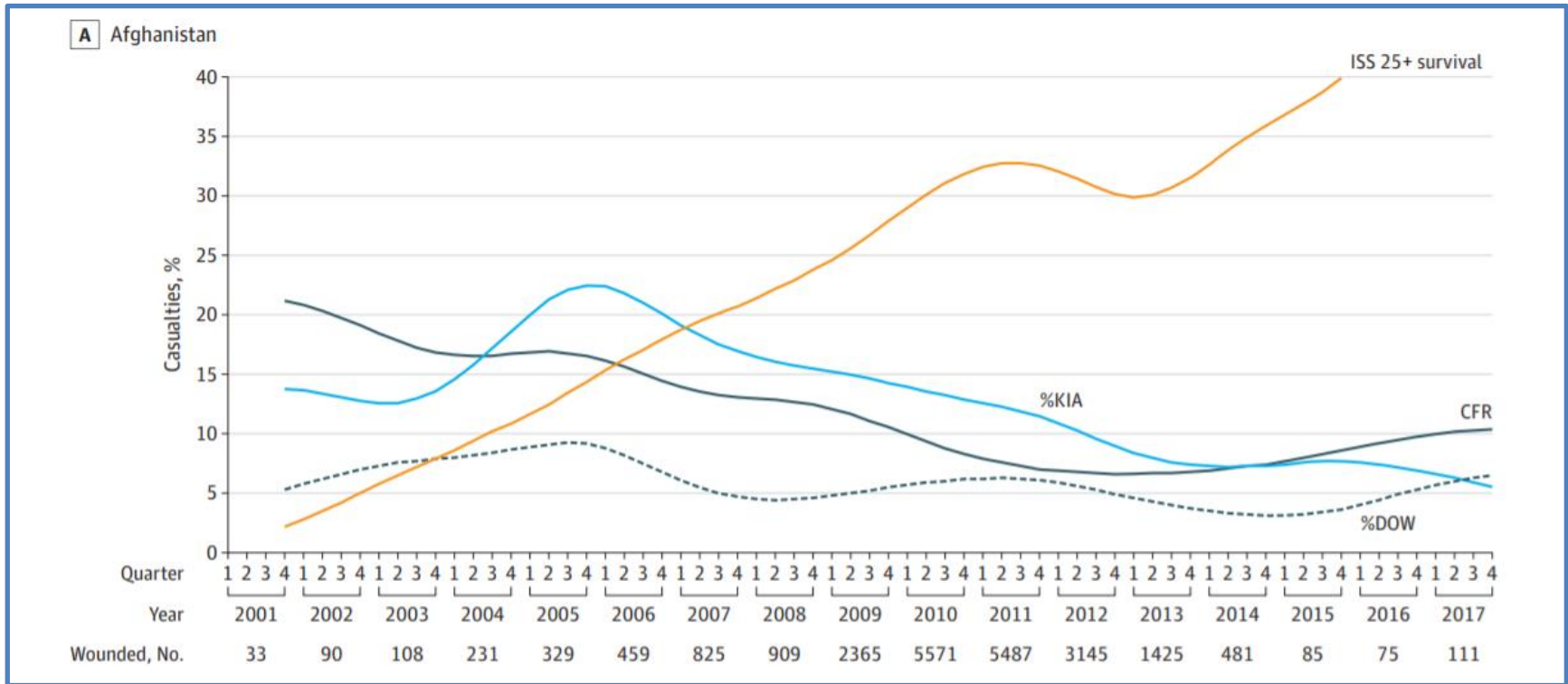




SOF casualties during counter-terrorism operations



Combat casualty care data



Howard et al. JAMA Surg 2019

Combat casualty care data

ORIGINAL ARTICLE

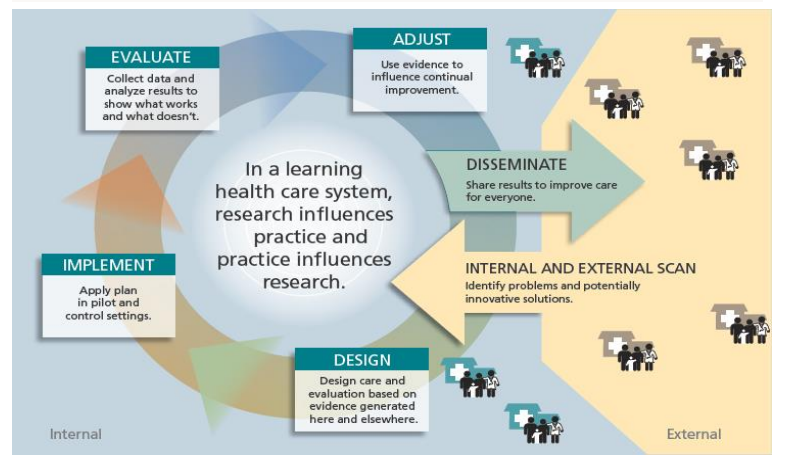
ONLINE FIRST

Eliminating Preventable Death on the Battlefield

Russ S. Kotwal, MD, MPH; Harold R. Montgomery, NREMT; Bari M. Kotwal, MS; Howard R. Champion, FRCS; Frank K. Butler Jr, MD; Robert L. Mabry, MD; Jeffrey S. Cain, MD; Lorne H. Blackbourne, MD; Kathy K. Mechler, MS, RN; John B. Holcomb, MD

Kotwal et al. Arch Surg 2011

3 A Framework for a Learning Trauma Care System



A NATIONAL TRAUMA CARE SYSTEM

Integrating Military and Civilian Trauma Systems to Achieve
ZERO
Preventable
DEATHS
After Injury

Committee on Military Trauma Care's Learning Health System and Its Translation to the Civilian Sector

Donald Berwick, Autumn Downey, and Elizabeth Cornett, *Editors*

Board on Health Sciences Policy
Board on the Health of Select Populations
Health and Medicine Division

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

THE NATIONAL ACADEMIES PRESS
Washington, DC
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○ — After action review

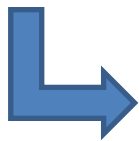


French Army Special Forces Command

Battle casualties 2016 – 2020

Retrospective data

Qualitative analysis*

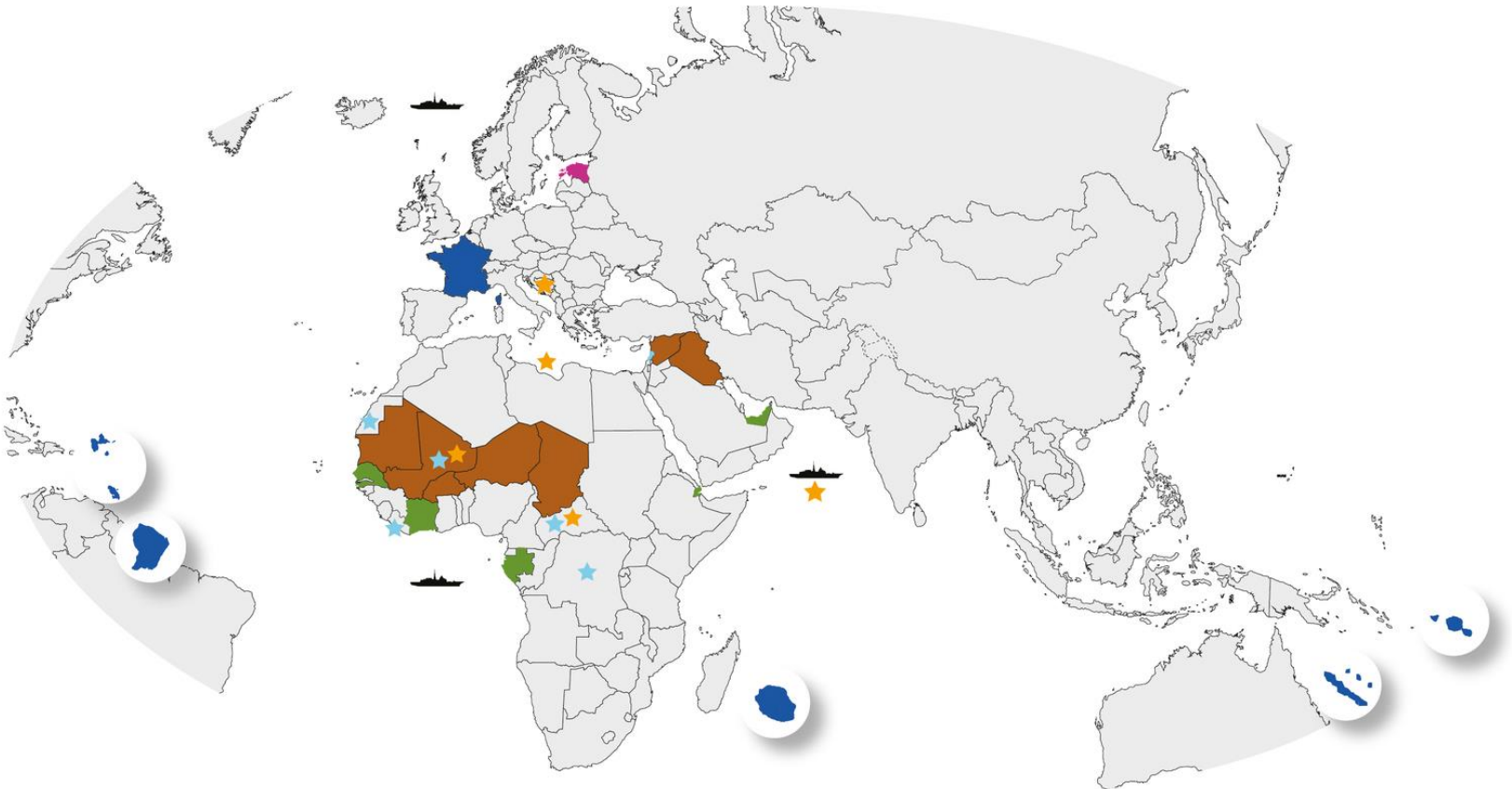


- **lessons learned** (*and relearned...*)
- **changes in procedures**
- **capability gaps** (doctrine, training, research, equipment ...)

**modified delphi method with head of medical staff from all units*

○ — After action review 2016 - 2020

29 casualties during 11 combat situations



Déploiements opérationnels des forces armées françaises.

<https://www.vie-publique.fr/eclairage/18474-les-operations-militaires-externes-de-la-france-opex>

○ — After action review 2016 - 2020

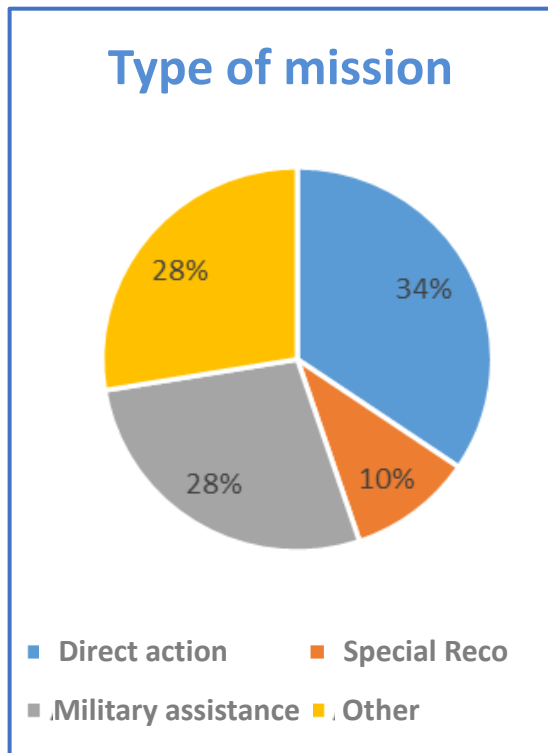
29 casualties during 11 combat situations

 *2,6 casualties per event*

○ — After action review 2016 - 2020

29 casualties during 11 combat situations

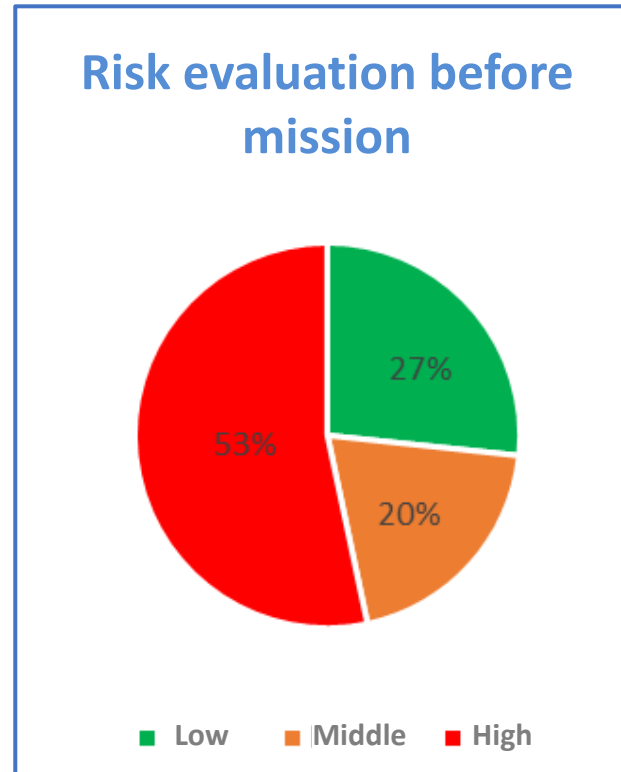
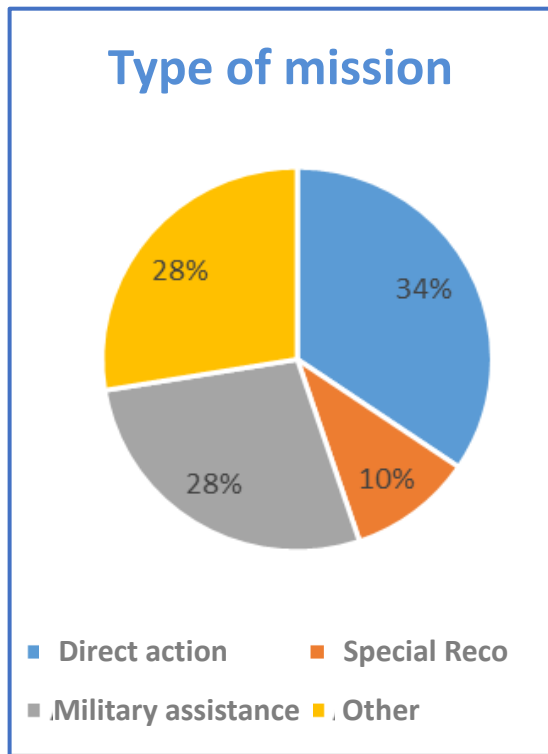
↳ *2,6 casualties per event*



○ — After action review 2016 - 2020

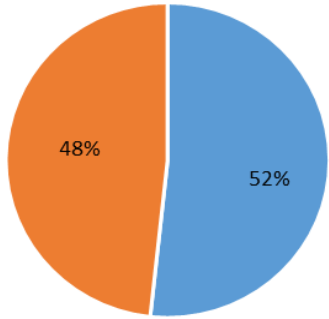
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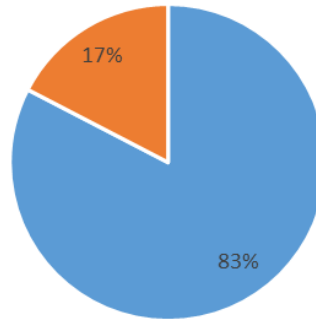
After action review 2016 - 2020

Wound pattern



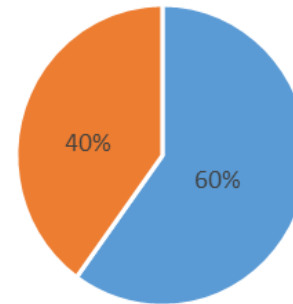
■ Balistic ■ Blast (including IED and drones)

Time



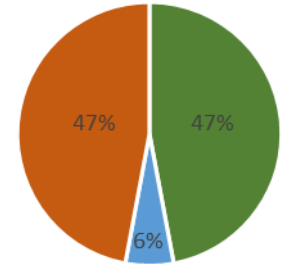
■ Day ■ Night

Place



■ Field ■ Medical station

Time in the mission

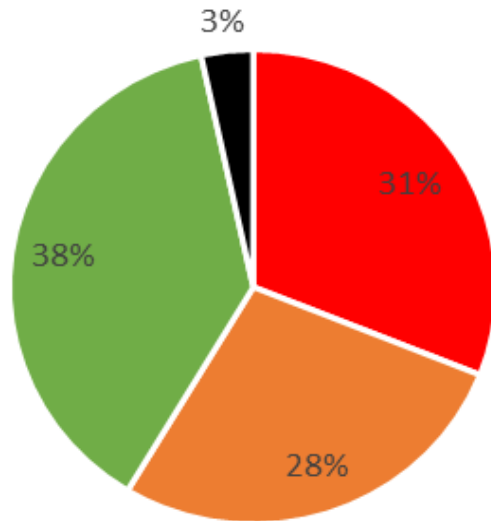


■ < 1 Day ■ 1-2 Days ■ 2+ Days



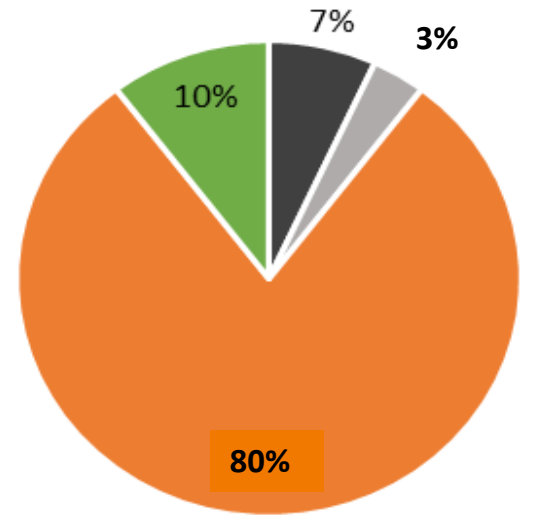
After action review 2016 - 2020

Initial triage



■ Alpha ■ Bravo ■ Charlie ■ KIA

Outcome



■ KIA ■ DOW ■ STRATEVAC ■ RTD

○ — After action review 2016 - 2020

28% of injuries occurred during helicopter direct actions

Average - 'injury' notification time = 18 min (5 to 36)



Medical support for French SOF operations



SC1

SC2

Nurses

Physicians

MEDEVAC

Surgery

STRATEVAC

ROLE 4

Reeducation
Réhabilitation

Tactical Combat Casualty Care



SC1

SC2

Nurses

Physicians

MEDEVAC

Surgery

STRATEVAC

ROLE 4

Reeducation
Rehabilitation

Life saving interventions: extraction, tourniquets, haemostatic packing, morphine ...

- Complex tactical situations
- Difficulties with tourniquets and packing in hostile environment



Tactical Combat Casualty Care



SC1

SC2

Nurses

Physicians

MEDEVAC

Surgery

STRATEVAC

ROLE 4

Reeducation
Rehabilitation

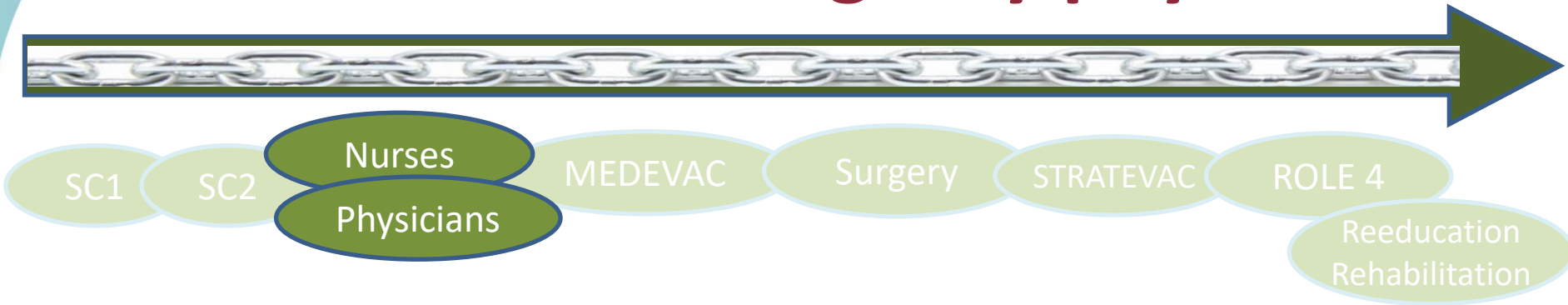
Life saving interventions: extraction, tourniquets, haemostatic packing, morphine ...

- Complex tactical situations
- Difficulties with tourniquets and packing in hostile environment



- TCCC training in every unit
- Tactical and medical global response and leadership
- Joint medical and non-medical training before deployment

Nurses and emergency physicians

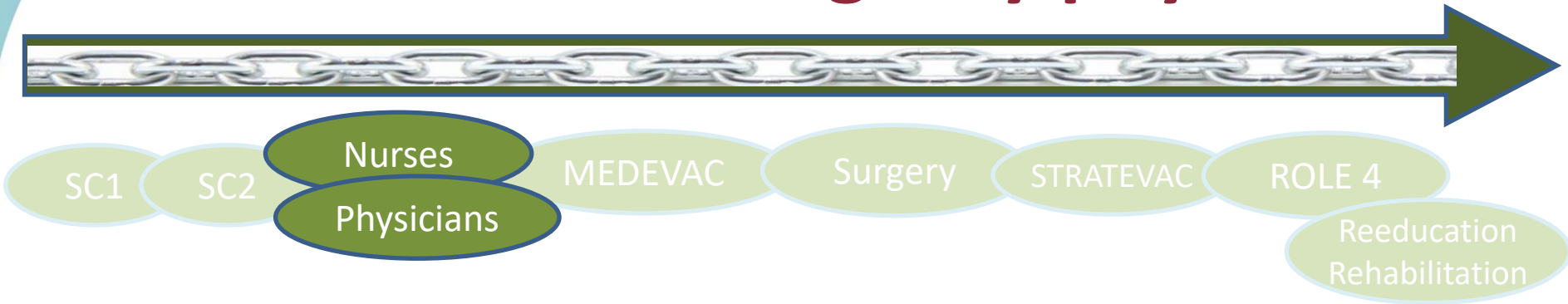


Average time from injury to nurse first care : 12,3 minutes (0 to 37)

Average time from injury to medical care : 13,8 minutes (0 to 37)



Nurses and emergency physicians



Average time from injury to nurse first care : 12,3 minutes (0 to 37)

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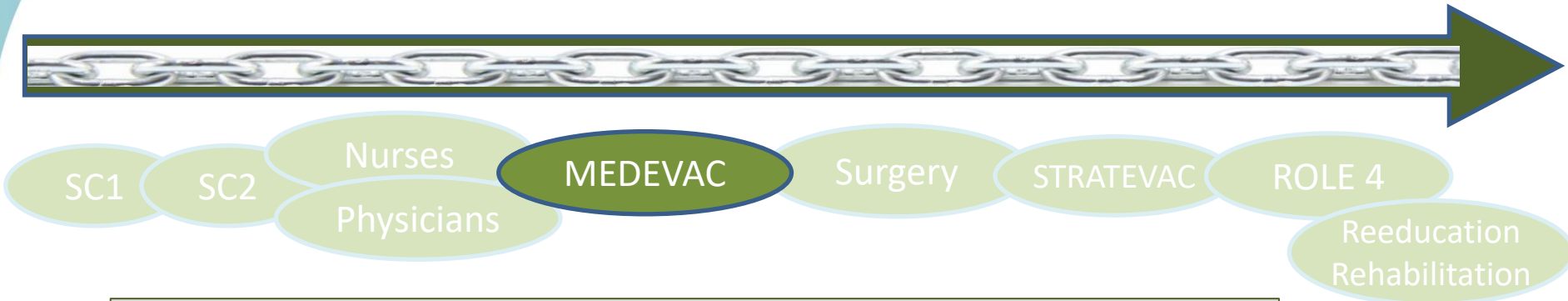
Emergency medical care :

- Hemorrhagic shock , transfusion, vasopressors
- Pain management, antibiotic
- Thoracostomy, airway management ...



- Relevance of the emergency doctor – nurse pairing
- Equipment
- At least 4 personnel per casualty ...
- Tactical and medical interactions

Forward MEDEVAC



Average time from injury to MEDEVAC landing : 45 +/- 42 minutes*

- 13,5 +/- 11 min if MEDEVAC helicopter already nearby
- 89 +/- 18 min if MEDEVAC helicopter is dispatched from its base

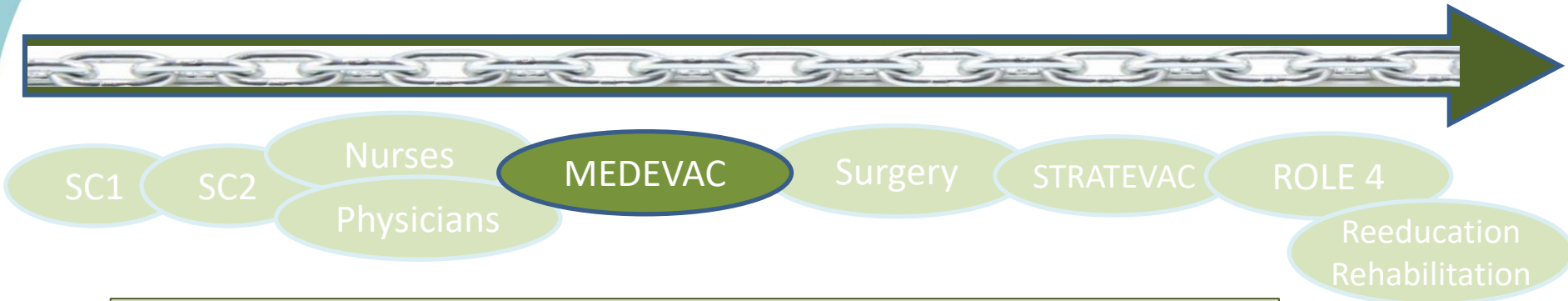
Average time from injury to surgical facility : 80 +/- 29 minutes*

- 65 +/- 15 min if MEDEVAC helicopter already nearby
- 115 +/- 21 min if MEDEVAC helicopter is dispatched from its base

* For *alpha* and *bravo* casualties



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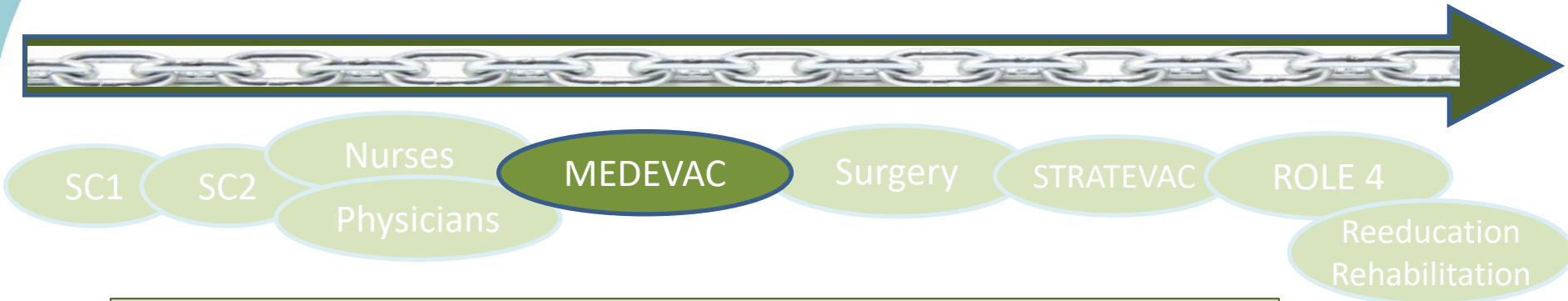
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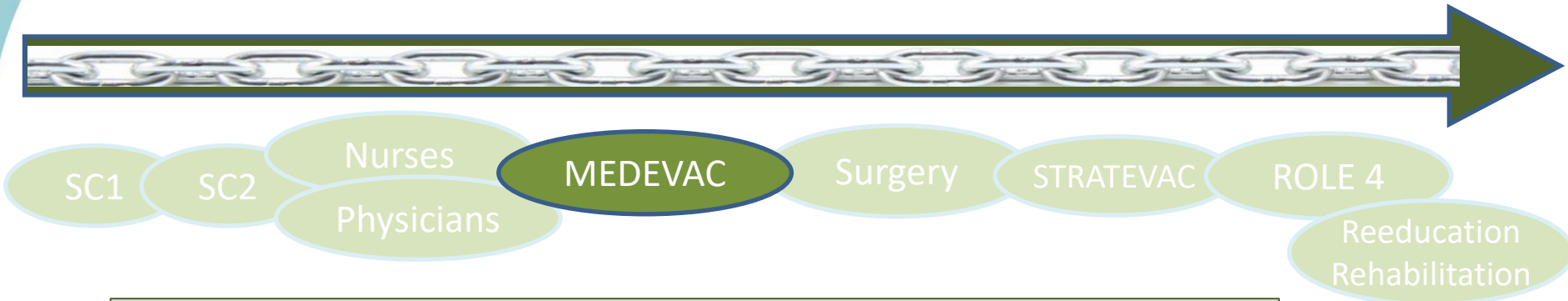
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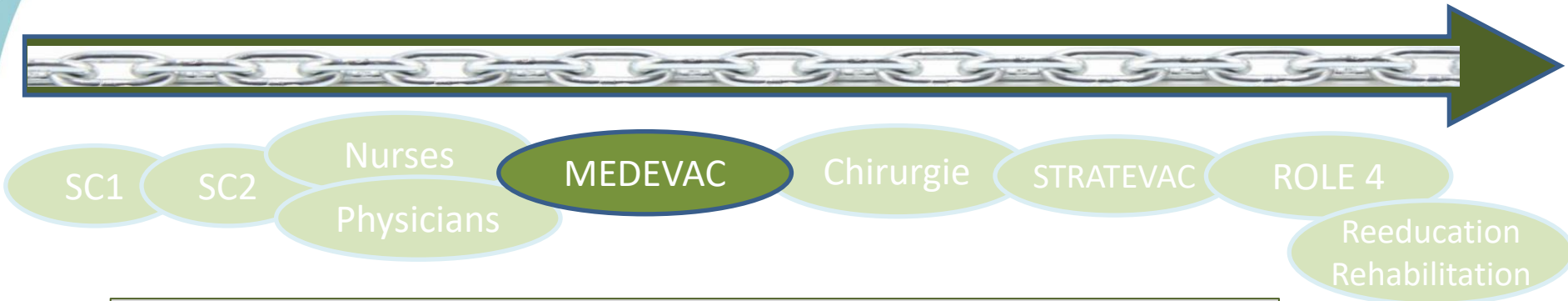
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- Planification, number and distribution of helicopters
- Global response based on medical and tactical considerations

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* For *alpha* and *bravo* casualties

Tactical considerations impacting medical response in 38% of cases

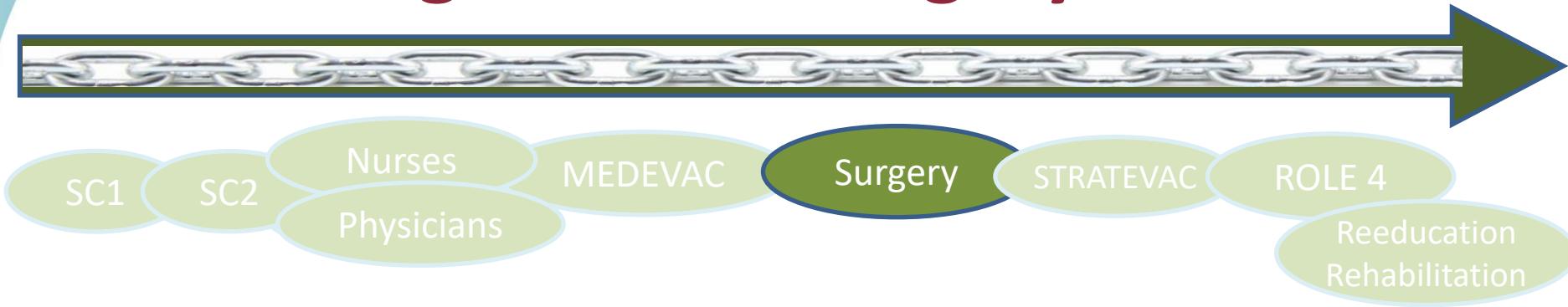
1 casualty during MEDEVAC

1 evacuation made possible by helicopter winching

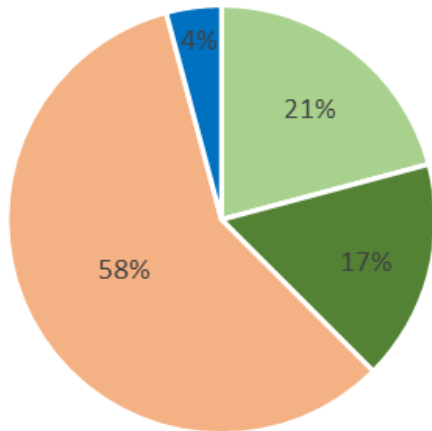


- **Planification, number and distribution of helicopters**
- **Global response based on medical and tactical considerations**

Damage control surgery



First surgical facility

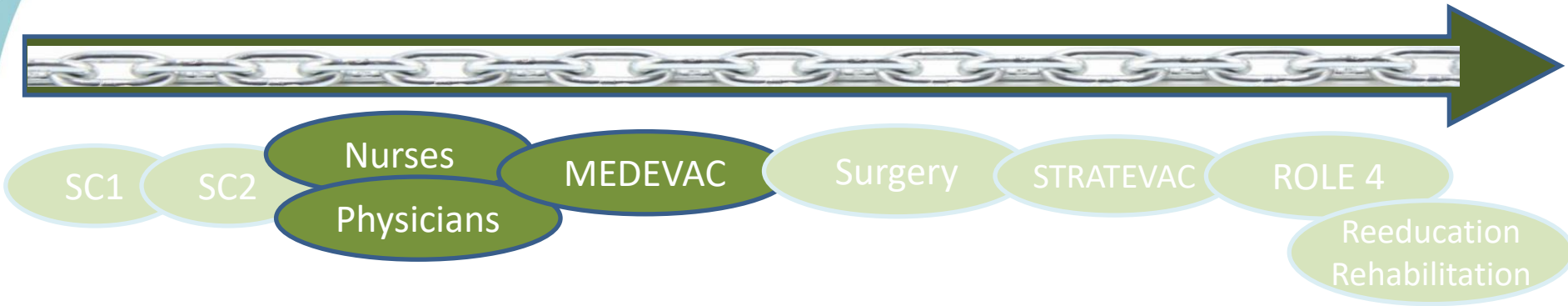


■ FST ■ French Role 2 ■ Interational ■ Other



- Precocity of the 1st surgical saving gesture (FST)
- Role 2
- Definitive surgical care in France

Lessons and feedback

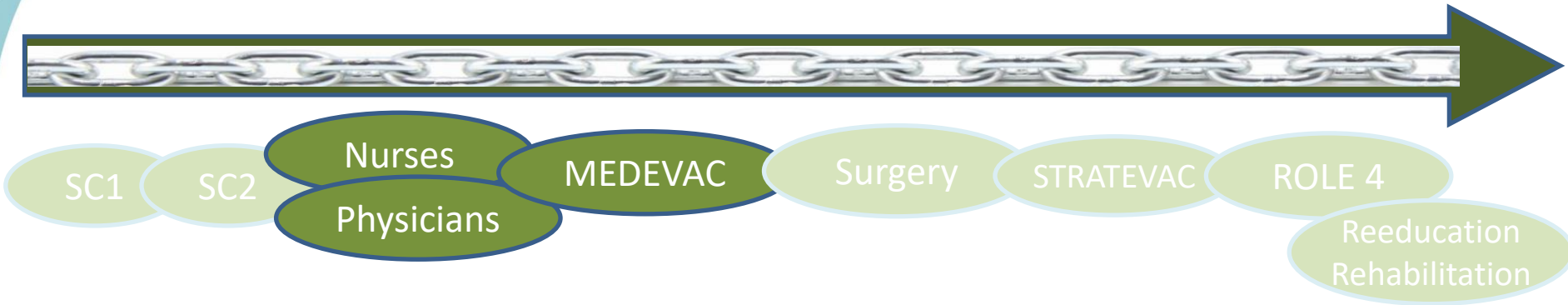


Evolution of forward transfusion strategies

Major benefit, logistical impact...



Lessons and feedback

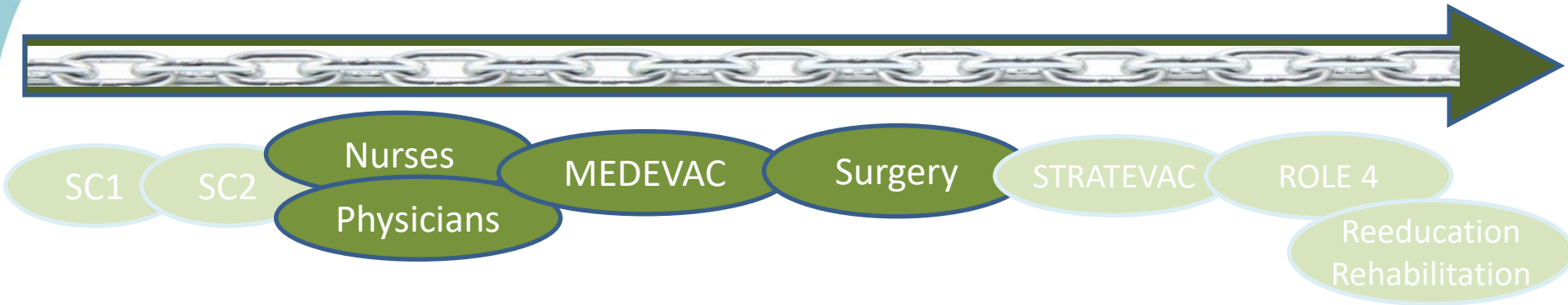


Evolution of forward transfusion strategies

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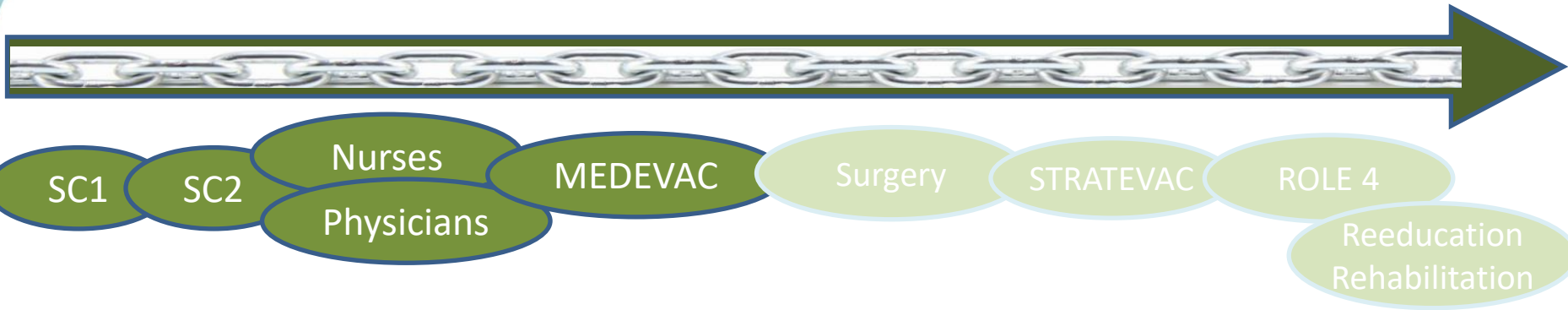
Shorten the time between injury and surgery

Number of helicopters – full medical kit on board

Forward surgical teams, onboard surgery ...



○ — Lessons and feedback



Interactions between medical and tactical chains of command

Feld physicians, nurses and medics ↔ *Tactical commander*

TOC physician ↔ *J3 / RW / TF commander*



Team work ...



Team work ...



In Memoriam



