Summary of Traumatic Brain Injury (TBI) Literature

BREAKTHROUGHS IN BLOOD
ADVANCEMENTS INTO ACTION

Breakthroughs in blood webinar October 25, 2024

HEMOTION Resource:
Slide deck

Canadian Blood Services
BLOOD PLASMA STEM CELLS ORGANS & TISSUES

Developed 2025-01-07; Educational / informational purposes only. Available on Canadian Blood Services' professional education website, Profedu.ca, Breakthroughs in blood webinar series.

BREAKTHROUGHS IN BLOOD
ADVANCEMENTS INTO ACTION

Purpose

This resource was created in January 2025 for the *Breakthroughs in blood: Advancements into action* webinar series and is available on Canadian Blood Services' professional education website, Profedu.ca.

It is intended for educational or informational purposes only.

BREAKTHROUGHS IN BLOOD

ADVANCEMENTS INTO ACTION

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- Jeannie Callum, MD, FRCPC / Transfusion medicine – Kingston, Canada
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- Gregory Hawryluk, MD, PhD, FRCPC / Neurosurgery – Cleveland, USA
- Victoria McCredie, PhD, UCNS, FRCPC / Critical Care Medicine – Toronto, Canada

A multicenter, randomized, controlled clinical trial Of transfusion requirements in critical care (TRICC)

Hébert PC et al. *The New England Journal of Medicine.* Published February 11, 1999. doi: 10.1056/NEJM199902113400601

Do restrictive strategies for RBC transfusion and liberal strategies produce equivalent results in critically ill patients?

A restrictive strategy of RBC transfusion is at least as effective as and possibly superior to a liberal transfusion strategy in some critically ill patients.

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TRICC Study

Population

524 Men

314 Women

Patients in **intensive care** with **low hemoglobin (**≤ 9g/dL)

- Stratified by center and disease severity
- APACHE II score

Location

25 ICUs in Canada

Intervention

838 Patients analyzed

420

Liberal transfusion

RBC transfusion triggered by hemoglobin level < 10g/dL

418

Restrictive transfusion

RBC transfusion triggered by hemoglobin level < 7g/dL

Primary outcome

Death from all causes in the 30 days after randomization.

Findings

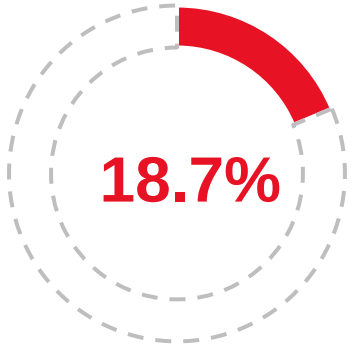
Mortality rate at 30 days

Liberal transfusion

98 of 420 patients

Restrictive transfusion

78 of 418 patients



Difference was not statistically significant:

Absolute difference, **4.7%**

(95% CI, -0.84% to 10.2%; *p* = .11)

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Liberal or Restrictive Transfusion Strategy in Patients with Traumatic Brain Injury (HEMOTION study)

Turgeon AF et al. *The New England Journal of Medicine.*
Published online June 13, 2024. doi: 10.1056/NEJMoa2404360

Does a liberal strategy for RBC transfusion lead to better long-term functional outcomes compared to a restrictive strategy in critically ill adults with traumatic brain injury and anemia?

The risk of an unfavourable neurologic outcome at 6 months was similar between a liberal vs restrictive transfusion for critically ill patients with acute moderate or severe traumatic brain injury and anemia

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HEMOTION Study

Population

542 Men

200 Women

Patients in **intensive care** with **low hemoglobin (**≤ 10 g/dL)

- Acute moderate or severe traumatic brain injury

Mean age: **48.7** years

Location

34 centres in

- Canada
- United Kingdom
- France
- Brazil

Intervention

742 Patients randomized
736 Patients analyzed

369

Liberal transfusion

RBC transfusion triggered by hemoglobin level ≤ 10 g/dL

367

Restrictive transfusion

RBC transfusion triggered by hemoglobin level ≤ 7 g/dL

Primary outcome

Outcome: unfavorable neurological outcome

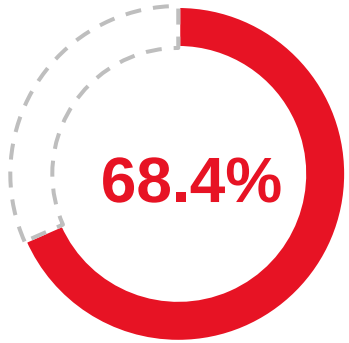
Glasgow Outcome Scale Extended score using a sliding dichotomy approach, six months after randomization

Findings

Unfavourable neurological outcome at 6 months

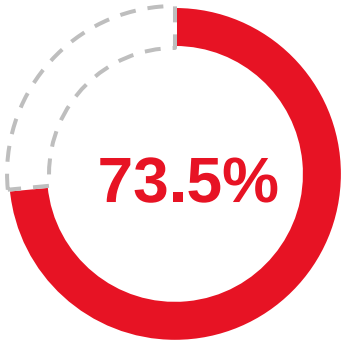
Liberal transfusion

249 of 364 patients



Restrictive transfusion

263 of 358 patients



Risk reduction was not statistically significant:

Adjusted risk reduction, **5.4%** (95% CI, -2.9 to 13.7)

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Canadian Blood Services — Blood, Plasma, Stem Cells, Organs & Tissues

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Restrictive vs liberal transfusion strategy in patients with acute brain injury the TRAIN randomized clinical trial

Taccone FS et al. *JAMA.* Published online October 09, 2024. doi:10.1001/jama.2024.20424

How does use of a liberal or restrictive strategy of blood transfusion influence neurological outcome among patients with acute brain injury?

A liberal transfusion strategy compared with a restrictive strategy resulted in a lower rate of unfavorable neurological outcome among patients with acute brain injury and anemia.

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TRAIN Study

Population

444 Men

376 Women

Patients in **intensive care** with **low hemoglobin (**< 9g/dL)

- Traumatic brain injury
- Subarachnoid hemorrhage
- Intracerebral hemorrhage

Mean age: **51** years

Location

72 ICUs in
22 countries

Intervention

850 Patients randomized
806 Patients analyzed

393

Liberal transfusion

RBC transfusion triggered by hemoglobin level < 9g/dL

413

Restrictive transfusion

RBC transfusion triggered by hemoglobin level < 7g/dL

Primary outcome

Outcome: unfavourable neurological outcome

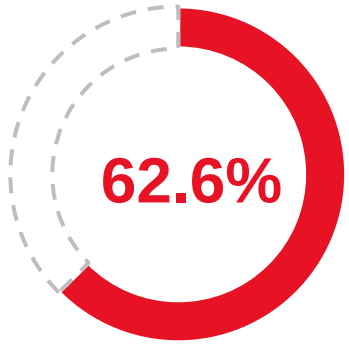
Glasgow Outcome Scale Extended score between 1 and 5, 180 days after randomization

Findings

Unfavourable neurological outcome at 180 days

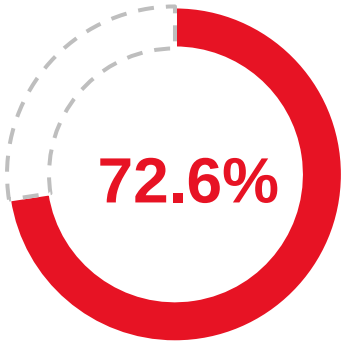
Liberal transfusion

246 of 393 patients



Restrictive transfusion

300 of 413 patients



Difference was statistically significant:

Absolute difference, **-10.0%** (95% CI, -16% to -3.6%)

Adjusted relative risk, **0.86** (95% CI, 0.79 to 0.94; *p* = .002)

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