“Amateurs study tactics. Professionals study logistics.”

-Omar Bradley?

Blood as a strategic resource

How wartime need built a national blood operation

The United States began with limited blood infrastructure.

Stored blood was still a young hospital practice. The Army had to turn clinical possibility into military supply.

1937

First U.S. blood bank

Fantus opens the Cook County blood preservation laboratory.

31 May 1940

Army asks NRC for help

Shock, transfusion, and blood banks become formal military problems.

1940-41

Plasma program scales

A durable product can move before whole-blood logistics mature.

1942-43

Surgery drives demand

Theaters learn that hemorrhage resuscitation needs cellular replacement.

The wartime problem was expansion: science, supply, transport, and forward use all had to grow together.

Cook County Health and University of Chicago Library on Fantus/Cook County, 1937; Kendrick, AMEDD Blood Program in World War II.

Kendrick, AMEDD Blood Program in World War II, chapter V.

The blood program became enormous.

The American Red Cross donor program supplied the raw material for a national military blood effort.

13.3M
donations drawn

10.3M
processed into dried plasma

This was industrial medicine: recruiting donors, collecting blood, processing product, and moving it into a global war.

Plasma made resuscitation portable.

Plasma matched the early logistics problem: durable, compact, and distributable to ships, stations, and evacuation chains.

Durable

Could be stored and shipped where refrigeration was limited.

Compact

Moved in volume before refrigerated whole blood could.

Forward

Supported shock care across widely dispersed theaters.

Complementary

Remained valuable as whole-blood use expanded.

The plasma program created reach while the whole-blood system matured.

Kendrick, AMEDD Blood Program in World War II, chapters V-VI.

The product mix evolved with the war.

Operational experience pushed the system toward plasma forward and whole blood as far forward as the cold chain could support.

Plasma forward

Durable product for shock care, evacuation, and distributed support.

Whole blood forward

Cellular replacement for hemorrhage and surgical resuscitation.

As the clinical target changed, the logistics requirement changed with it.

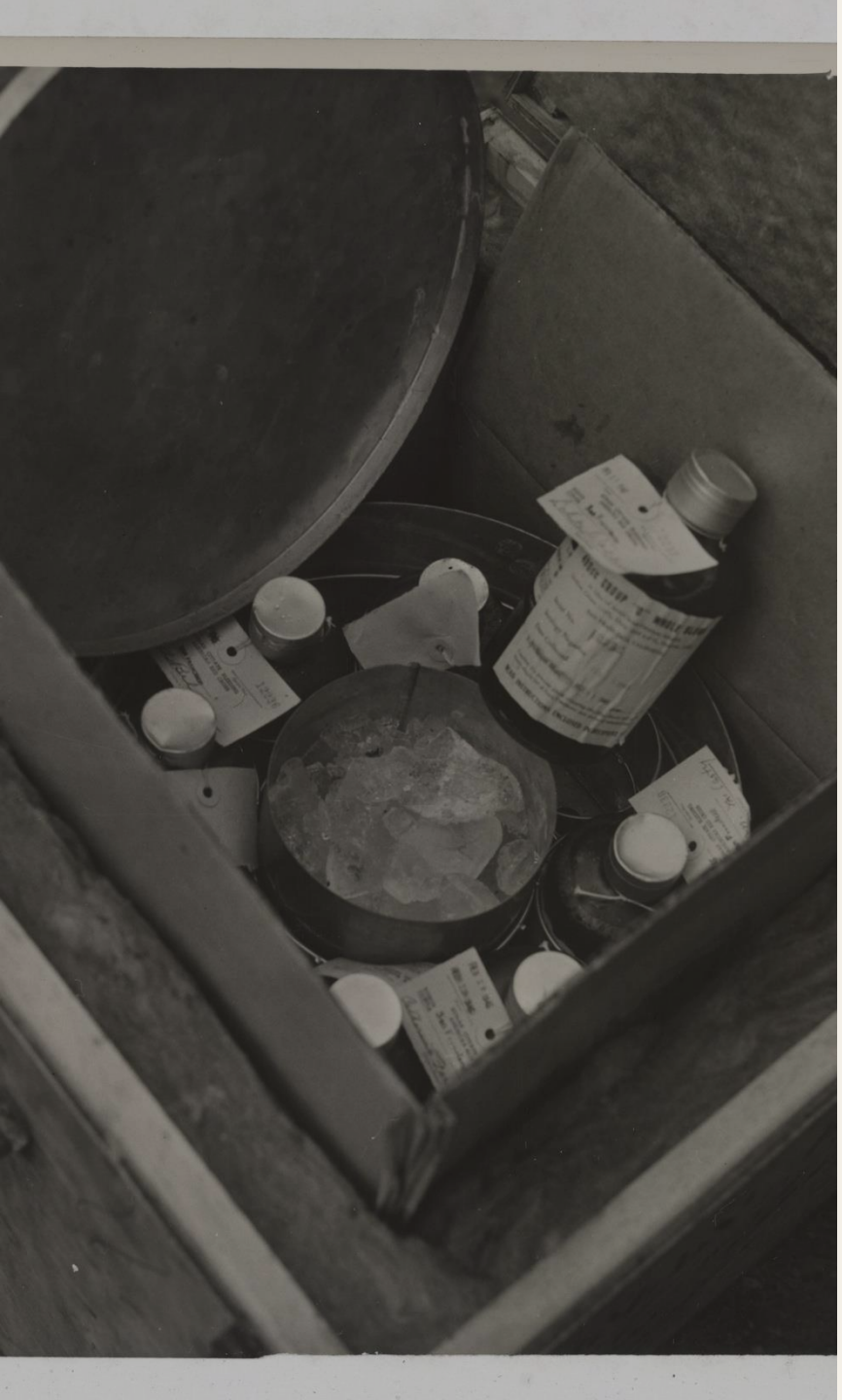
Kendrick, AMEDD Blood Program in World War II; Baines et al., Transfusion, 2026.

The program expanded by building every link.

The intervention was the system: people, product, preservation, movement, command attention, and clinical integration.

A blood program fails at the weakest handoff.

Kendrick, AMEDD Blood Program in World War II, chapters VI and XI.



Whole blood turned supply into a cold-chain problem.

As whole blood moved forward, usable inventory depended on time, temperature, transport, and loss control.

Dating

7-day dating made speed part of capacity.

Transit

Favorable donor-to-Iwo movement could be 2-3 days.

Loss

10-15% donor-to-recipient loss approached the practical minimum.

Collected blood became military capacity only if it arrived usable.

Kendrick, AMEDD Blood Program in World War II; Baines et al., Transfusion, 2026.

Theaters learned to manage blood as a flow.

Requirements, collection, processing, transportation, theater storage, and hospital use had to be managed as one rhythm.

Forecast

How much blood will the operation consume?

Balance

Can donor draw and processing keep pace?

Move

Can the product survive distance and delay?

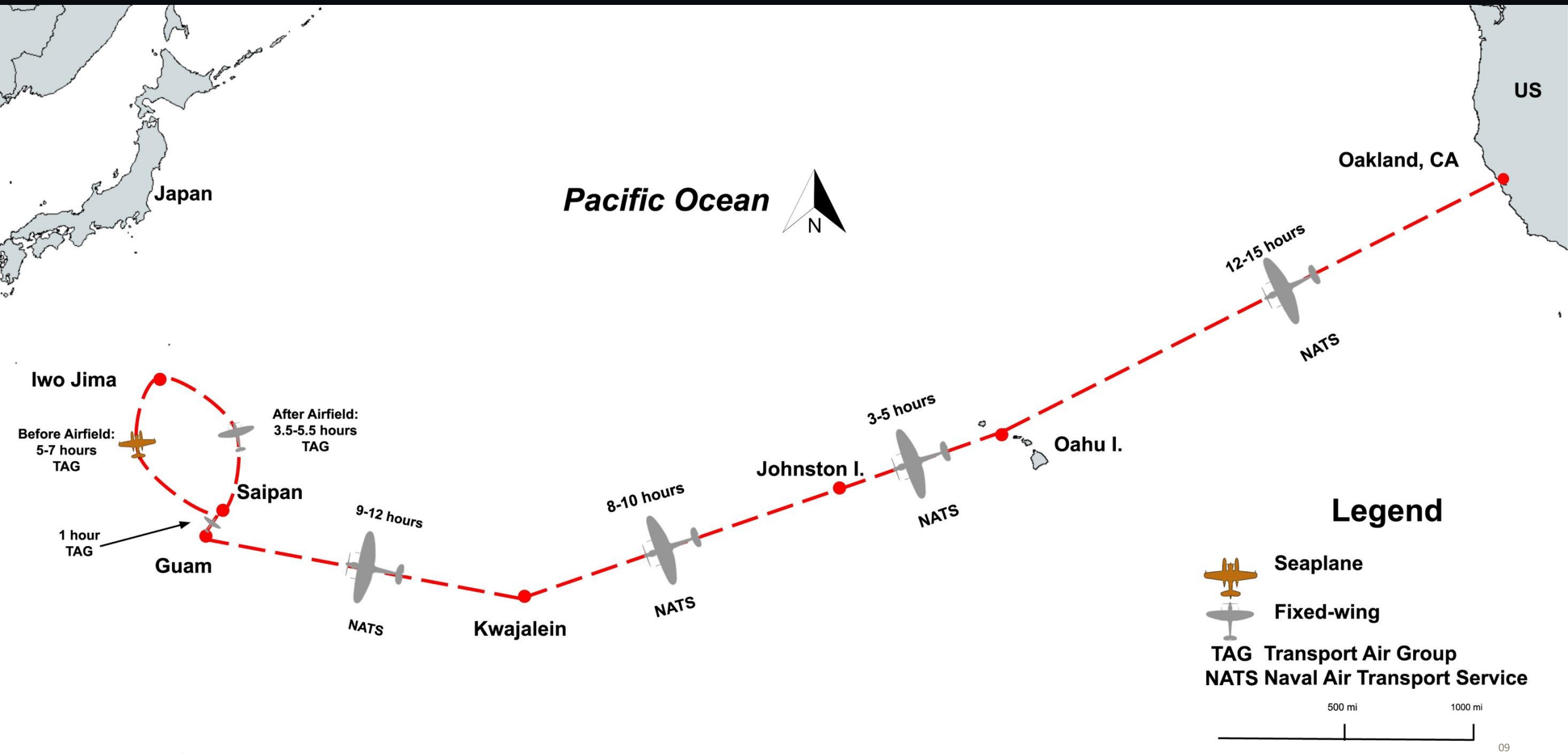
Absorb

Can forward hospitals use it before it expires?

Iwo Jima was the Pacific version of that mature flow.

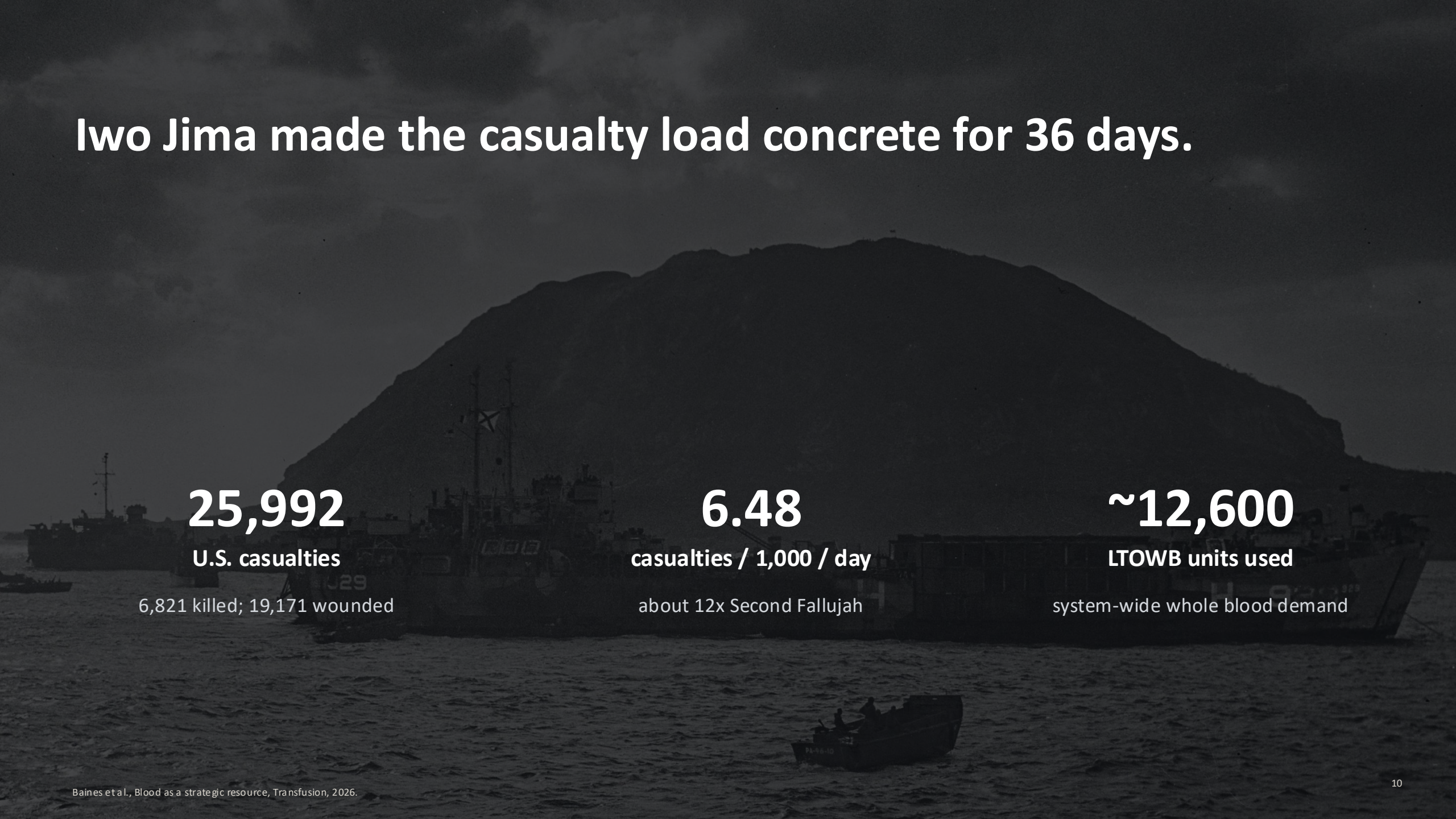
Kendrick, AMEDD Blood Program in World War II, chapters XI and XV; Baines et al., 2026.

The Pacific route was part of the capability.



Route map adapted from Baines et al., Transfusion, 2026.

Iwo Jima made the casualty load concrete for 36 days.



25,992

U.S. casualties

6,821 killed; 19,171 wounded

6.48

casualties / 1,000 / day

about 12x Second Fallujah

~12,600

LTOWB units used

system-wide whole blood demand

Baines et al., Blood as a strategic resource, Transfusion, 2026.

At Iwo Jima, forward blood was organized work.

Afloat banks

LST(H)-929 received 3,994 units and issued 3,569.

Ashore supply

At least 5,406 units reached shore facilities.

Clinical use

LTOWB reached aid stations and surgical care.

The visible transfusion was the endpoint of a much larger supply chain.

Baines et al., Transfusion, 2026.

Updating Usage Estimates to Modern Transfusion Doctrine

25,992 casualties x assumed transfusion fraction x 8 WBE

Derived scenario assumption

20% of casualties transfused

Used in our Iwo Jima capacity translation to estimate recipients.

Official planning factor

8 WBE per recipient

Official whole-blood-equivalent requirement per transfused casualty.

WBE is an accounting unit: whole blood, or balanced components approximating whole blood.

Baines et al., Transfusion, 2026; Gurney et al., J Trauma Acute Care Surg, 2024.

Modern expectations turn Iwo into a 40,000-unit problem.

25,992 casualties x 20% assumed transfused x 8 WBE

= 41,587 WBE

Actual Iwo Jima use

~12,600 units

about 0.49 LTOWB units per casualty

Modern estimate

>40,000 WBE

same casualty load, current transfusion intensity

Baines et al., Transfusion, 2026. Calculation rounded in article as greater than 40,000 WBE.

The constraint quickly becomes national.

The Iwo Jima article compares late-war throughput and modern-scaled demand against present U.S. type O supply.

Military demand draws on the same national blood base.

Baines et al., Transfusion, 2026. Type O comparisons use supply estimates cited in the article.

The planning question is national blood capacity.

World War II blood support expanded to match changing science and wartime need. LSCO asks whether today's national base can do the same under modern transfusion expectations.

Source

donors, collection, testing, release

Product

plasma reach plus whole-blood resuscitation

Movement

cold chain, airlift, staging, rotation

Usability

dating, loss control, forward absorption

Civilian and military systems meet at the same reservoir of usable blood.

Synthesis from Kendrick AMEDD history; Baines et al. 2026; Gurney et al. 2024; Bowers et al. 2025.