted upon their direct supervision, the team's ability to quickly assess and treat casualties would have been severely compromised.

The attack on Pearl Harbor was a unique and memorable disaster for all Americans. Pearl Harbor marked the launch of the United States into World War II, leading to the eventual defeat of the Axis Powers of Japan, Germany, and Italy. The medical care provided in this disaster exemplified unprecedented levels of collaboration,

commitment, and dedication from the nurses, physicians, corpsmen, and civilian volunteers. For nurses, this initial indoctrination to the realities of war acquainted them with both the positive and negative aspects of human nature that can occur during a war disaster.

CHAPTER 1: INTRODUCTION AND METHODS

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Appendix A: Institutional Review Board Letter of Approval

UNIVERSITY of VIRGINIA
OFFICE OF THE VICE PRESIDENT FOR RESEARCH
INSTITUTIONAL REVIEW BOARD FOR THE SOCIAL AND BEHAVIORAL SCIENCES

May 23, 2016

Ms. Gwyneth Rhiannon Milbrath
College of Arts and Sciences
University of Virginia

Dear Ms. Milbrath,

The Institutional Review Board for the Social and Behavioral Sciences (IRB-SBS) at the University of Virginia (UVA) has reviewed the research activities as described in your submission dated May 19, 2016 under the title "The Nurses of Pearl Harbor: December, 1941." We understand from your submission that you be looking at primary and secondary archival materials that are currently available to the public through libraries and open archives. After reading about your project, we have determined that you are not engaged in research that needs to be covered by the IRB-SBS at UVA. Accessing archival resources and materials available to the public is an activity that does not meet the federal definition of human subject research. According to your submission, no private personal information will be collected and your research involves no intervention that requires IRB-SBS review.

Your project does not require an IRB-SBS protocol submission or review at this time. You may proceed with your project. If your project changes such that IRB-SBS review may be required, please contact my office immediately to discuss.

Sincerely,

Bronwyn Blackwood
Director, Institutional Review Board for the Social and Behavioral Sciences
University of Virginia
434-243-2915
blackwood@virginia.edu

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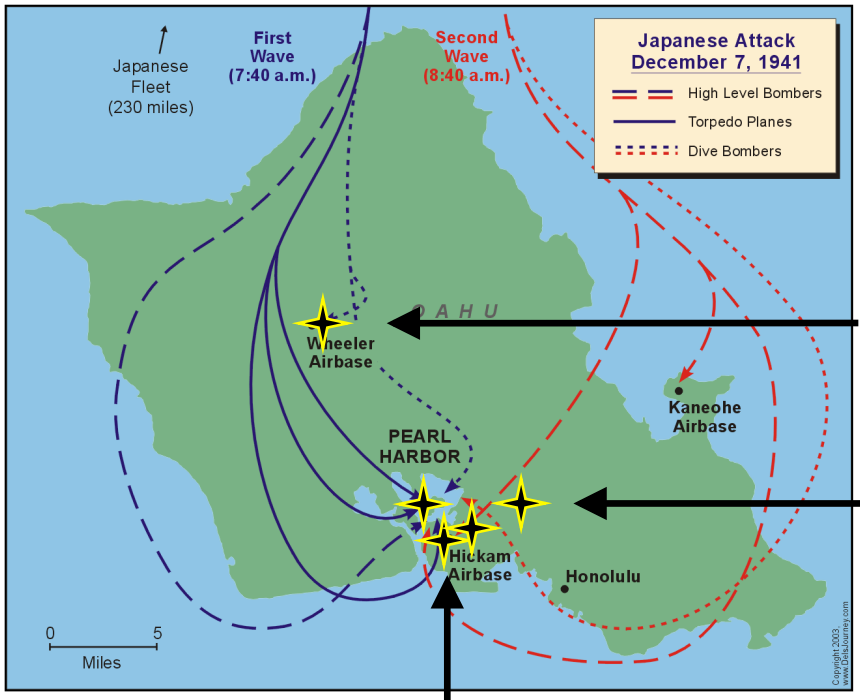
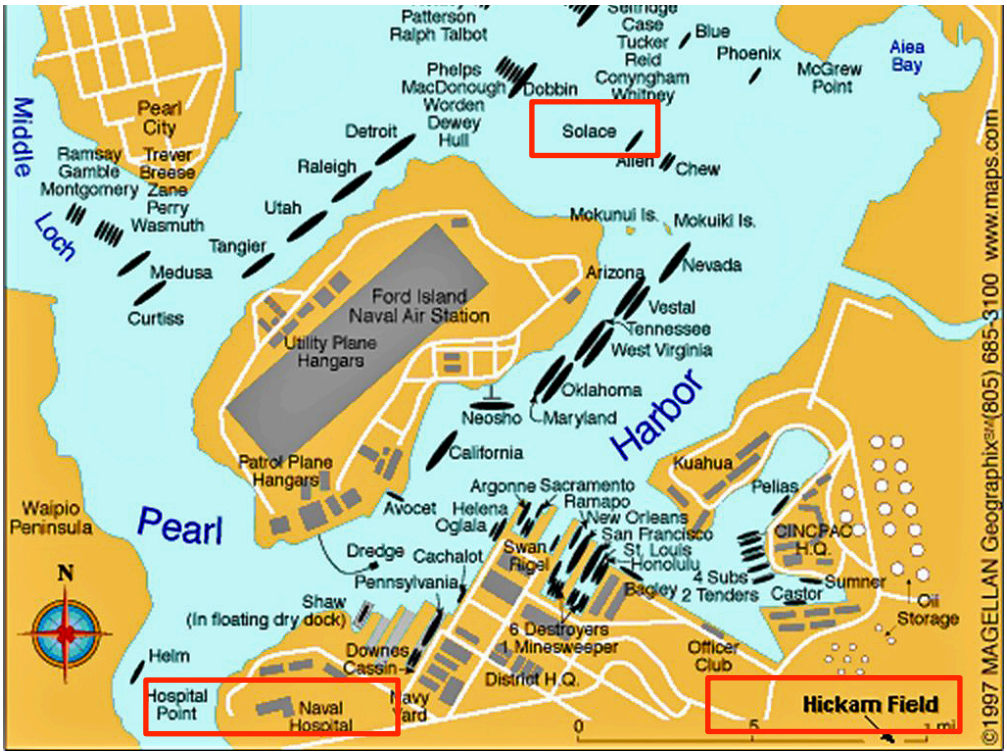
www.virginia.edu/vpr/irb/sbs.html

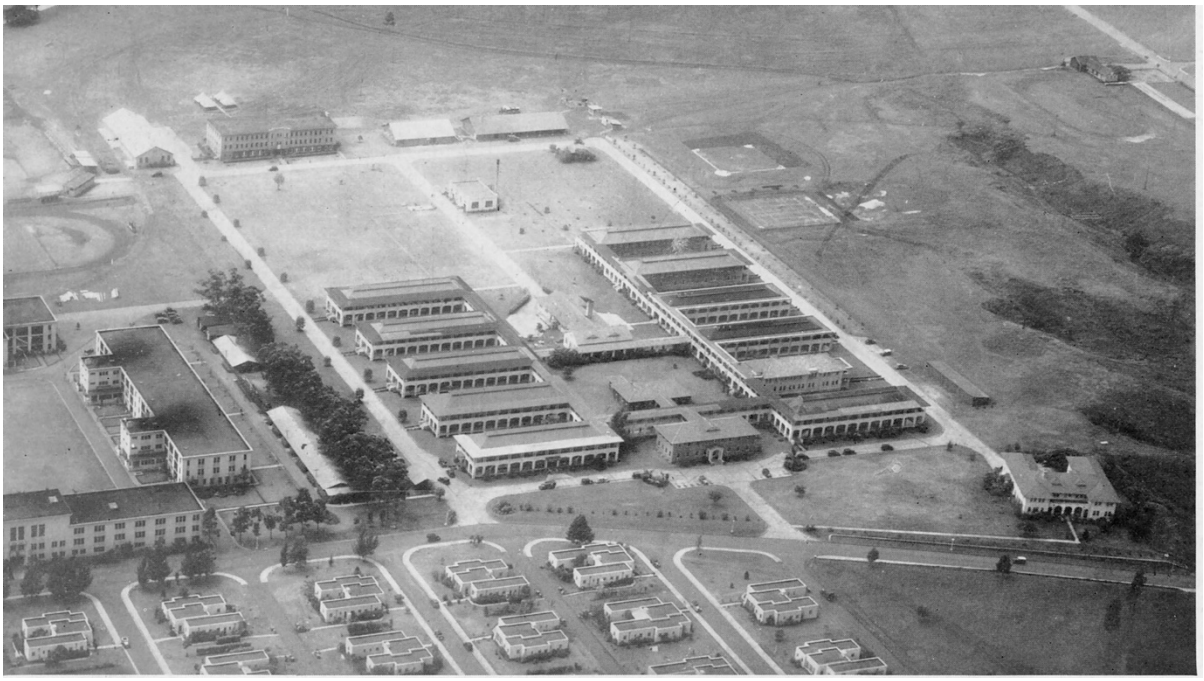
Appendix B: Maps and Selected Photographs





Above map: The Island of Oahu and its military medical facilities. Map modified from its original version, author unknown.

Left map: View of Pearl Harbor and the location of the docked ships. Note the location of the *USS Solace* and Hospital Point.



Aerial view of Schofield Hospital at Schofield Barracks, T.H, 1935
Photo courtesy of the U.S. Army Garrison – Hawaii

Schofield Hospital Nurses, 1941
Photo courtesy of the U.S. Army Garrison – Hawaii

Lieutenant Annie Fox, Chief Nurse,
Hickam Field Hospital
Photo courtesy of the Army Medical
Department

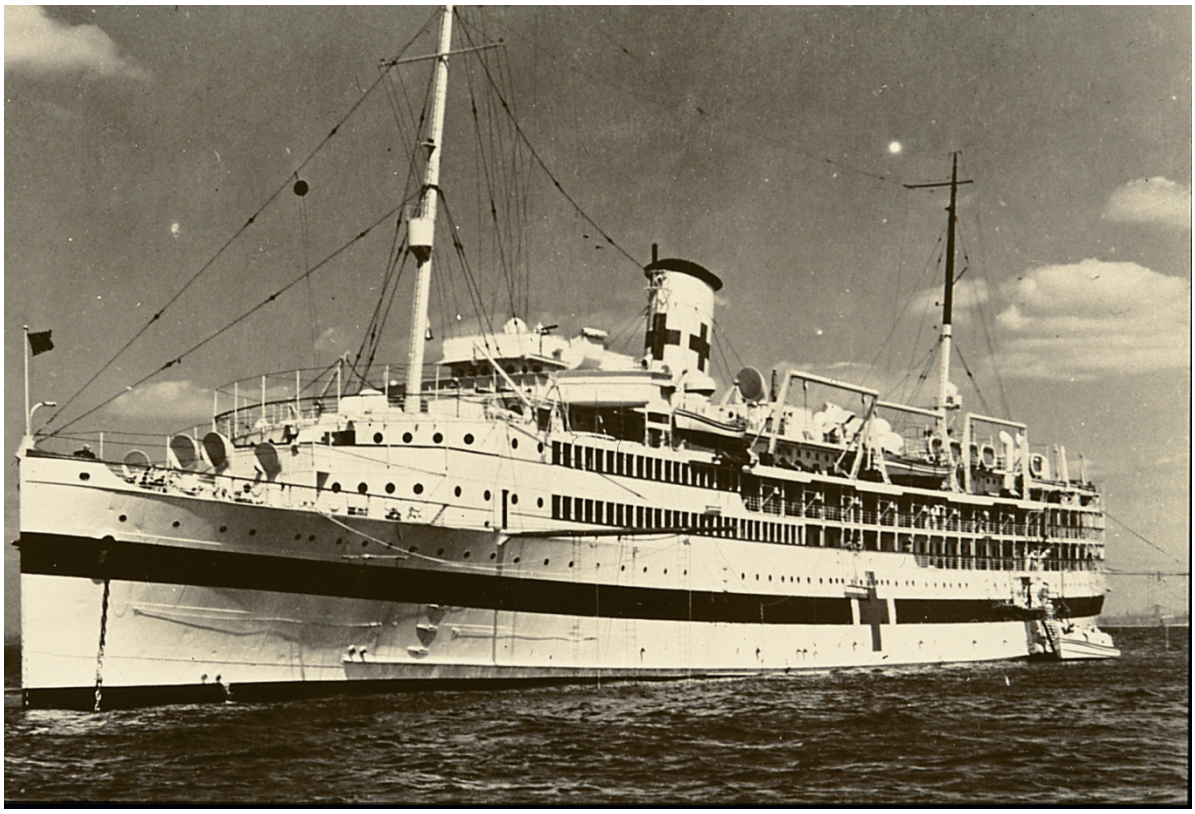
Hickam Field Hospital Nurses, Monica Conter
(left) and Kathleen Coberly (right)
Photo courtesy of the Army Medical Department

Hickam Field Hospital, 1941
Photo courtesy of the Army Medical Department

Nurses Quarters, Hickam Field
Photo courtesy of the Army
Medical Department

Naval Hospital Pearl Harbor
Photo courtesy of the Navy Bureau of Medicine and Surgery

Naval Hospital Pearl Harbor medical officers and Nursing Staff, ca 1942
Photo courtesy of the Navy Bureau of Medicine and Surgery



USS Solace, ca 1941
Photo courtesy of the Navy Bureau of Medicine and Surgery

Nurses dining aboard the *USS Solace*
Photo courtesy of the Navy Bureau of Medicine and Surgery

Appendix C: Included Army and Navy Nurses at Pearl Harbor

Hickam Field Hospital
Annie Fox, Chief Nurse
Irene Boyd
Kathleen Coberly
Monica Conter
Sara (Sally) Entrikin
Winifred Mallet

Tripler General Hospital
Edna Rockefeller, Chief Nurse
Elma Asson
Dorcas Baugh
Christine Chesnik
Alphild Christophersen
Rosemary Corrigan
Patricia Dolan
Kathryn Doody
Alma Eidsaa
Elizabeth "Betty" Elmer
Leonore Foster
Doris Francis
Revella Guest
Harriet Holmes
Madelyn Knapp
Edna Linn
Julia Martin
Clara Martz
Gelane Matthews
Marguerite Oberson
Nellie Osterlund
Celeste Pilvelis
Hubertina Schepers
Edge Sutherland
Verla Thompson
Anna Urda
Mildred (Bonnie) Von Protz
Ellison Wallace

Schofield Hospital
Helena Clearwater, Chief Nurse
Alice Boyer
Mildred Irene Clark
Marion Emmons
Bertha Gilmer
Pauline Girard
Hedwige Kaczanowski
Alberta Knips
Ada Olsson
Myrtle Watson
Rhoda Ziesler

USS Solace
Grace Lally, Chief Nurse
Ruth Cohen
Anna Danyo
Agnes Shurr

Naval Hospital Pearl Harbor
Gertrude Arnest, Chief Nurse
Ann Davidson
Freda Connie
Catherine Richardson
Frances Sonsalla
Eva Antonelli
Valera Vaubel
Phyllis Dana
Lenore Terrell
Helen Entriken
Ann Tucker
Ruth Erickson
Genevieve Van de Drink
Rosella Nesgis
Margaret Peggy Swann
Bertha Houck