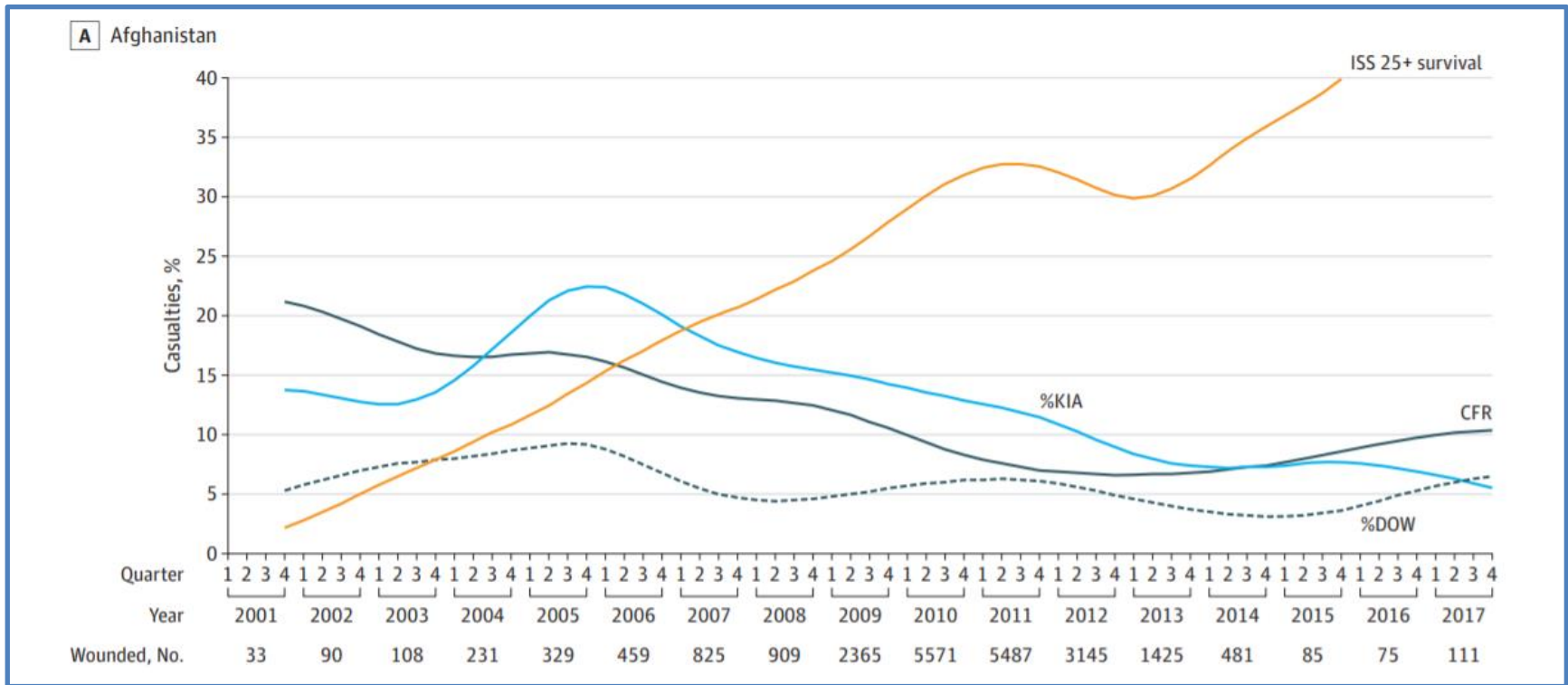




# SOF casualties during counter-terrorism operations



# Combat casualty care data



Howard et al. JAMA Surg 2019

# Combat casualty care data

ORIGINAL ARTICLE

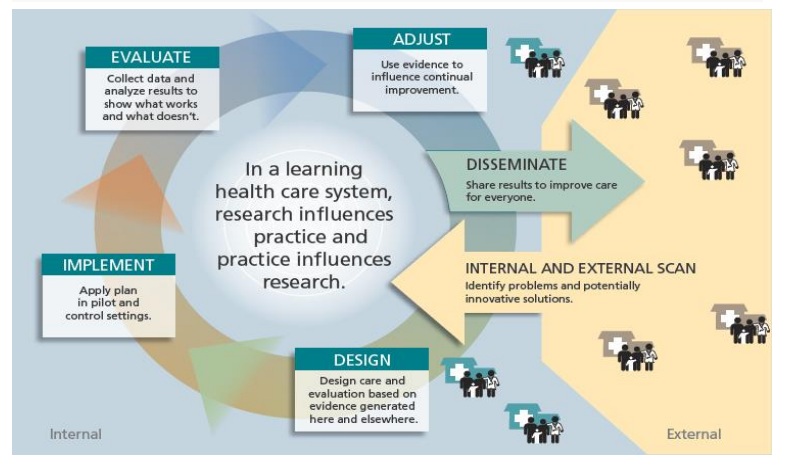
ONLINE FIRST

## 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  
[www.nap.edu](http://www.nap.edu)

# ○ — After action review

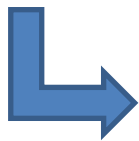


## French Army Special Forces Command

### Battle casualties 2016 – 2020

Retrospective data

Qualitative analysis\*

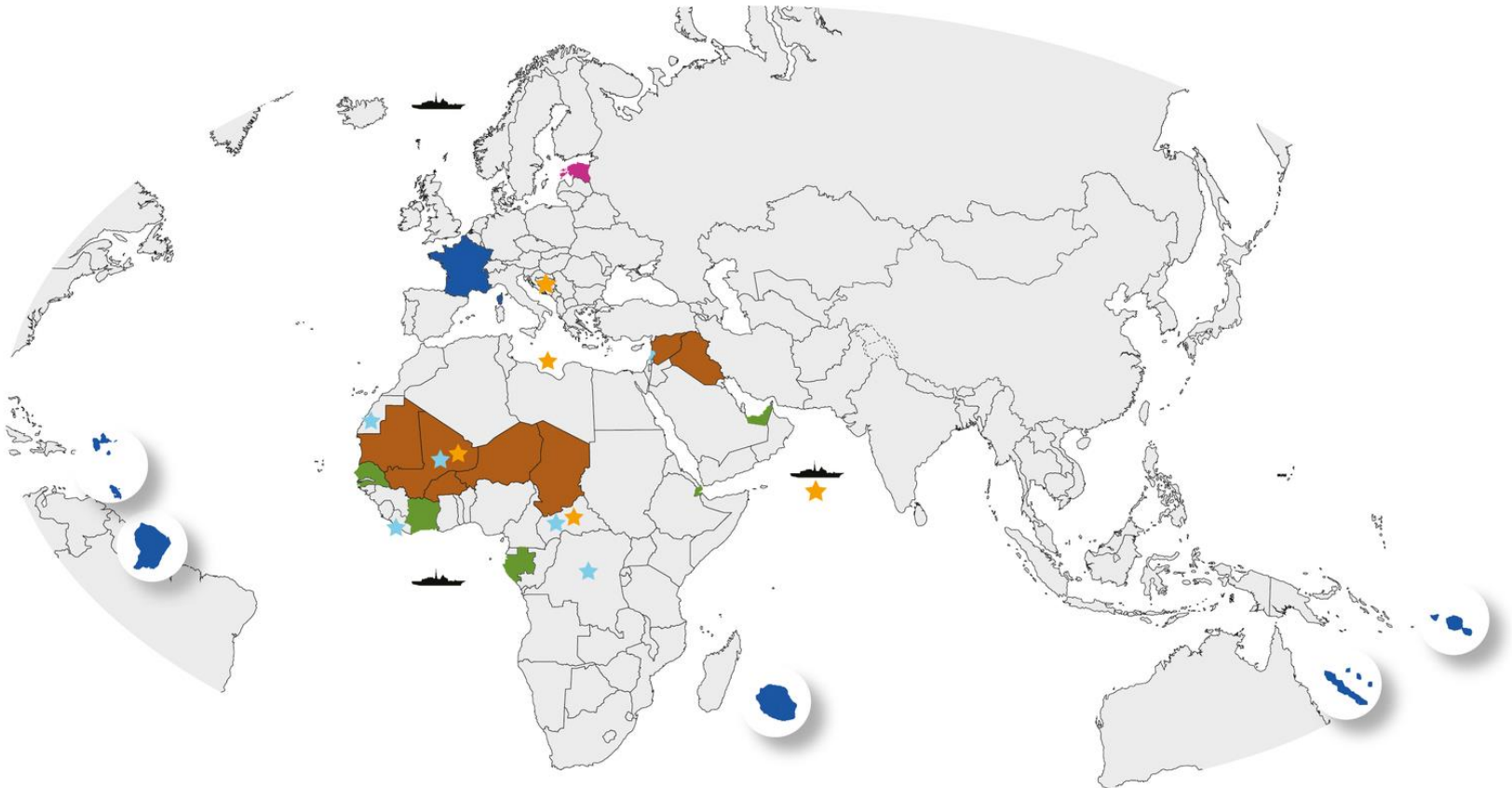


- **lessons learned** (*and relearned...*)
- **changes in procedures**
- **capability gaps** (doctrine, training, research, equipment ...)

*\*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

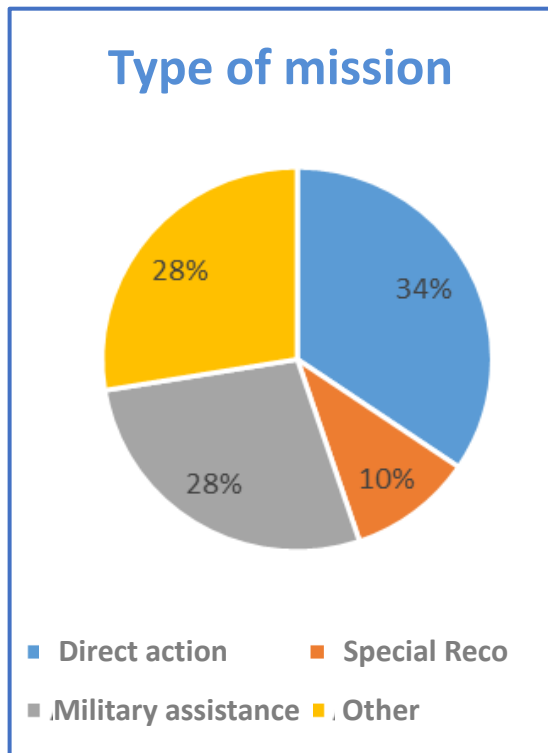
**29 casualties during 11 combat situations**

 *2,6 casualties per event*

# ○ — After action review 2016 - 2020

**29 casualties during 11 combat situations**

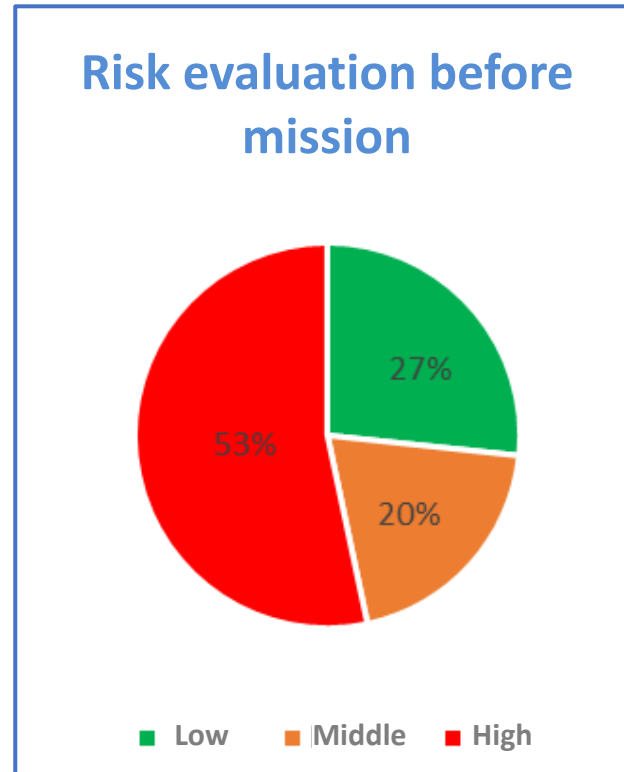
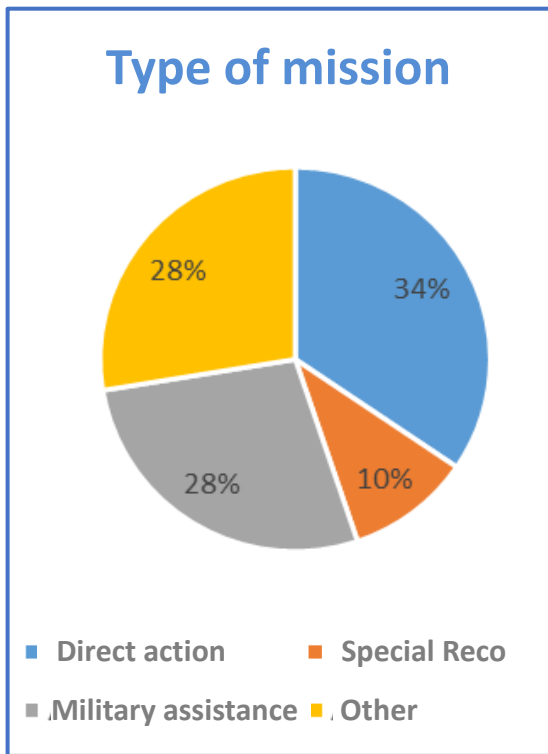
↳ *2,6 casualties per event*



# ○ — After action review 2016 - 2020

**29 casualties during 11 combat situations**

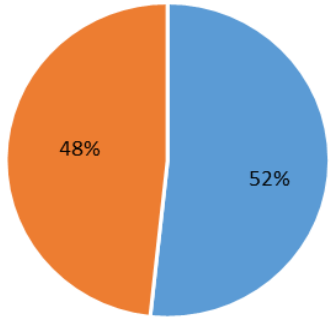
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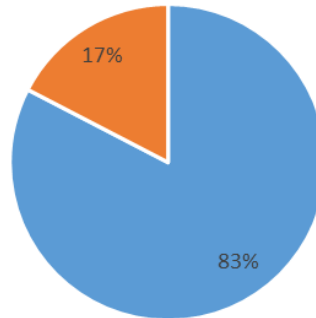
# After action review 2016 - 2020

### Wound pattern



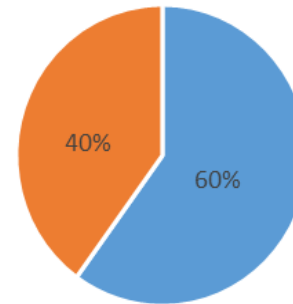
■ Balistic ■ Blast (including IED and drones)

### Time



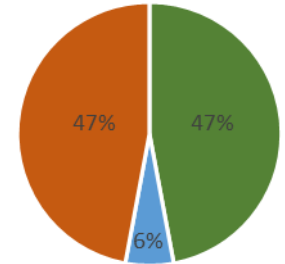
■ Day ■ Night

### Place



■ Field ■ Medical station

### Time in the mission

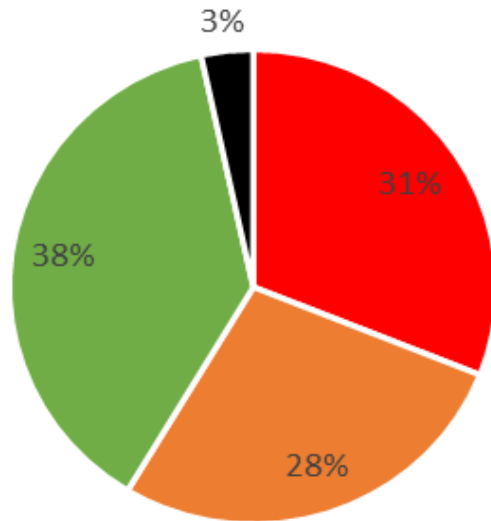


■ < 1 Day ■ 1-2 Days ■ 2+ Days



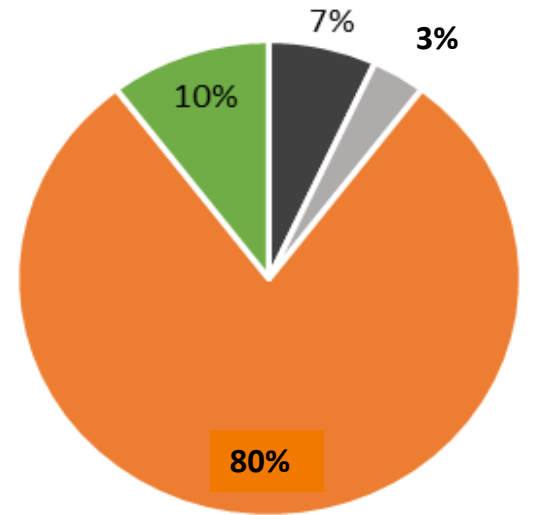
# After action review 2016 - 2020

## 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' nd i i m g e = 1 8 m i n ( 5 t o 3 6



# 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



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SC2

Nurses

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Surgery

STRATEVAC

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Reeducation  
Rehabilitation

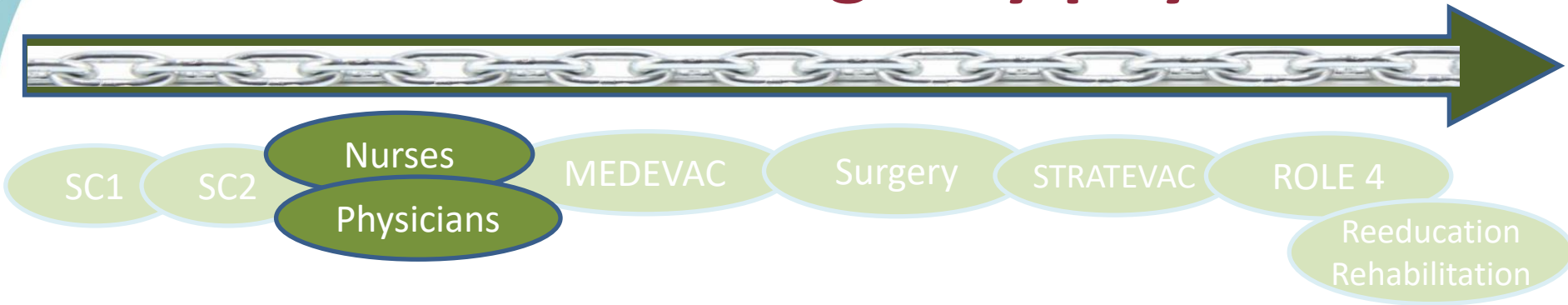
**Life saving interventions: extraction, tourniquets, haemostatic packing, morphine ...**

- 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

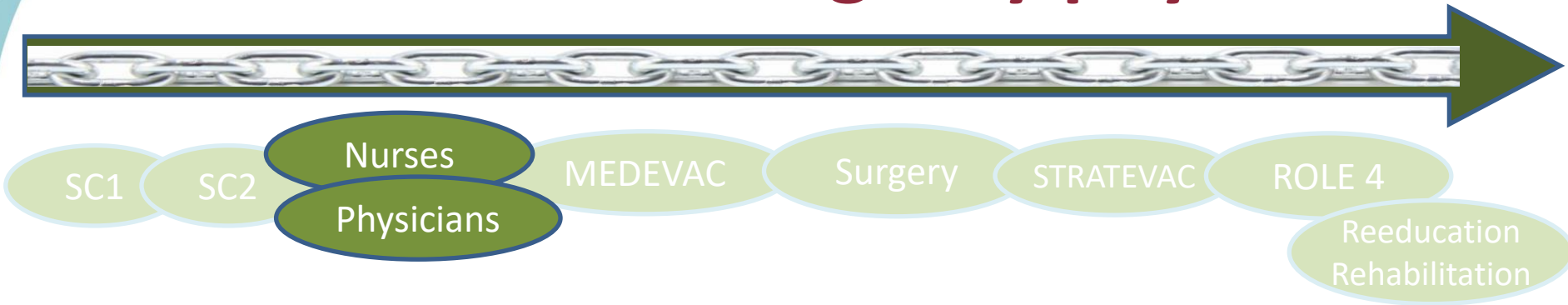


**Average time from injury to nurse first care : 12,3 minutes (0 to 37)**

**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)

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

## Emergency medical care :

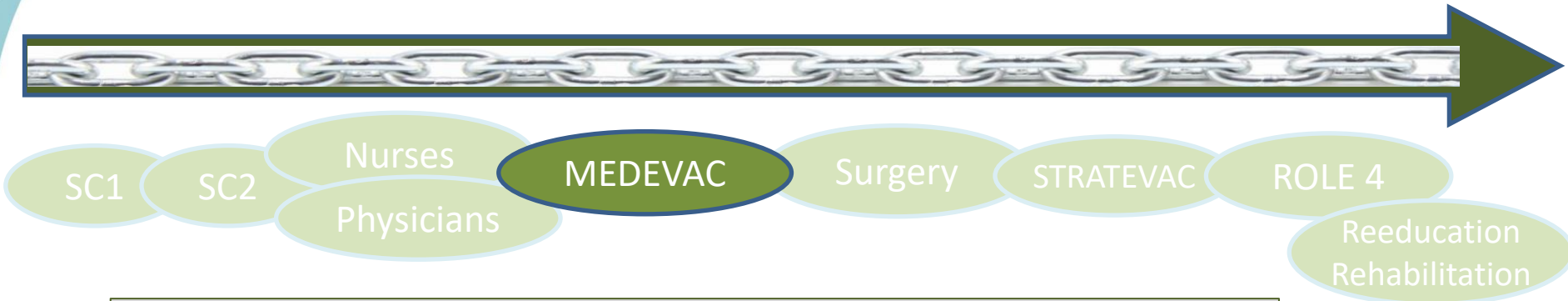
- Hemorrhagic shock , transfusion, vasopressors
- Pain management, antibiotic
- Thoracostomy, airway management ...



- 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

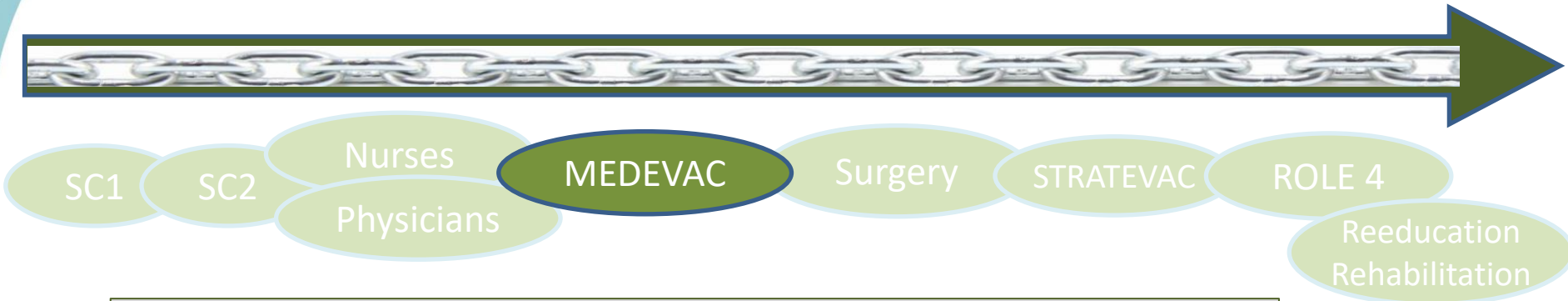
**Average time from injury to surgical facility : 80 +/- 29 minutes\***

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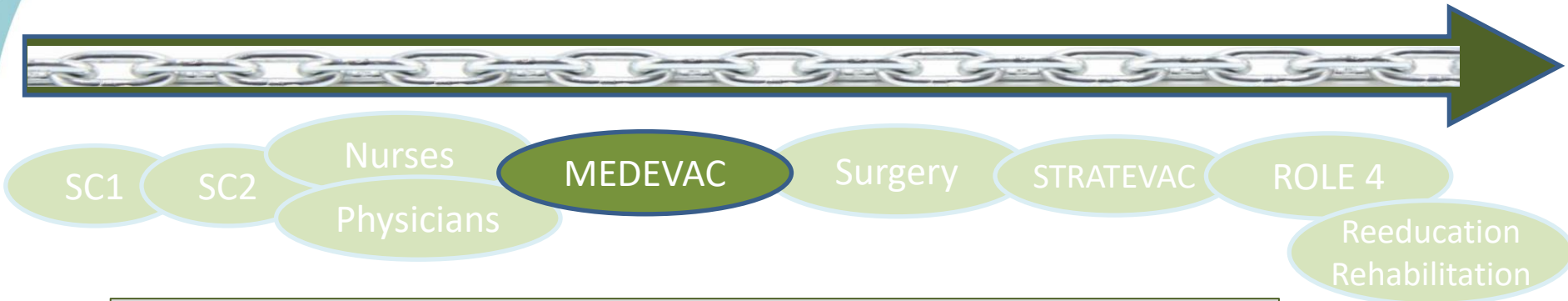
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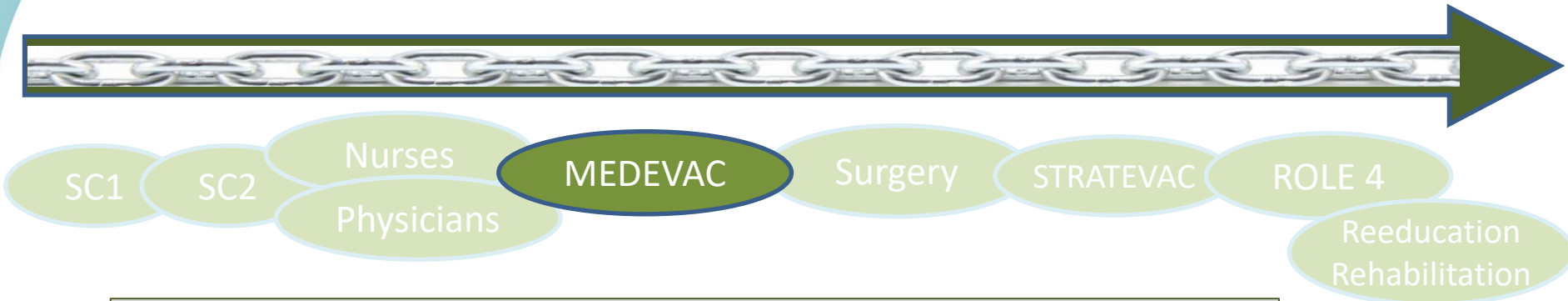
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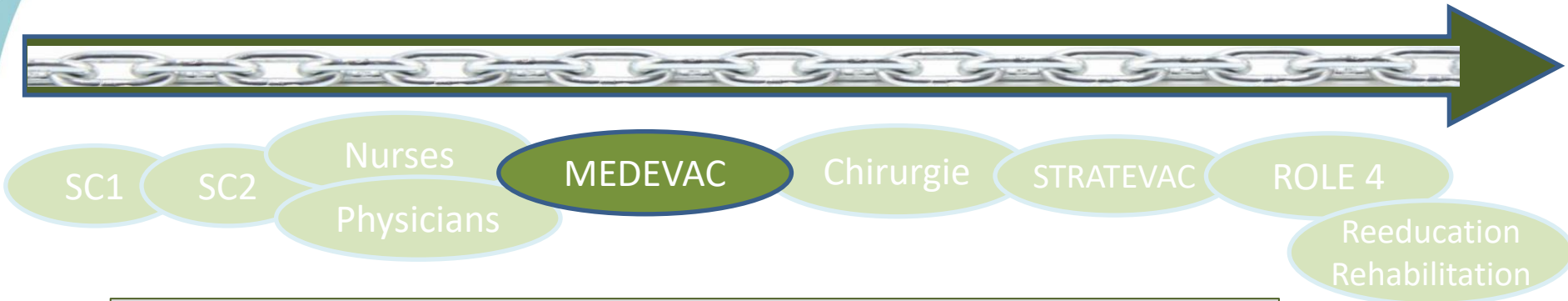
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- Planification, number and distribution of helicopters
- Global response based on medical and tactical considerations

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\* For *alpha* and *bravo* casualties

**Tactical considerations impacting medical response in 38% of cases**

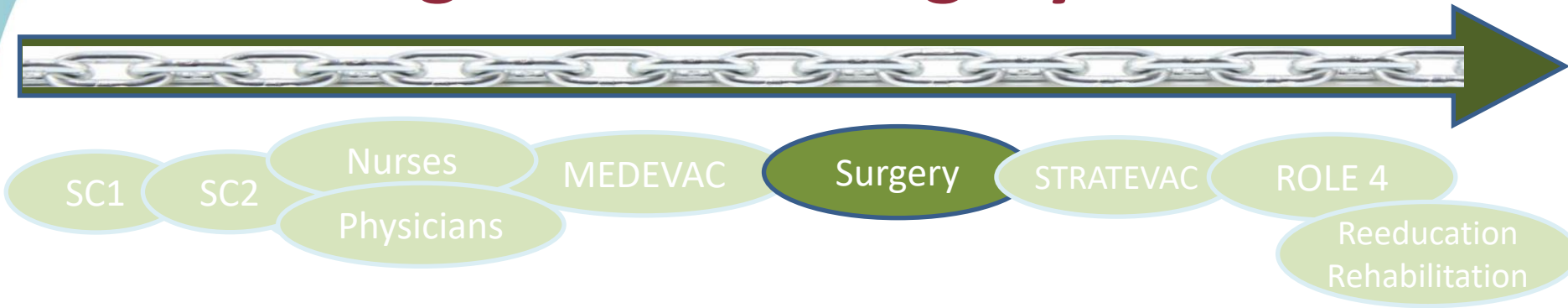
**1 casualty during MEDEVAC**

**1 evacuation made possible by helicopter winching**

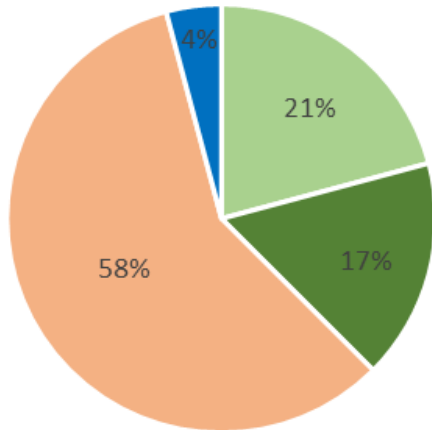


- **Planification, number and distribution of helicopters**
- **Global response based on medical and tactical considerations**

# Damage control surgery



First surgical facility

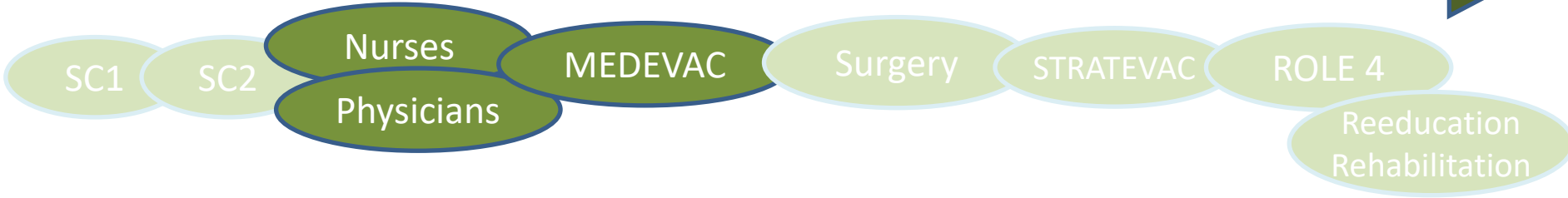


■ FST ■ French Role 2 ■ Interational ■ Other



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

# ○ — Lessons and feedback

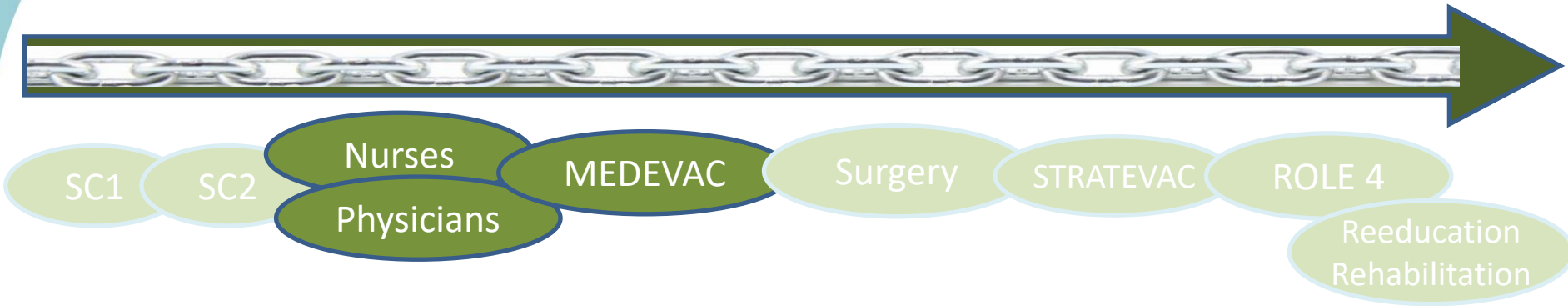


## Evolution of forward transfusion strategies

*Major benefit, logistical impact...*



# ○ — Lessons and feedback



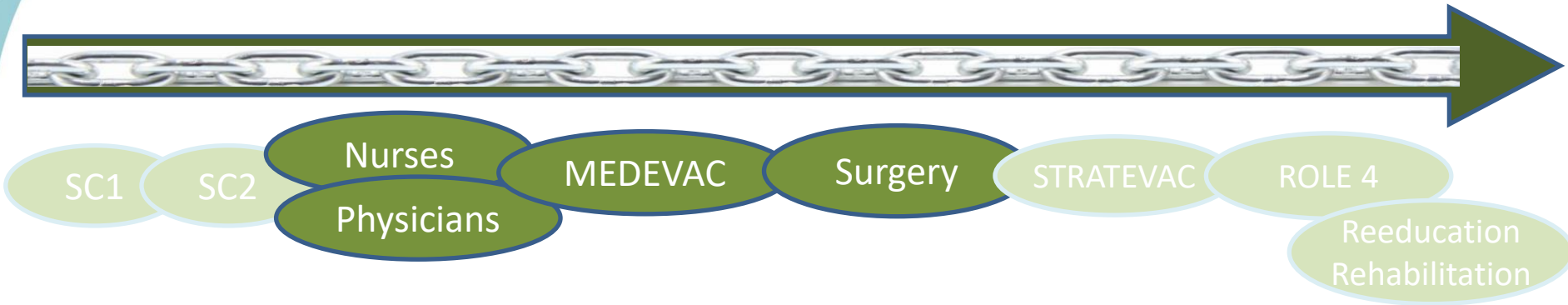
## Evolution of forward transfusion strategies

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# Lessons and feedback



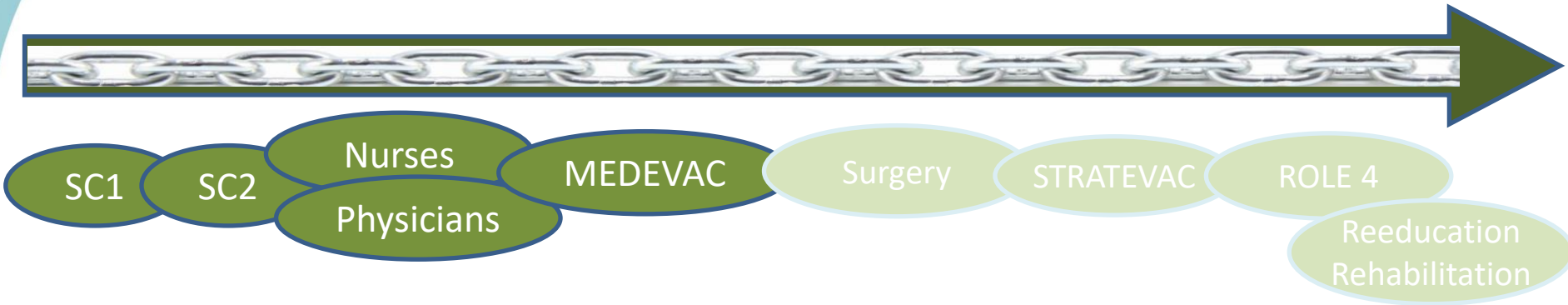
## Shorten the time between injury and surgery

*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*



