



# INNOVATIONS DISCOVERY GUIDE

## Welcome!

AGES 15-18

Welcome to the National Museum of Health and Medicine! NMHM was founded in 1862 during the Civil War to "study specimens of morbid anatomy." Photographs, drawings, letters, bones, bullets, and surgical tools were all collected to understand and improve the care of service members. Today, we inspire interest in the past, present, and future of American military medicine.

This discovery guide will help you research the museum's collections.  
This guide will explore:

- Challenges and triumphs
- Turning points
- Materials
- Pioneers in military medicine
- The hidden injury

This guide is designed to inspire interest in American military medicine and encourage discussions in the classroom and conversations on social media. Use the hashtags to find definitions, images, articles, and conversations relating to the topics of military medicine. *There are no right or wrong answers to the questions.*

## Warm-Up

What do you know about military medicine?

How has military medicine impacted your life or the life of someone you know?

# Challenges and Triumphs

## Visit the Military Medicine Gallery.

Today's armed forces face unique challenges in keeping service members medically ready both at home and abroad. The military conducts research to develop drugs and #vaccines to treat and prevent diseases. Often, human test subjects participate in certain types of research trials. In order to volunteer for clinical studies, the person must sign a consent form or contract that provides a summary of the study and describes the individual's rights and risks as a research subject. U.S. Army Maj. Walter Reed developed one of the first informed consent forms for the Yellow Fever Commission in 1900.

## Locate the consent form and answer the following:

*What is yellow fever?*

*How is yellow fever transmitted?*

*Who wrote this document?*

*Who was the intended audience for this document?*

*Why was this document written?*

*What evidence in the document helps you know why it was written?*

*Provide a quote from the document.*

*Write a question to the author that you think the document leaves unanswered.*

The undersigned,  
being more than twenty-five years of age, native of  
in the province of , the son of  
and here states by these presents, being in  
the enjoyment and exercise of his own very free will, that he consents  
to submit himself to experiments for the purpose of determining the  
methods of transmission of yellow fever, made upon his person by the  
Commission appointed for this purpose by the Secretary of War of the  
United States, and that he gives his consent to undergo the said ex-  
periments for the reasons and under the conditions below stated.

The undersigned understands perfectly well that in case of the  
development of yellow fever in him, that he endangers his life to a  
certain extent but it being entirely impossible for him to avoid the  
infection during his stay in this island, he prefers to take the  
chance of contracting it intentionally in the belief that he will  
receive from the said Commission the greatest care and the most skill-  
ful medical service.

It is understood that at the completion of these experiments, with-  
in two months from this date, the undersigned will receive the sum of  
\$100 in American gold and that in case of his contracting yellow fever  
at any time during his residence in this camp, he will receive in addi-  
tion to that sum a further sum of \$100 in American gold, upon his re-  
covery and that in case of his death because of this disease, the  
Commission will transmit the said sum (two hundred American dollars)  
to the person whom the undersigned shall designate at his convenience.

The undersigned binds himself not to leave the bounds of this camp  
during the period of the experiments and will forfeit all right to the  
benefits named in this contract if he breaks this agreement.

And to bind himself he signs this paper in duplicate, in the Experi-  
mental Camp, near Quemados, Cuba, on the th day of October  
nineteen hundred.

On the part of the Commission: The contracting party,  
Walter Reed  
Maj. & Surg., U.S.A.

## Did you know?

The World Health Organization (@WHO on Instagram) estimates that nearly 200,000 people are diagnosed with #yellowfever each year.



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## Turning Points

Turning points are moments in time that effect changes in science, technology or culture. Due to the extreme conditions of #militarymedicine, #innovations, and developments occur to improve the state of medicine. Find the object at right and answer the corresponding questions about its effect on #medicine.

Antibiotics or antimicrobials are drugs that are used to kill microbial infections. Antibiotics, such as sulfonamide (sulfa) and penicillin, revolutionized medicine by creating an effective means to treat infections, such as staphylococcus.



List the four types of microbes.

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*"But I would like to sound one note of warning. Penicillin is to all intents and purposes non-poisonous so there is no need to worry about giving an overdose and poisoning the patient. There may be a danger, though, in under dosage. It is not difficult to make microbes resistant to penicillin in the laboratory by exposing them to concentrations not sufficient to kill them, and the same thing has occasionally happened in the body."*

Alexander Fleming, Nobel Prize Acceptance Speech, Dec. 11, 1945

Alexander Fleming provided this warning during his Nobel Prize acceptance speech for the discovery of penicillin. Antibiotic or antimicrobial resistance occurs when the microbes are no longer destroyed by the antibiotic. Resistance is also a natural process in the evolution of bacteria, which requires a need for new antibiotics and diagnostic testing.

*Where are most antibiotic-resistant infections found? Why?*

*How are antibiotic-resistant infections spread?*

*Why would antibiotic-resistant infections be a concern for military medicine?*

*Describe an option for reducing the spread of antibiotic-resistant infections.*

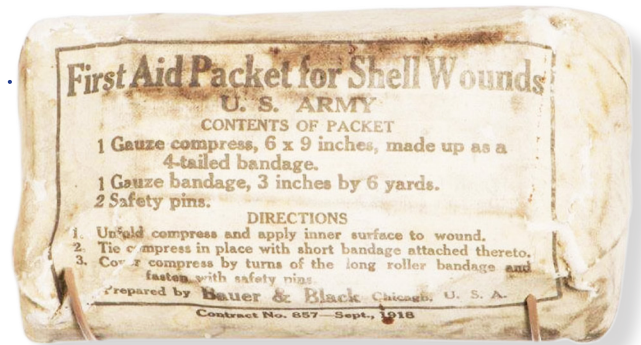
## Did you know?

**Penicillin was the first commercialized antibiotic used to treat surgical and wound infections during World War II.**



## Materials

Bandages, or dressings, are used to stop bleeding and protect the wound from dirt and prevent infection. Bandages are easily transportable and can be applied to a wound at any location. Bandages can be made from many materials including lint, cloth, gauze, or even silver.



**Find the #WorldWarI bandage, “First Aid Packet for Shell Wounds.”**

*What material is used in this bandage?*

*How would this bandage be used?*

*Who would have used this bandage?*

*Find other bandages in the museum. If you were an inventor, what type of materials or methods would you use to make a bandage?*

## Did you know?

World War I introduced a new, highly-absorbent bandage called Cellucotton (cellulose wadding). This product was developed by the Kimberly-Clark Company and was adapted as the first feminine pad called Kotex (cotton texture) in 1920.



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1



Can you identify the following people as an inventor, pioneer, or patient?

*Hint: Look for the colored panels!*

2



INVENTOR PIONEER PATIENT

1. Dr. Gurdon Buck

2. Peter Cluckey

3



3. Dr. Gunther Van Hagens

4. Lt. Col. J.J. Woodward

4



5. Dr. Willem Kolff

6. Dr. Peyton Rous

5



8. Dr. Mary Walker

9. President Abraham Lincoln

6



10. Maj. Walter Reed

11. Col. Emma Vogel

7



12. Dr. Ellis Kerley

13. Dr. Jules-Émile Péan

8



14. Sgt. 1st Class Eric Smeed

15. Pvt. Julius Fabry



9



10



11



12



13



14



15

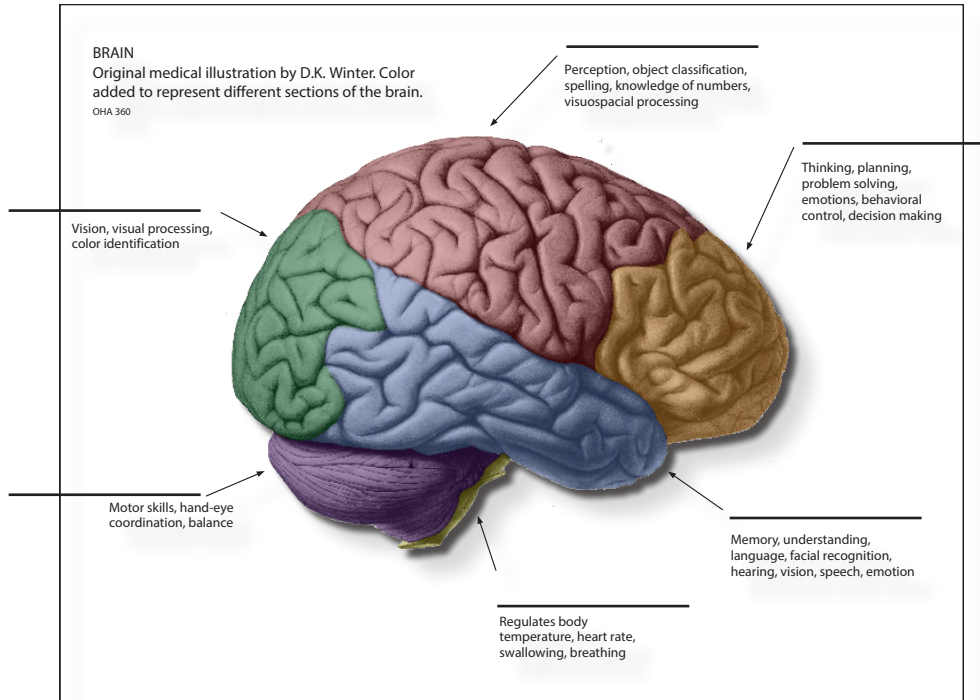
## Did you know?

Some cancers can be transmitted by viruses. This was first discovered when Dr. Peyton Rous injected cancer cells into chickens and tumors formed.

# The Hidden Injury

Visit the "Fragile Organ" Exhibit in the Anatomy and Pathology Gallery.

## Match the anatomical structures of the #brain.



1. Parietal lobe
2. Frontal lobe
3. Temporal lobe
4. Brainstem
5. Occipital lobe
6. Cerebellum

Traumatic brain injuries, or TBIs, are caused by a sudden force or blow to the head.

*What are examples of a #TBI?*

*List activities or events that could cause a #TBI.*

#Braininjuries can produce a variety of symptoms depending on the location of the injury on the brain. How would the symptoms be different if the hematoma occurred in the frontal lobe versus the temporal lobe? Why are the symptoms different? How would this impact a diagnosis?

#TBIs are often considered to be a hidden injury. Why would patients feel that their injuries can't be seen? What impact would this have on their health or treatment?

What types of treatments are used for #TBIs?

## Did you know?

Explosions are the leading cause of TBIs for active duty military in war zones, but falls are the leading cause of #TBIs for all Americans. Nearly 1.5 million Americans sustain #TBIs each year.

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## *Continue the Conversation @MedicalMuseum*

#militarymedicine

#innovations

#innovators

#TBI

#braininjury

*Now that you have toured the museum and completed the discovery sheets, can you describe examples of how military medicine has impacted your life or the life of someone you know?*

*List three things you learned about military medicine.*



## NATIONAL MUSEUM OF HEALTH AND MEDICINE

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