Linee guida 2010 per la rianimazione cardiorespiratoria

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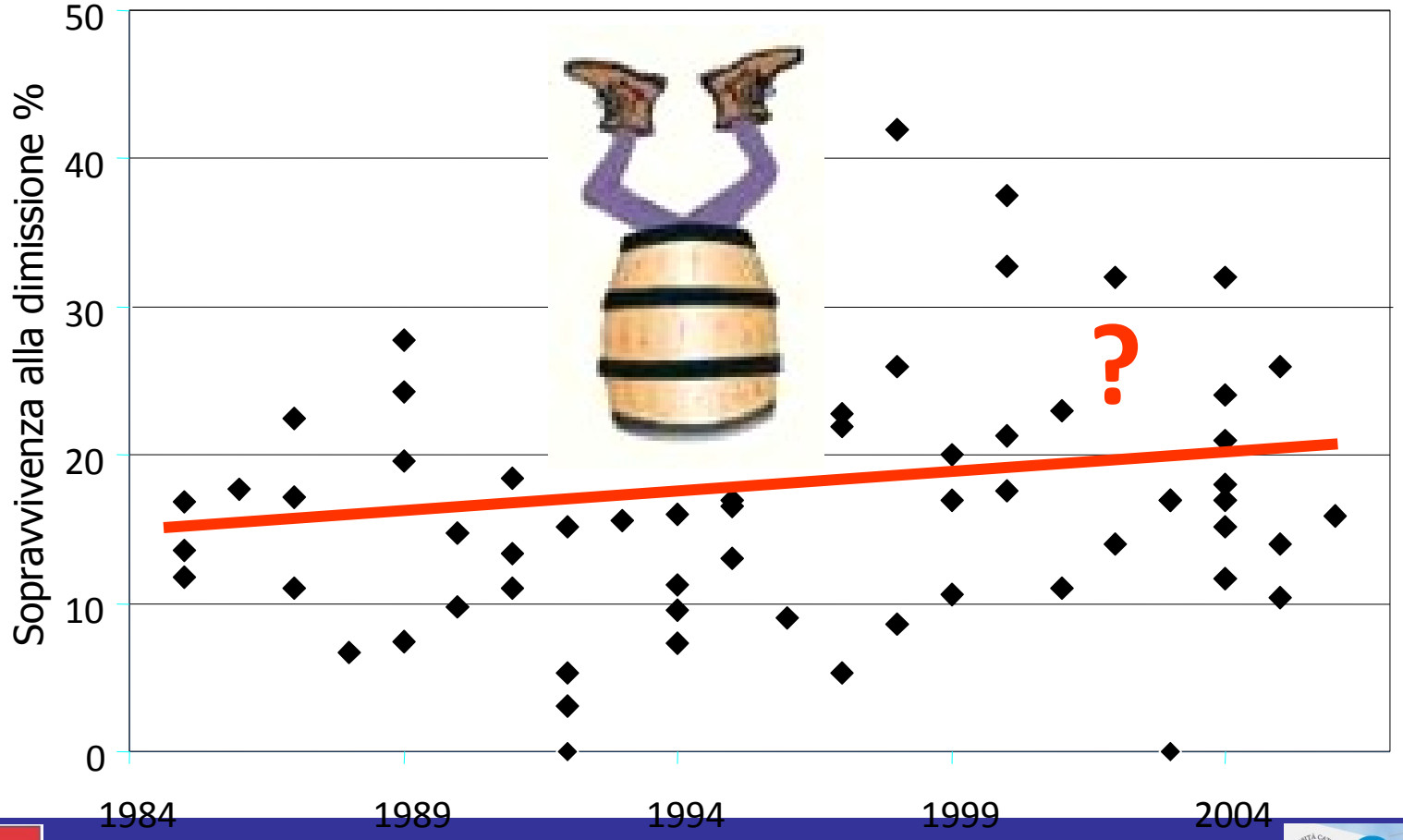
Programma

- ✓ Perché ancora linee guida ?
- ✓ Quali differenze rispetto al 2005 ?
- ✓ Quali linee guida ?

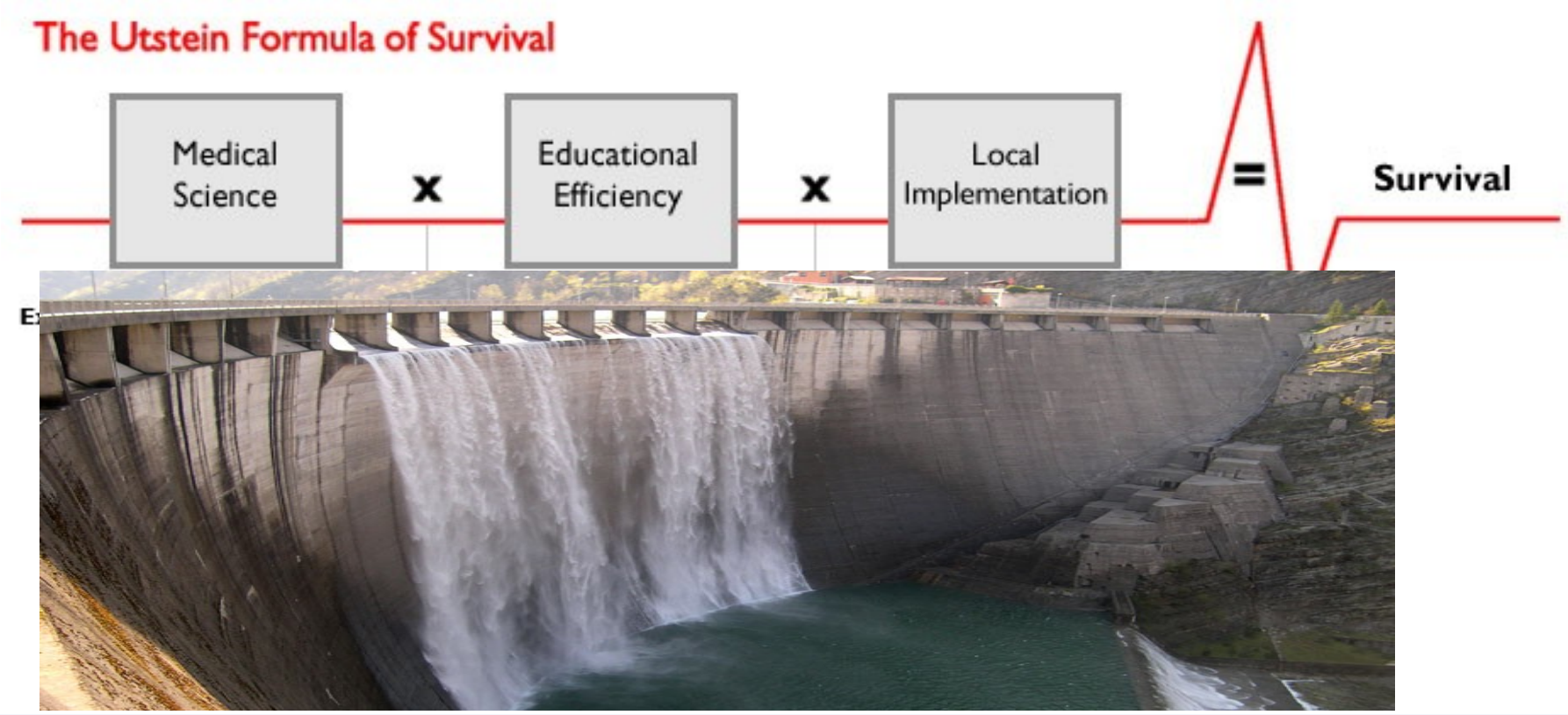
Arresto cardiaco: sopravvivenza alla dimissione

trend 1985-2006



La “formula” della sopravvivenza

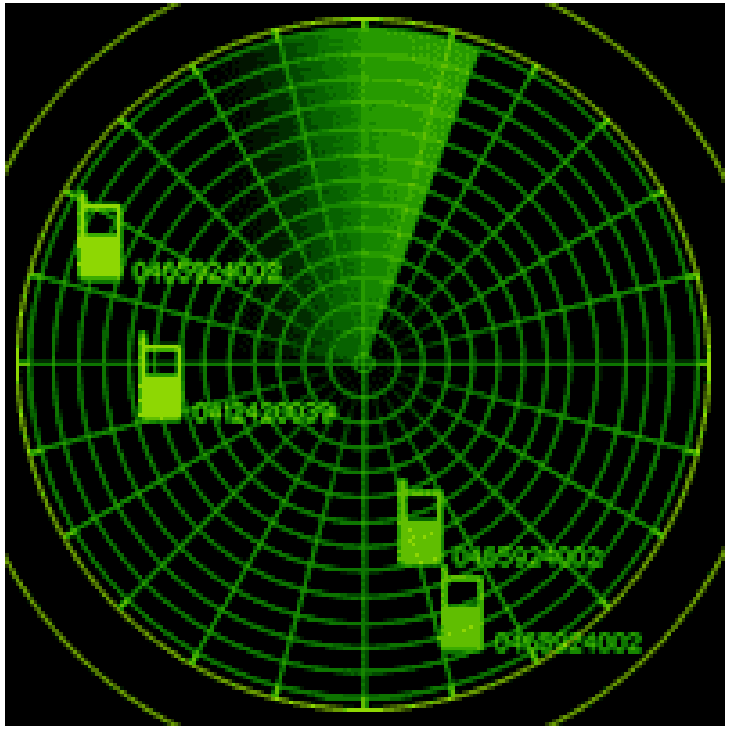
RICERCA x FORMAZIONE x ATTUAZIONE



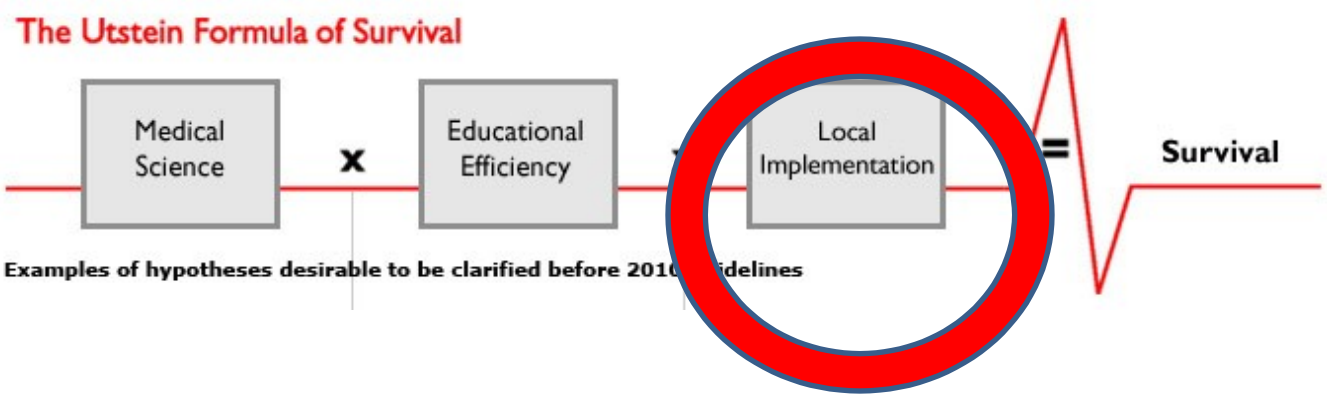
Dov'è la falla?

Da dove possiamo osservare?

- ✓ Registri **epidemiologici**
- ✓ Dispositivi **che registrano la RCP reale**
- ✓ Simulazione **ad alta fedeltà**

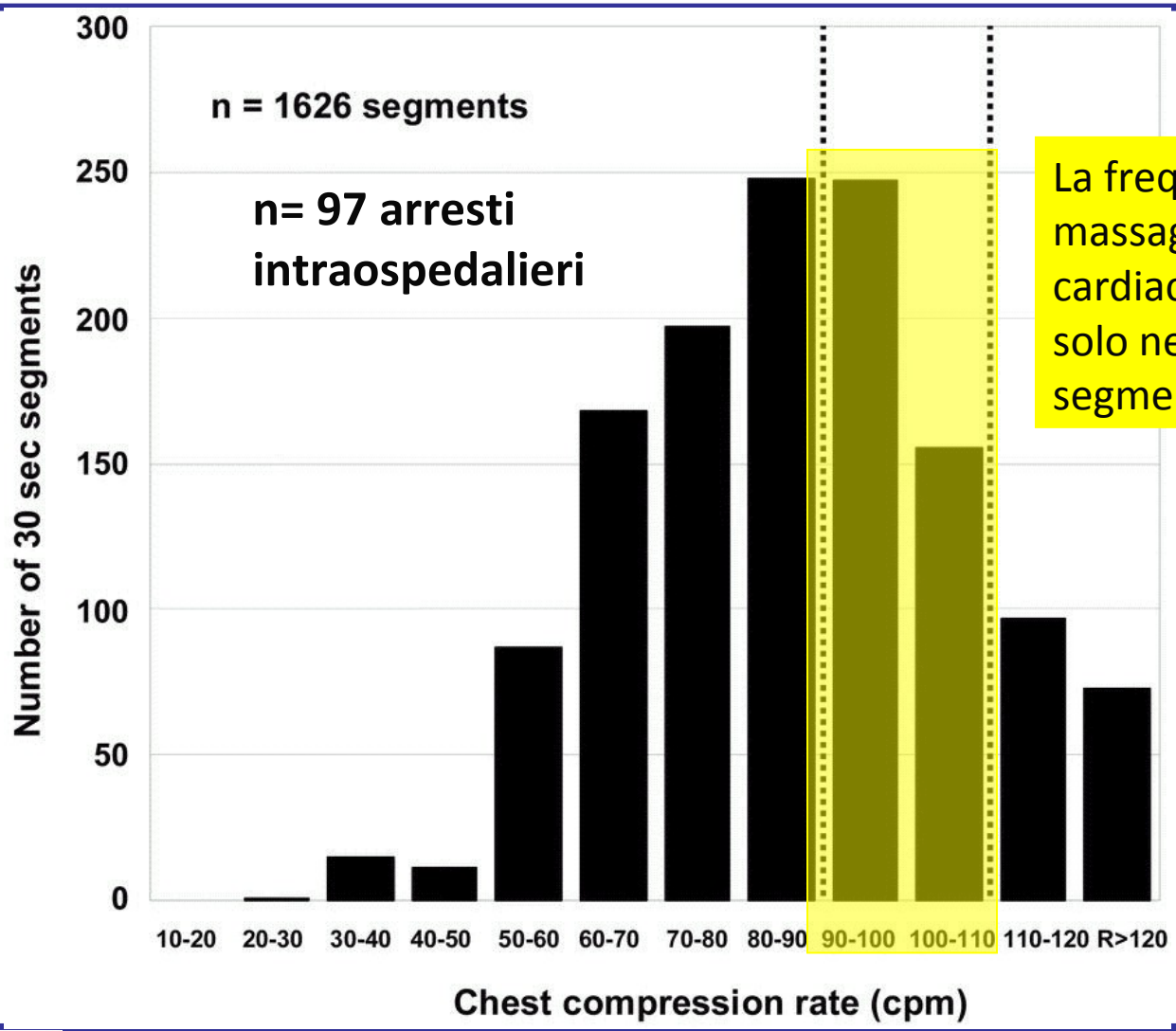


Attuazione locale



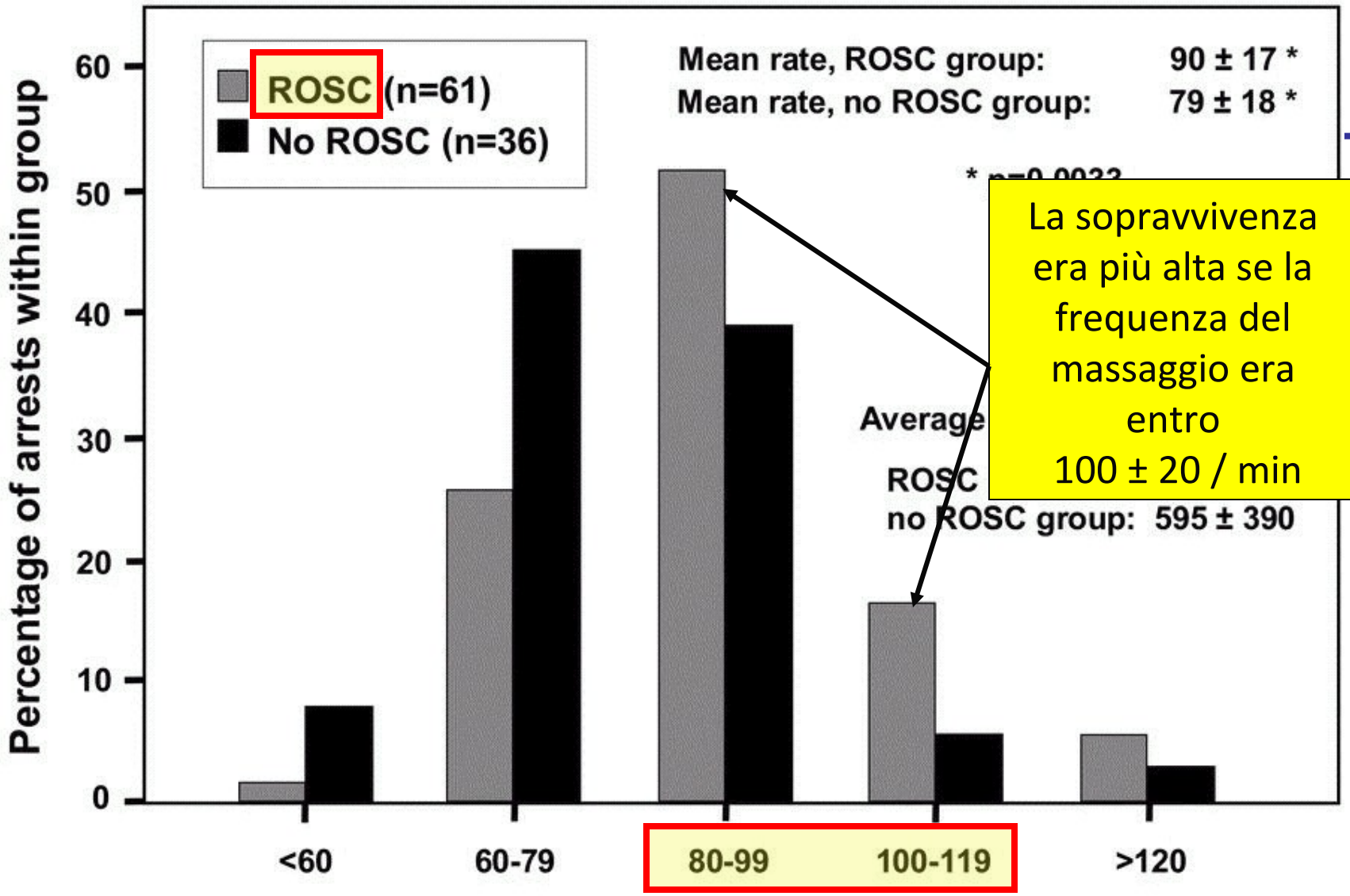
Com'è la RCP reale sul campo intra ed extra ospedaliero?

Quality of Cardiopulmonary Resuscitation During In-Hospital Cardiac Arrest



La frequenza del massaggio cardiaco era 100 ± 10 solo nel 34 % dei segmenti

Abella *Circulation* 2005; 111:428-34



La sopravvivenza era più alta se la frequenza del massaggio era entro
100 ± 20 / min

Abella, *Circulation* 2005; 111:428-34

Quality of Cardiopulmonary Resuscitation During Out-of-Hospital Cardiac Arrest

Lars Wik; Jo Kramer-Johansen; Helge Myklebust; et al. JAMA, January 19, 2005—Vol 293, No. 3

Table 3. Performance of CPR During the First 5 Minutes and Entire Episode of CPR*

La metà tempo totale di RCP è senza compressioni

		le of CPR
No flow (n = 176)		
NFR, %	49 (21)	48 (18)
NFR_{adj}, %	42 (19)	38 (17)
Compression (n = 176)†		
Compressions/min	60 (25)	64 (23)
Compression rate, /min	120 (20)	121 (18)
Depth per episode, mm	35 (10)	34 (9)
38-51 mm with complete release	27 (30)	28 (25)
Too deep (>51 mm), median (IQR)	0 (0-3)	0 (0-5)
Too shallow (<38 mm)	59 (37)	62 (33)
Incomplete release		0 (0-2)
Duty cycle, %		42 (4)
Ventilation (n = 163)		
Ventilations/min	8 (4.6)	11 (4.7)

Compressioni troppo superficiali

Abbreviations: CPR, cardiopulmonary resuscitation; IQR, interquartile range; NFR, no-flow ratio, the time without CPR

Chest Compression Fraction Determines Survival in Patients With Out-of-Hospital Ventricular Fibrillation

Christenson et al *Circulation* 2009;120;1241-1247

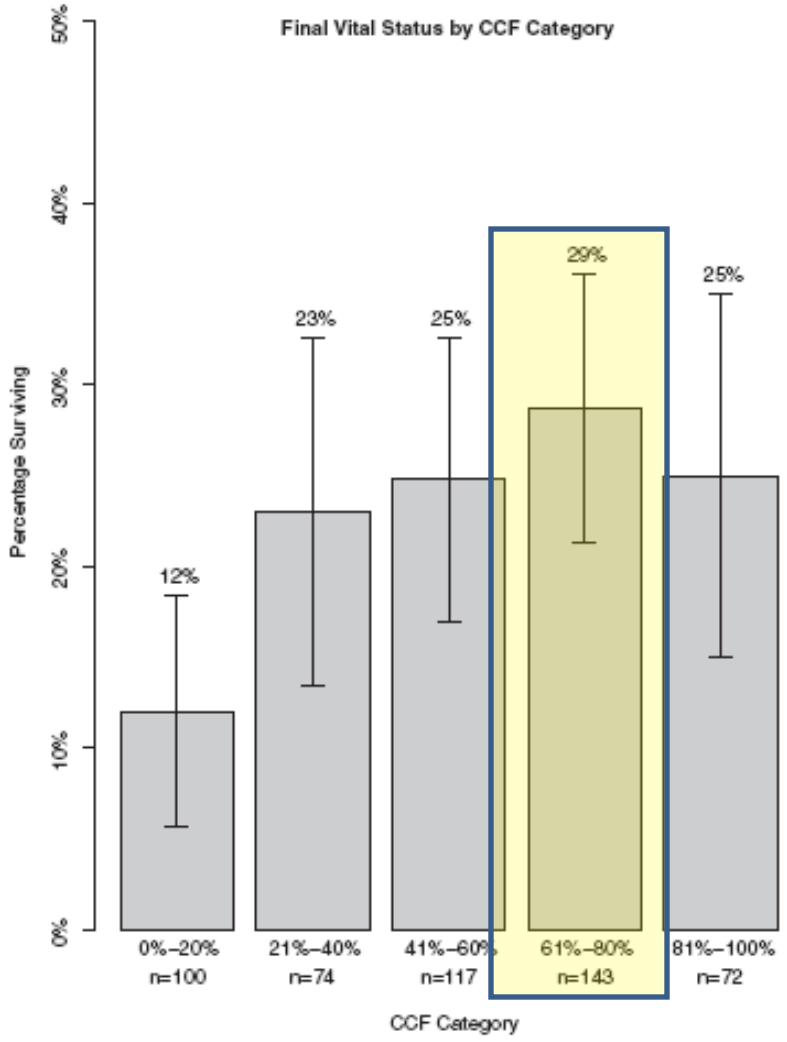


Figure 2. Survival to discharge for each category of chest compression fraction.

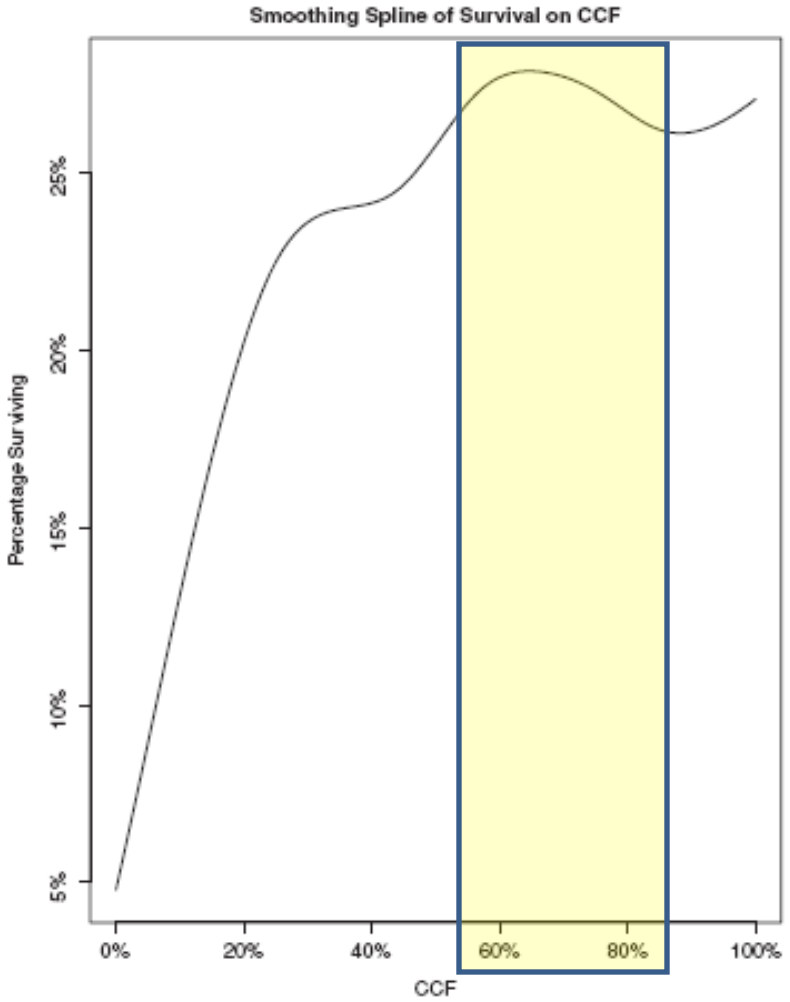
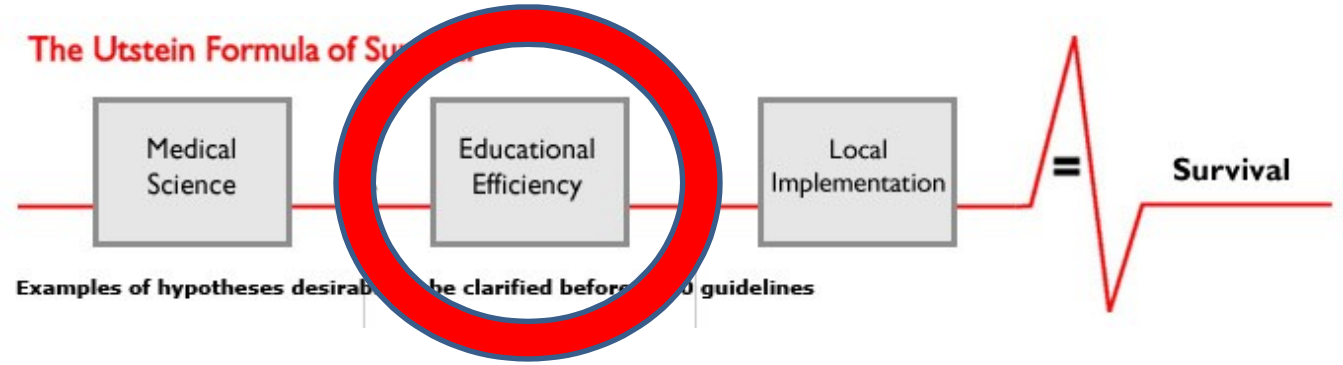


Figure 3. Smoothing spline representing the incremental probability of survival corresponding to a linear increase in chest compression fraction.

M.Parr, Ghent 2008

Efficacia della Formazione



Com'è la RCP appresa durante i corsi?

Nei corsi BLS il *solo* giudizio dell'istruttore non è sufficiente a determinare la correttezza delle compressioni

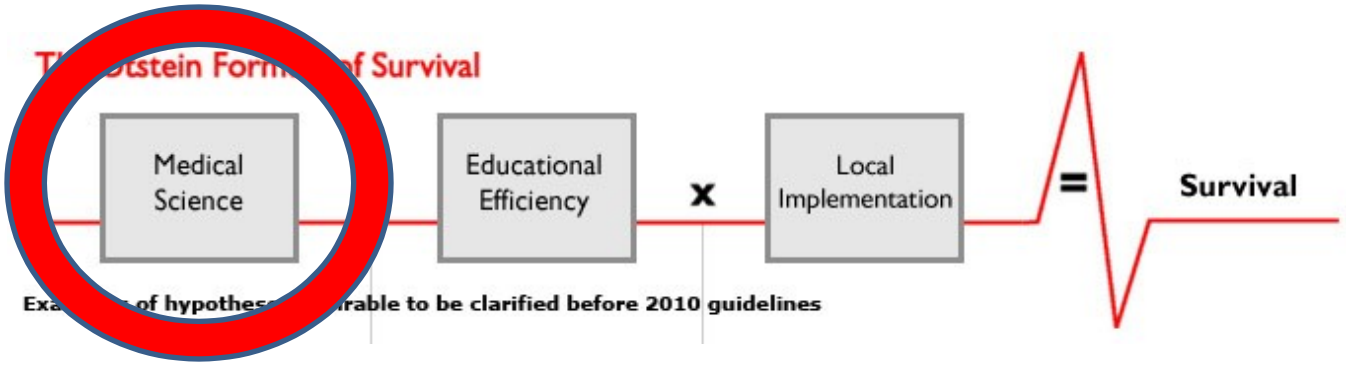
Assessment of BLS skills: Optimizing use of instructor and manikin measures☆

B. Lynch et al. Resuscitation (2008) 76, 233—243

Results: Instructors' ratings of the ventilation skills were highly accurate; ratings of compressions were correct about 83% of the time; yet inadequate compression depth was rated adequate 55% of the time, and incorrect hand placement was rated adequate 49% of the time.

In metà dei casi, gli istruttori giudicano come adeguate profondità e posizione scorrette

Ricerca scientifica



Come può la ricerca colmare i deficit di formazione ed attuazione?

Depth – Profondità

> 38mm = 1/5 del diametro A-P del torace

LG 2010: almeno 5 cm, non più di 6 cm

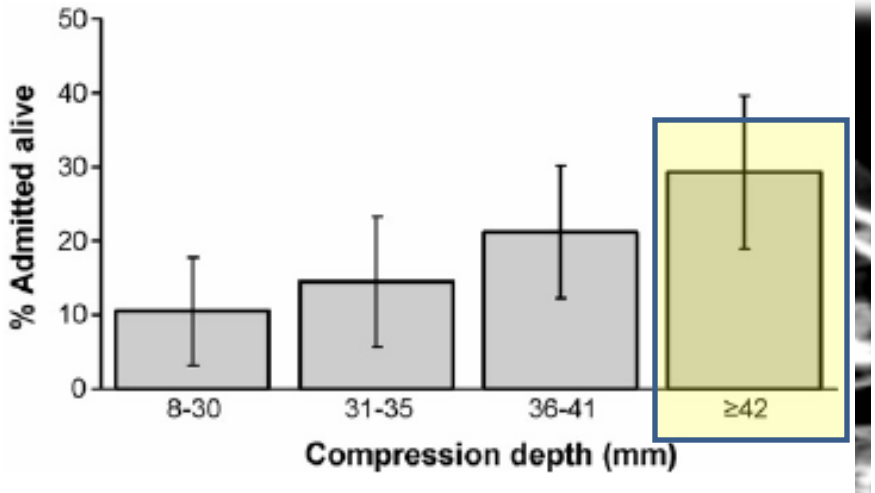


Figure 1 Percentage of patients admitted alive (error bars represent 95% CI) when grouped by increasing compression depth by quartiles.

J. Kramer-Johansen et al. Resuscitation (2006) 71, 283–292

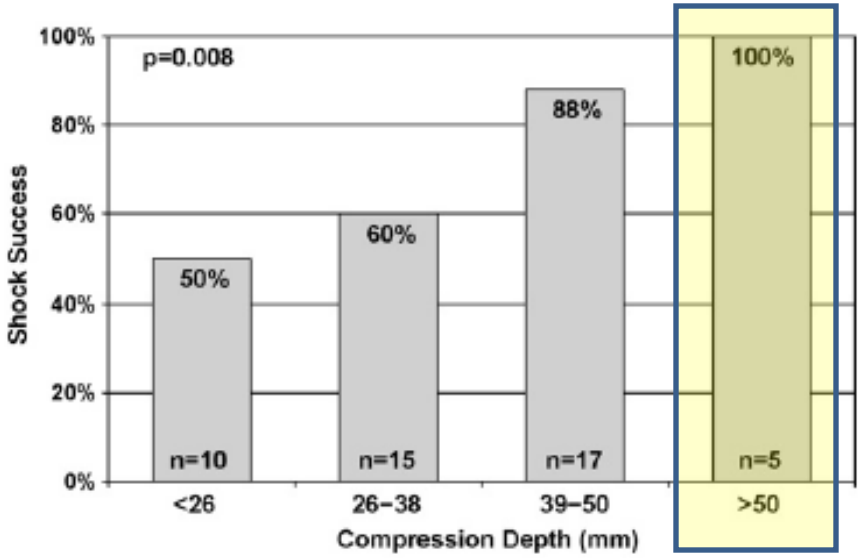


Figure 3 Association between chest compression depth and shock success. Cases are grouped by 30 s average compression depth in approximately 11 mm (0.5 in.) intervals. Chest compression depth of 38–50 mm (1.5–2 in.) represents current CPR guidelines recommendations. Deeper chest compressions are significantly associated with increased probability of shock success.

A. Pickard et al. Resuscitation (2006) 71, 387–390

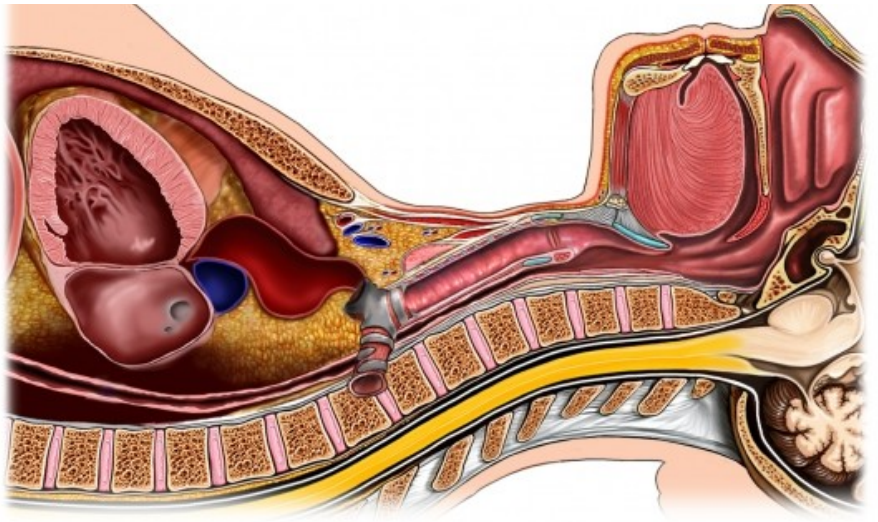
D.P. Edelson et al. Resuscitation (2006) 71, 137–145

Depth – Profondità

deflessione del diametro A-P del torace

Misura **diretta**

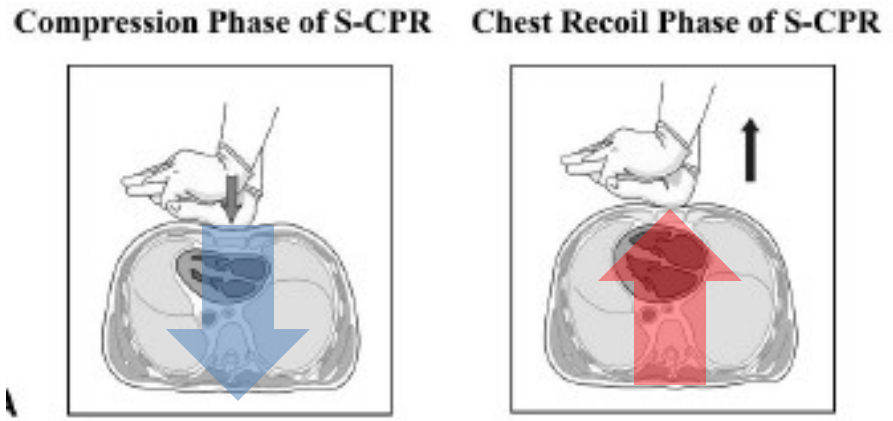
- Accellerometro
- Potenziometro

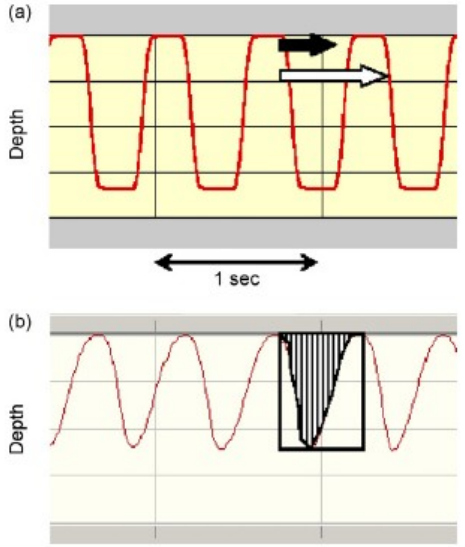


Misura **indiretta**

- Trasduttore di forza

Duty cycle





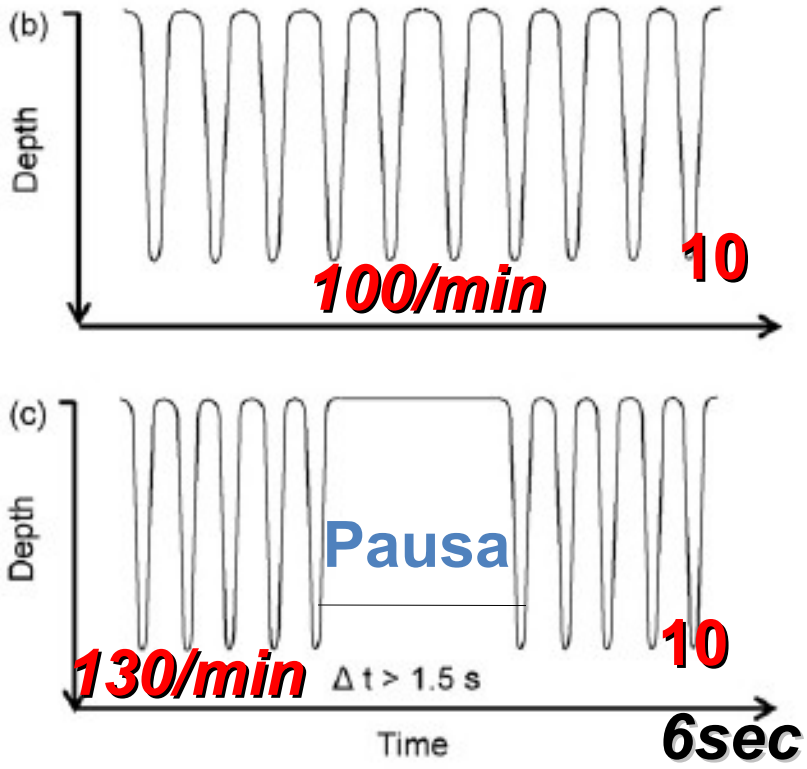
La frazione di tempo **in cui sul torace è applicata la** pressione meccanica o manuale

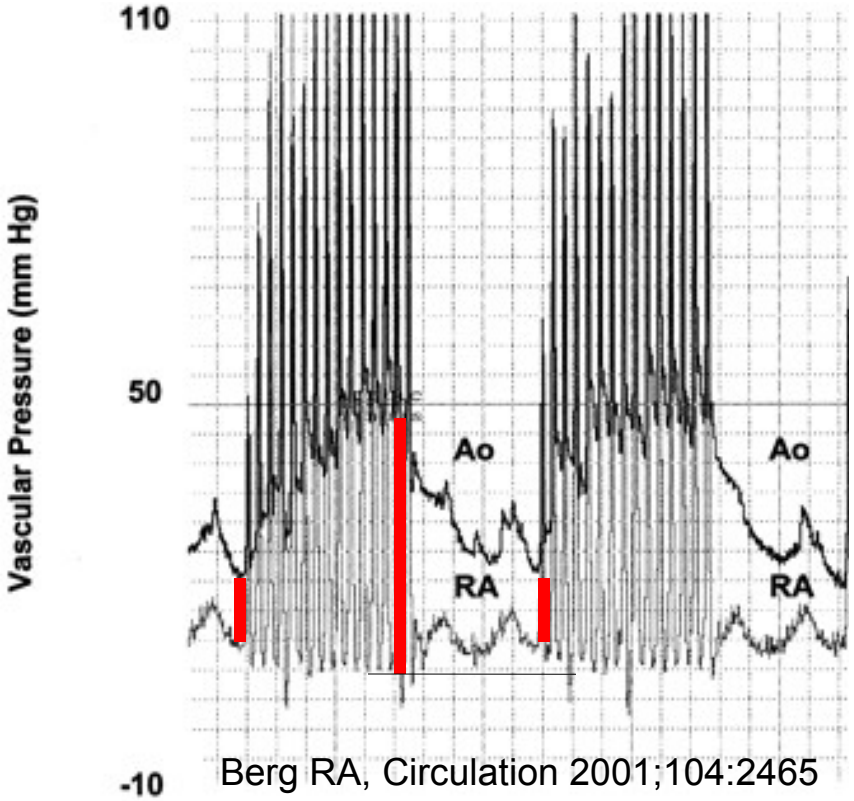
0.5 o **50%**

Compromesso tra **perfusione**

Sistemica e **Coronarica**

Frequenza ≠ Compressioni in un minuto





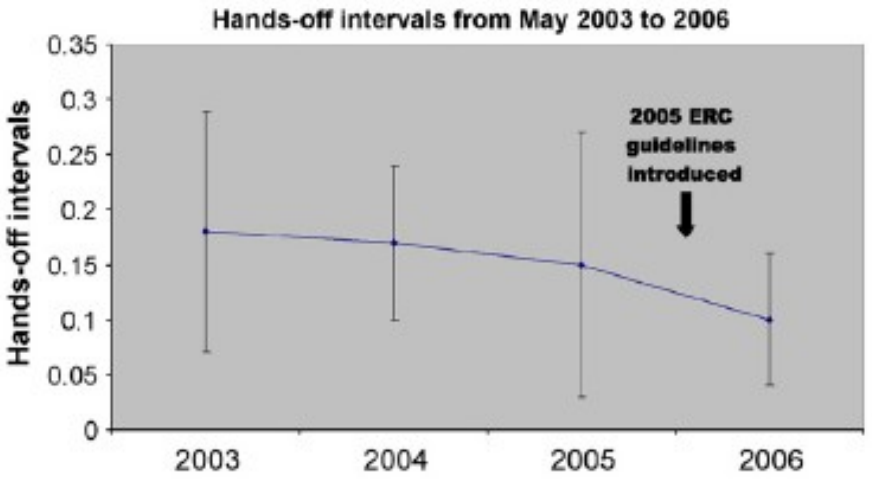
Berg RA, Circulation 2001;104:2465

- Facilmente **misurabili**: artefatti ECG, accelerometro
- Facilmente **correggibili**: metronomo

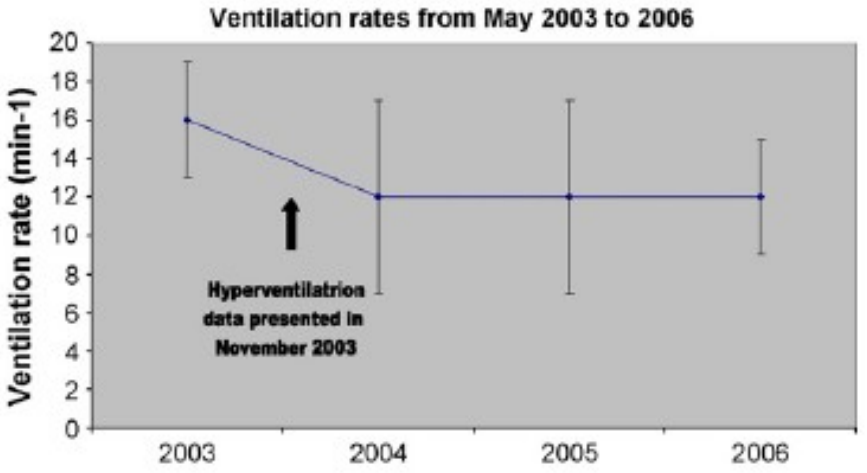
La **qualità della RCP** è migliorata con le **LG2005.**
La **sopravvivenza** ha solo una **lieve** tendenza al miglioramento

Effect of implementation of new resuscitation guidelines on quality of cardiopulmonary resuscitation and survival☆ *T.M. Olasveengen et al. / Resuscitation 80 (2009) 407–411*

Si riduce l'*hands-off time*



Si riduce l'*iperventilazione*



Resuscitation (2007) 75, 260–266

Come vengono applicate le LG?

Have the 2005 guidelines for resuscitation been implemented?

Nielsen AM, Isbye DL, Lippert FK.

Ugeskr Laeger. 2008 Nov 17;170(47):3843-7. Danish

A un anno dalla pubblicazione c'è una scarsa conoscenza delle LG2005 tra i medici in servizio

Insufficient implementation of guidelines for basic life support in Denmark

Steensen CO, Krarup NH, Løfgren B.

Ugeskr Laeger. 2008 Aug 25;170(35):2685-91. Danish

Discrepanza fra il materiale didattico per il BLS laici e le LG ERC su tecniche e illustrazioni

Knowledge translation in emergency medical services: A qualitative survey of barriers to guideline implementation☆

Table 1
Barriers to implementation of the 2005 AHA CPR and ECC guidelines.

Barriers to implementation	
Theme *n* (%)	Barrier *n* (%)
Instruction delays 14 (41)	Lack of instructors 3 (9)
	Lack of materials 5 (15)
	Delay to next scheduled training 6 (18)
Defibrillator delays 13 (38)	Delay to reprogram defibrillators 8 (24)
	Delay to receive new defibrillators 5 (15)
Decision-Making Delays 13 (38)	Delay due to coordinating with other agencies 3 (9)
	Delay due to government regulators 3 (9)
	Delay due to medical direction 3 (9)
	Delay due to ROC participation 3 (9)
	Delay due to internal crisis 1 (3)

Guideline implementation was reportedly delayed by 10 barriers grouped into three themes.

B.L. Bigham et al. / Resuscitation 81 (2010) 836–840

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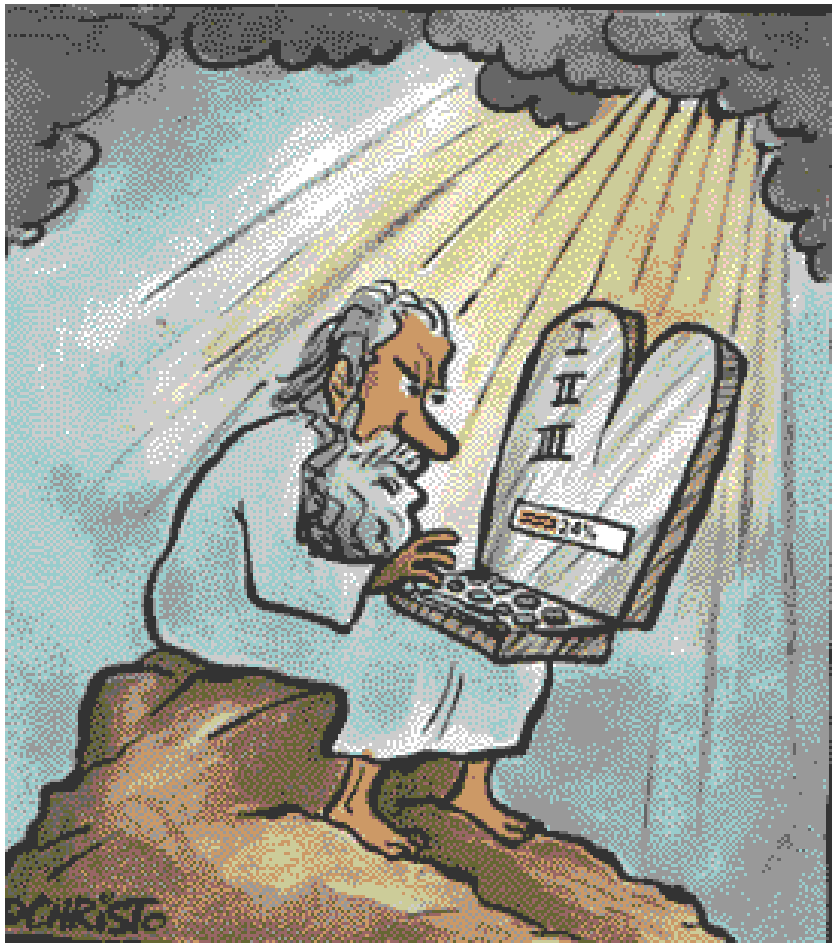
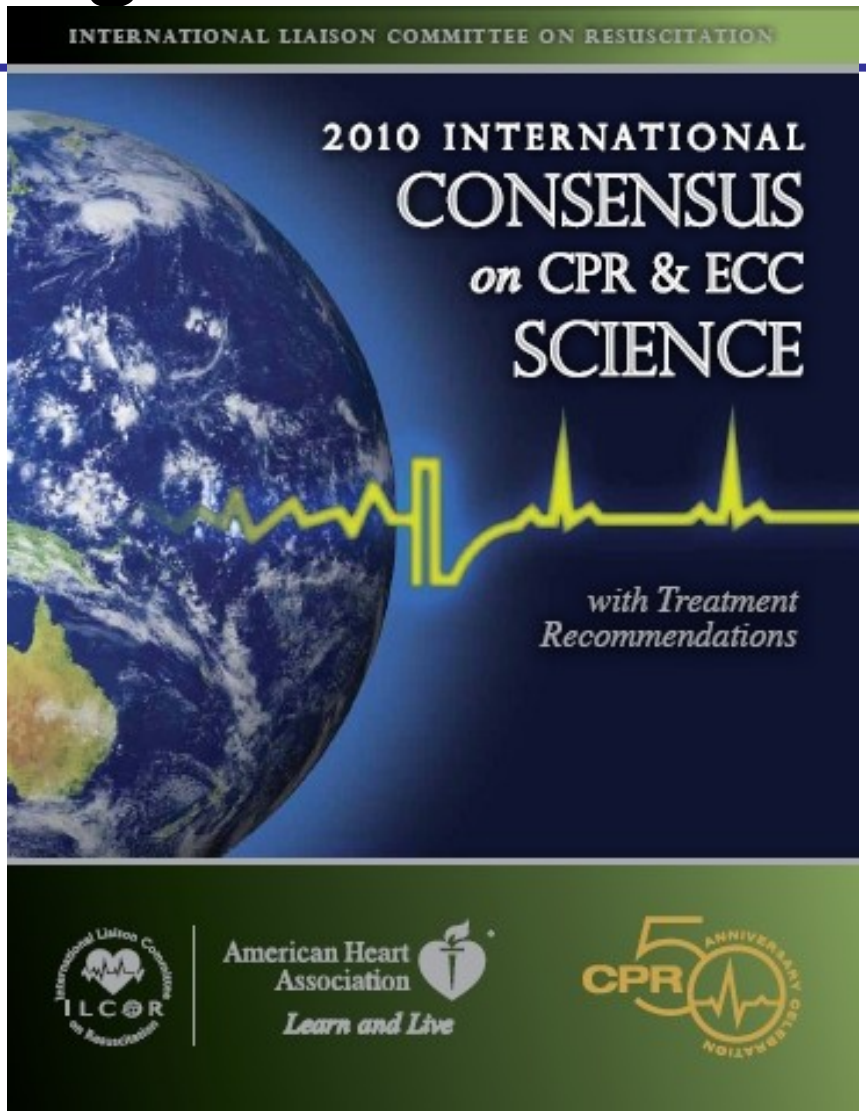
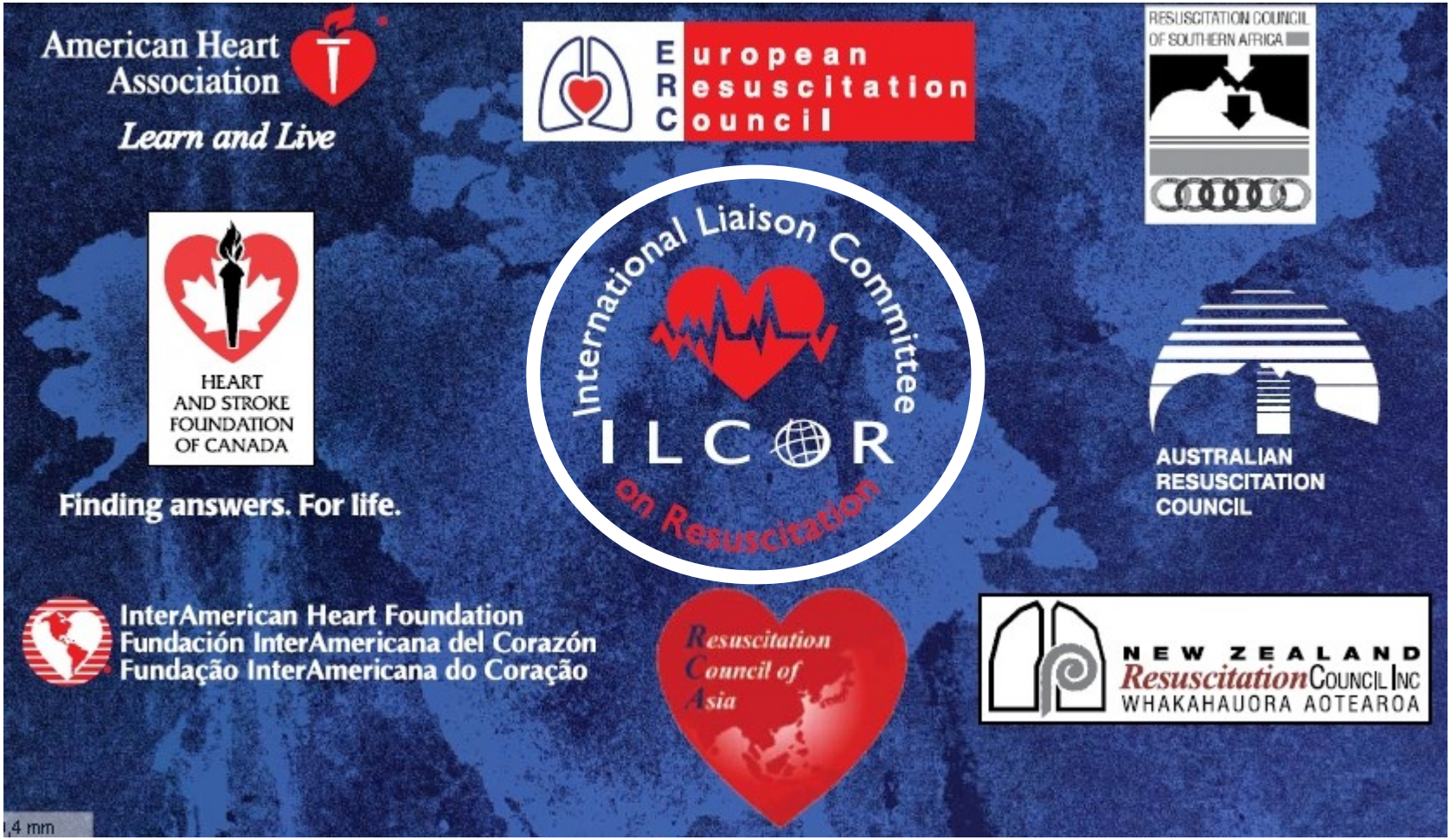


Quali linee guida ? Dallas 2010 …



Quali linee guida ? Dallas 2010 …



Quali linee guida ?

E’ scorretto parlare o scrivere di

linee guida ~~ILCOR 2010~~

così come è stato scorretto parlare o scrivere di linee guida ILCOR 2005

Quali linee guida ?

ERC

AHA

Compressioni toraciche

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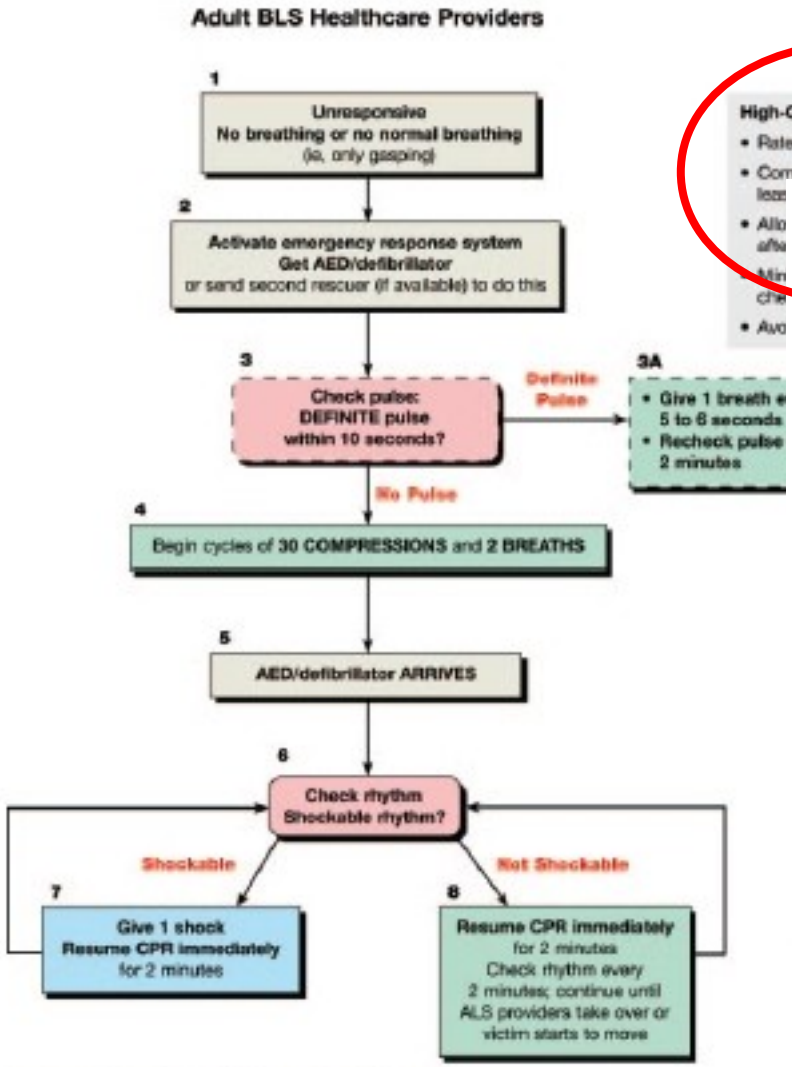

High-Quality CPR

- Rate at least 100/min
- Compression depth at least 2 inches (5 cm)
- Allow complete chest recoil after each compression
- Minimize interruptions in chest compressions
- Avoid excessive ventilation

Compressioni toraciche

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cardiac arrest should receive chest compressions (Class I, LOE B).[47–51]

- To provide effective chest compressions, push hard and push fast. It is reasonable for laypersons and healthcare providers to compress the adult chest at a rate of at least 100 compressions per minute (Class IIa, LOE B) with a compression depth of at least 2 inches/5 cm (Class IIa, LOE B). Rescuers should allow complete recoil of the chest after each compression, to allow the heart to fill completely before the next compression (Class IIa, LOE B).
- Rescuers should attempt to minimize the frequency and duration of interruptions in compressions to maximize the number of compressions delivered per minute (Class IIa, LOE B). A compression-ventilation ratio of 30:2 is recommended (Class IIa, LOE B).

Adrenalina

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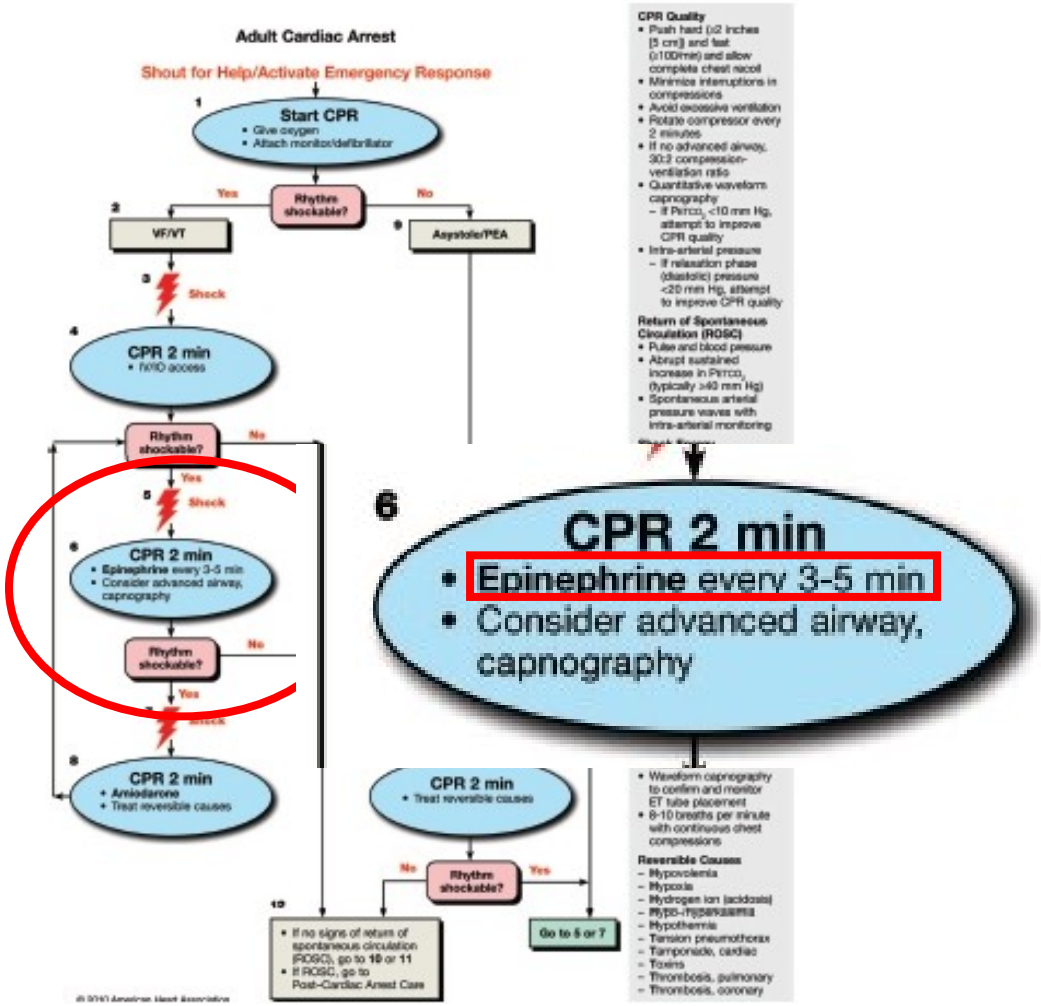

6
CPR 2 min
• Epinephrine every 3-5 min
• Consider advanced airway, capnography

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Drug Therapy in VF/Pulseless VT

When VF/pulseless VT persists after at least 1 shock and a 2-minute CPR period, a vasopressor can be given with the primary goal of increasing myocardial blood flow during CPR and achieving ROSC (see "Medications for Arrest Rhythms" below for dosing) (Class IIb, LOE A). The peak effect of an intravenous (IV)/intraosseous (IO) vasopressor given as a bolus dose during CPR is delayed for at least 1 to 2 minutes. The optimal timing of vasopressor administration during the 2-minute period of uninterrupted CPR has not been established. If a shock fails to generate a perfusing rhythm, then giving a vasopressor soon after the shock will optimize the potential impact of increased myocardial blood flow before the next shock. However, if a shock results in a perfusing rhythm, a bolus dose of vasopressor at any time during the subsequent 2-minute period of CPR (before rhythm check) could theoretically have detrimental effects on cardiovascular stability. This may be avoided by using

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Epinephrine

Epinephrine hydrochloride produces beneficial effects in patients during cardiac arrest, primarily because of its α-adrenergic receptor-stimulating (ie, vasoconstrictor) properties.[264] The α-adrenergic effects of epinephrine can increase CPP and cerebral perfusion pressure during CPR.[265] The value and safety of the β-adrenergic effects of epinephrine are controversial because they may increase myocardial work and reduce subendocardial perfusion.[266]

There are no RCTs that adequately compare epinephrine with placebo in treatment of and outcomes related to out-of-hospital cardiac arrest. A retrospective study[267] compared epinephrine to no epinephrine for sustained VF and PEA/asystole and found improved ROSC with epinephrine but no difference in survival between the treatment groups. A meta-analysis and other studies have found improved ROSC, but none have demonstrated a survival benefit of high-dose epinephrine versus standard-dose epinephrine in cardiac arrest.[135,268–272]

It is reasonable to consider administering a 1 mg dose of IV/IO epinephrine every 3 to 5 minutes during adult cardiac arrest (Class IIb, LOE A). Higher doses may be indicated to treat specific problems, such as a β-blocker or calcium channel blocker overdose. Higher doses can also be consid-

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Resuscitation 81 (2010) 1277–1292

Contents lists available at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

European Resuscitation Council Guidelines for Resuscitation 2010
Section 2. Adult basic life support and use of automated external defibrillators

Rudolph W. Koster[a,*], Michael A. Baubin[b], Leo L. Bossaert[c], Antonio Caballero[d], Pascal Cassan[e], Maaret Castrén[f], Cristina Granja[g], Anthony J. Handley[h], Koenraad G. Monsieurs[i], Gavin D. Perkins[j], Violetta Raffay[k], Claudio Sandroni[l]

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Resuscitation 81 (2010) 1400–1433

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Resuscitation

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European Resuscitation Council Guidelines for Resuscitation 2010 Section 8. Cardiac arrest in special circumstances: Electrolyte abnormalities, poisoning, drowning, accidental hypothermia, hyperthermia, asthma, anaphylaxis, cardiac surgery, trauma, pregnancy, electrocution

Jasmeet Soar[a,*], Gavin D. Perkins[b], Gamal Abbas[c], Annette Alfonzo[d], Alessandro Barelli[e], Joost J.L.M. Bierens[f], Hermann Brugger[g], Charles D. Deakin[h], Joel Dunning[i], Marios Georgiou[j], Anthony J. Handley[k], David J. Lockey[l], Peter Paal[m], Claudio Sandroni[n], Karl-Christian Thies[o], David A. Zideman[p], Jerry P. Nolan[q]

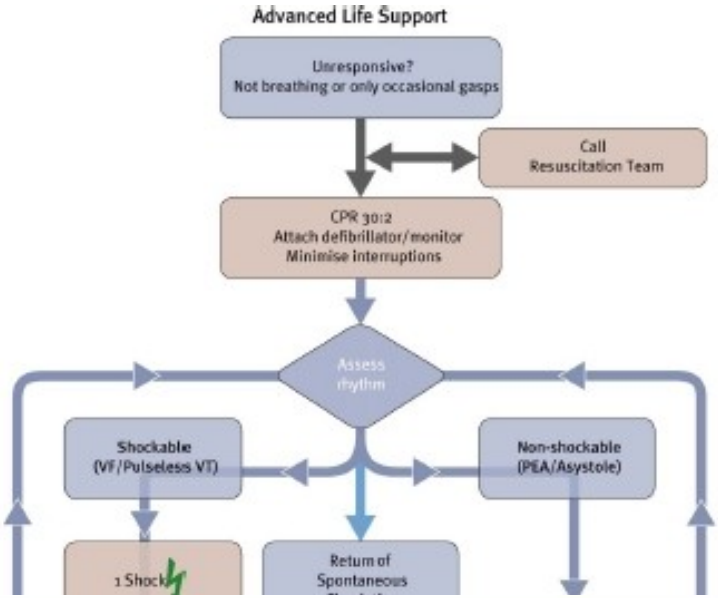
Compressioni toraciche

- start chest compression as follows:
  - kneel by the side of the victim;
  - place the heel of one hand in the centre of the victim's chest; (which is the lower half of the victim's breastbone (sternum)) (Fig. 2.7);
  - place the heel of your other hand on top of the first hand (Fig. 2.8);
  - interlock the fingers of your hands and ensure that pressure is not applied over the victim's ribs. Keep your arms straight (Fig. 2.9). Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone);
  - position yourself vertically above the victim's chest and press down on the sternum at least 5 cm (but not exceeding 6 cm) (Fig. 2.10);
  - after each compression, release all the pressure on the chest without losing contact between your hands and the sternum; repeat at a rate of at least 100 min^{-1} (but not exceeding 120 min^{-1});
  - compression and release should take equal amounts of time.

6a. Combine chest compression with rescue breaths.

- After 30 compressions open the airway again using head tilt and chin lift (Fig. 2.5).
- Pinch the soft part of the nose closed, using the index finger and thumb of your hand on the forehead.
- Allow the mouth to open, but maintain chin lift.

Adrenalina



DURING CPR

- Ensure high-quality CPR: rate, depth, recoil
- Plan actions before interrupting CPR
- Give oxygen
- Consider advanced airway and capnography
- Continuous chest compressions when advanced airway in place
- Vascular access (intravenous, intraosseous)
- Give adrenaline every 3-5 min
- Correct reversible causes

Adrenalina

Adrenaline

Despite the widespread use of adrenaline during resuscitation, and several studies involving vasopressin, there is no placebo-controlled study that shows that the routine use of any vasopressor at any stage during human cardiac arrest increases neurologically intact survival to hospital discharge. Current evidence is insufficient to support or refute the routine use of any particular drug or sequence of drugs. Despite the lack of human data, the use of adrenaline is still recommended, based largely on animal data and increased short-term survival in humans.[245,246] The alpha-adrenergic actions of adrenaline cause vasoconstriction, which increases myocardial and cerebral perfusion pressure. The higher coronary blood flow increases the frequency and amplitude of the VF waveform and should improve the chance of restoring a circulation when defibrillation is attempted.[260,279,280] Although adrenaline improves short-term survival, animal data indicate that it impairs the microcirculation[281,282] and post-cardiac arrest myocardial dysfunction,[283,284] which both might impact on long-term outcome. The optimal dose of adrenaline is not known, and there are no data supporting the use of repeated doses. There are few data on the pharmacokinetics of adrenaline during CPR. The optimal duration of CPR and number of shocks that should be given before giving drugs is unknown. On the basis of expert consensus, for VF/VT give adrenaline after the third shock once chest compressions have resumed, and then repeat every 3–5 min during cardiac arrest (alternate cycles). Do not interrupt CPR to give drugs.

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