CPR feedback devices in resuscitation: Which, when and how?

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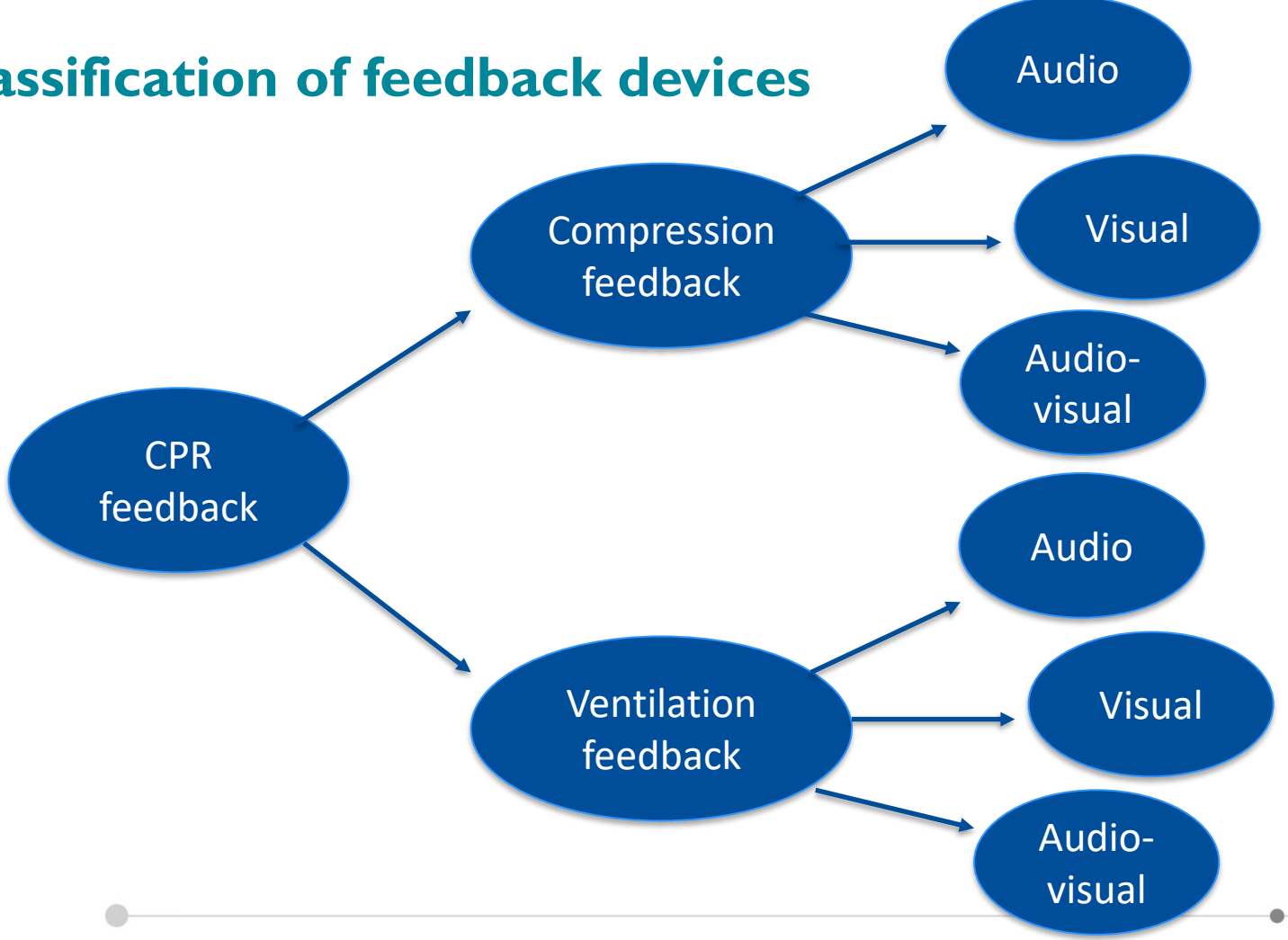
Agenda

- Types of feedback

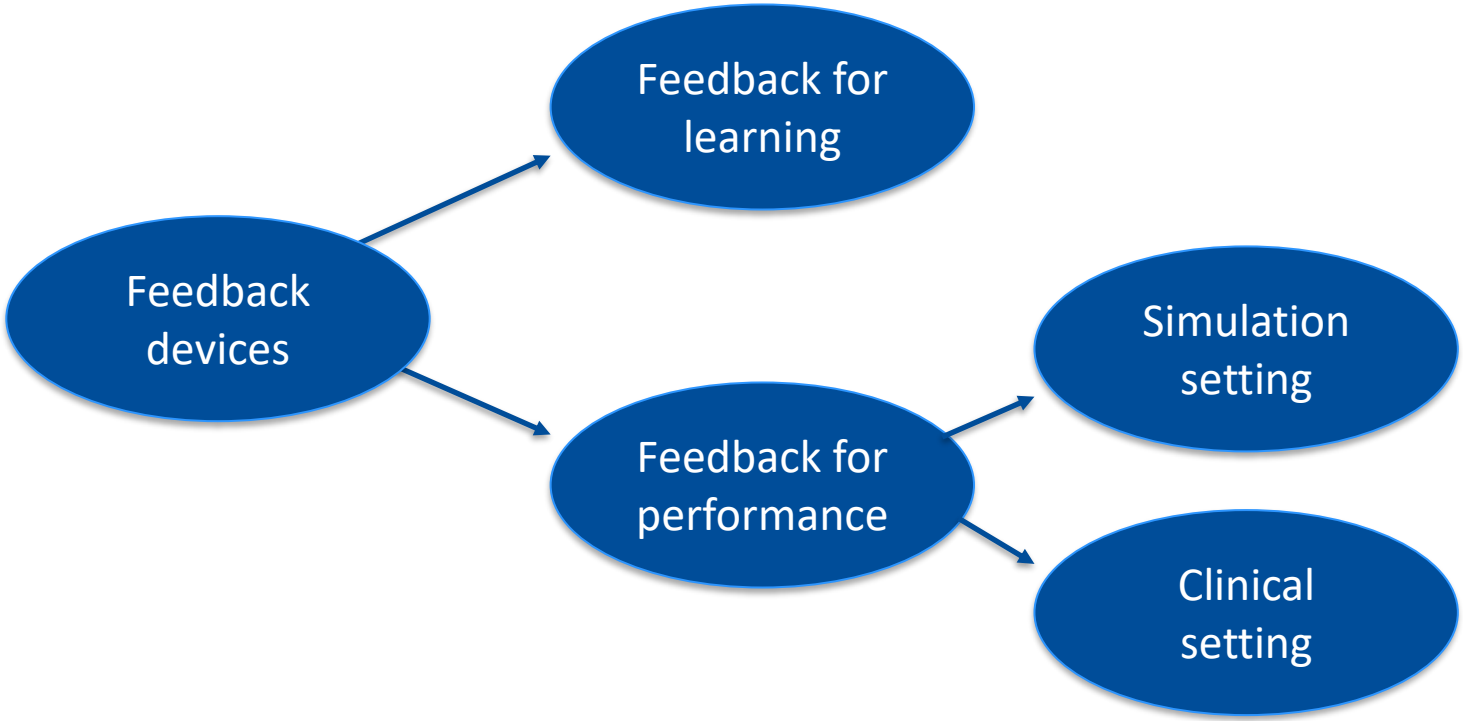
- What does the evidence tell us?

- Practical considerations

Overall classification of feedback devices



Settings for feedback



The evidence

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Review

Use of CPR feedback devices in resuscitation training: A systematic review and meta-analysis of randomized controlled trials

Yiqun Lin[a,], Andrew Lockey[b,c], Aaron Donoghue[d], Robert Greif[e,f], Andrea Cortegiani[g,h], Barbara Farquharson[i], Fahad Javaid Siddiqui[j], Arna Banerjee[k], Tasuku Matsuyama[l], Adam Cheng[m,n], on behalf of the Education Implementation Team Task Force of the International Liaison Committee on Resuscitation ILCOR[*,1]*

Findings

- 20 randomized controlled trials included
- Moderate to high certainty of evidence

Outcome	Study	Participant	Effect Size [95%CI]	P value for Interaction
Mean Depth (mm)				
Healthcare Professionals	13	1496	0.86 [0.01, 1.72]	
Lay Persons	2	2738	0.15 [0.07, 0.22]	
Combined	15	4234	0.76 [0.02, 1.50]	0.10
Mean Rate (bpm)				
Healthcare Professionals	14	1549	0.27 [0.04, 0.50]	
Lay Persons	3	2778	0.36 [0.03, 0.69]	
Combined	17	4327	0.29 [0.10, 0.48]	0.67
Depth Compliance (%)				
Healthcare Professionals	13	1526	1.14 [0.04, 2.24]	
Lay Persons	3	2778	0.17 [0.01, 0.32]	
Combined	16	4304	0.98 [0.10, 1.87]	0.09
Rate Compliance (%)				
Healthcare Professionals	8	780	0.44 [0.19, 0.68]	
Lay Persons	1	125	0.49 [0.14, 0.85]	
Combined	9	905	0.44 [0.23, 0.66]	0.80
Recoil Compliance (%)				
Healthcare Professionals	8	723	0.67 [0.52, 0.82]	
Lay Persons	2	2738	0.20 [−0.24, 0.64]	
Combined	10	3461	0.53 [0.31, 0.75]	0.05

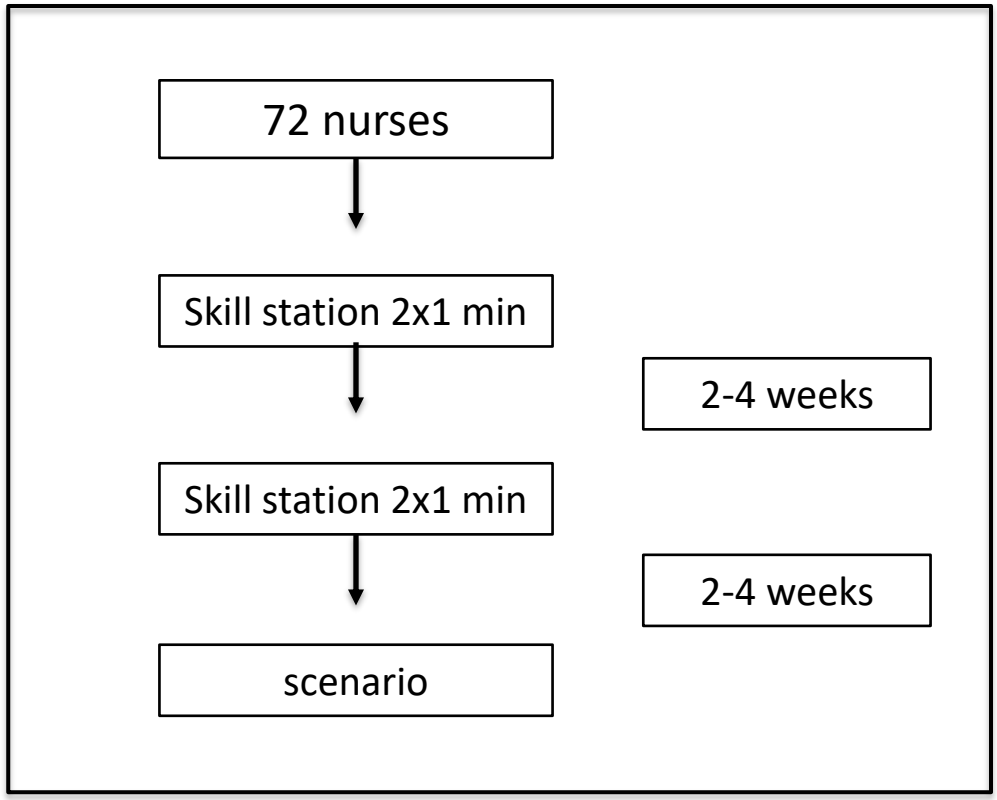
Lin et al., Resus Plus 2025

However…

- No evidence on translation to clinical performance

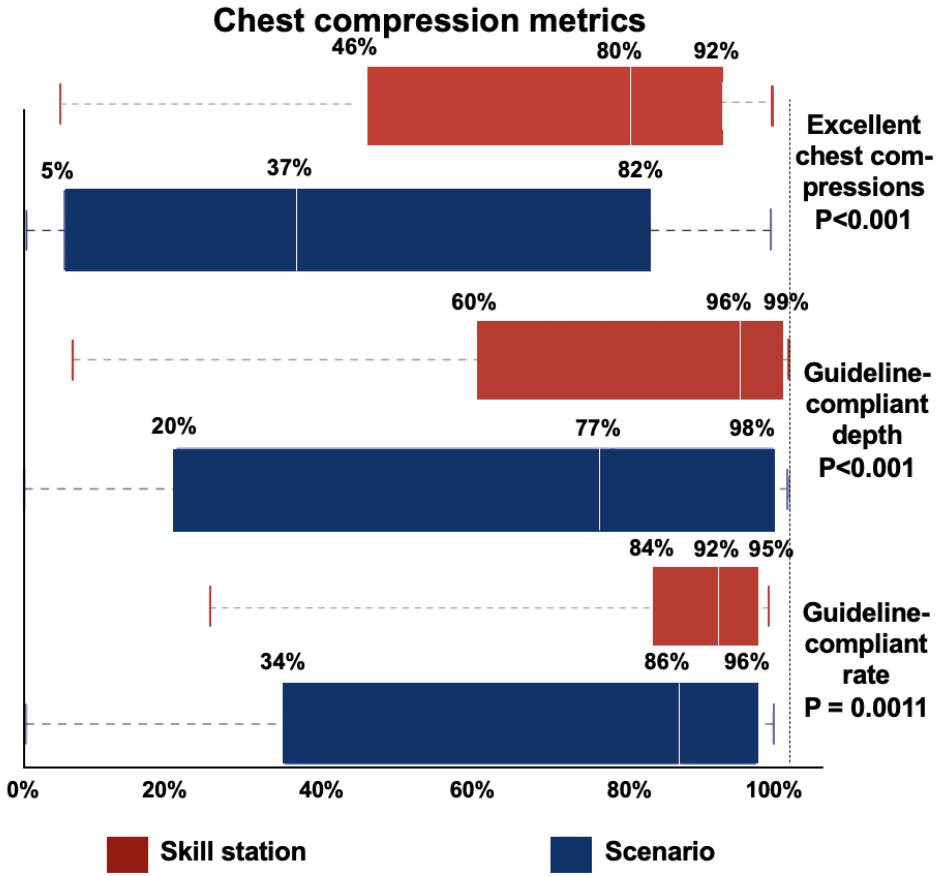
- Most studies simply investigate the effect for compressions on a manikin in non-contextual settings

Do skill stations with feedback translate to scenarios?



Brøgger M et al. submitted

Overall poor transfer



Brøgger M et al. submitted

Feedback devices to improve clinical performance

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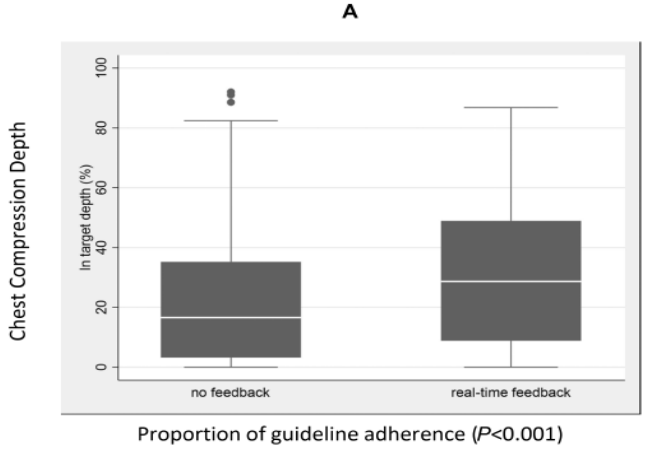
Training and education

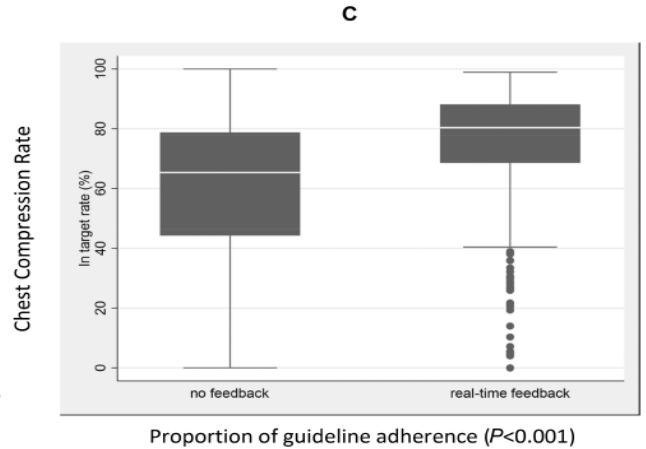
Do automated real-time feedback devices improve CPR quality? A systematic review of literature

Debora Gugelmin-Almeida[a,b,*], *Lucia Tobase*[c], *Thatiane Facholi Polastri*[d], *Heloisa Helena Ciqueto Peres*[e], *Sergio Timerman*[d]

Gugelmin-Almeida et al., Resus Plus 2021

Cohort study on clinical OHCA





Lyngby et al., JAHA 2023

No signals of survival benefit

Table 3. OR and Proportion for Patient-Centered Outcomes

Patient-centered outcome	Phase	No.	Events, n (%)	OR (95% CI)
ROSC	No feedback	467	155 (33.2)	1 (Reference)
	Real-time feedback	446	142 (31.8)	0.94 (0.71–1.24)
sROSC	No feedback	467	126 (27.0)	1 (Reference)
	Real-time feedback	445	106 (23.9)	0.85 (0.63–1.14)
30-d Survival	No feedback	467	64 (13.7)	1 (Reference)
	Real-time feedback	445	51 (11.5)	0.81 (0.55–1.20)

OR indicates odds ratio; ROSC, return of spontaneous circulation; and sROSC, sustained ROSC.

Lyngby et al., JAHA 2023

How about ventilation feedback?

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Review

Real-time ventilation quality feedback devices efficacy in out-of-hospital cardiac arrest: a scoping review

Guillaume Debaty [a,], Nicholas J. Johnson [b], Maya Dewan [c], Laurie J. Morrison [d,e], Janet E. Bray [f,g], on behalf of the International Liaison Committee on Resuscitation Basic Life Support Task Force [h]*

Findings

- Clinical: 2 cohort studies, 1 case series, 2 abstracts
- Simulation: 10 observational, 2 RCTs
- Improved ventilation performance (simulation and clinically), uncertain effect on patient outcomes
- Limited/ no evidence for ventilation feedback in training

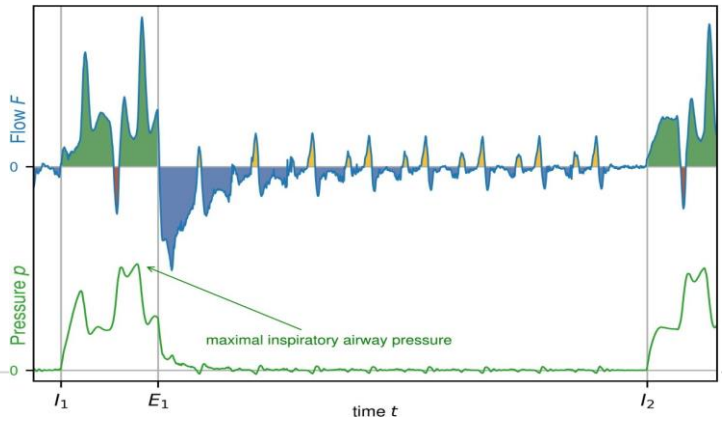
Practical issues when measuring compressions

Can you rely on chest compression depth in a hospital?

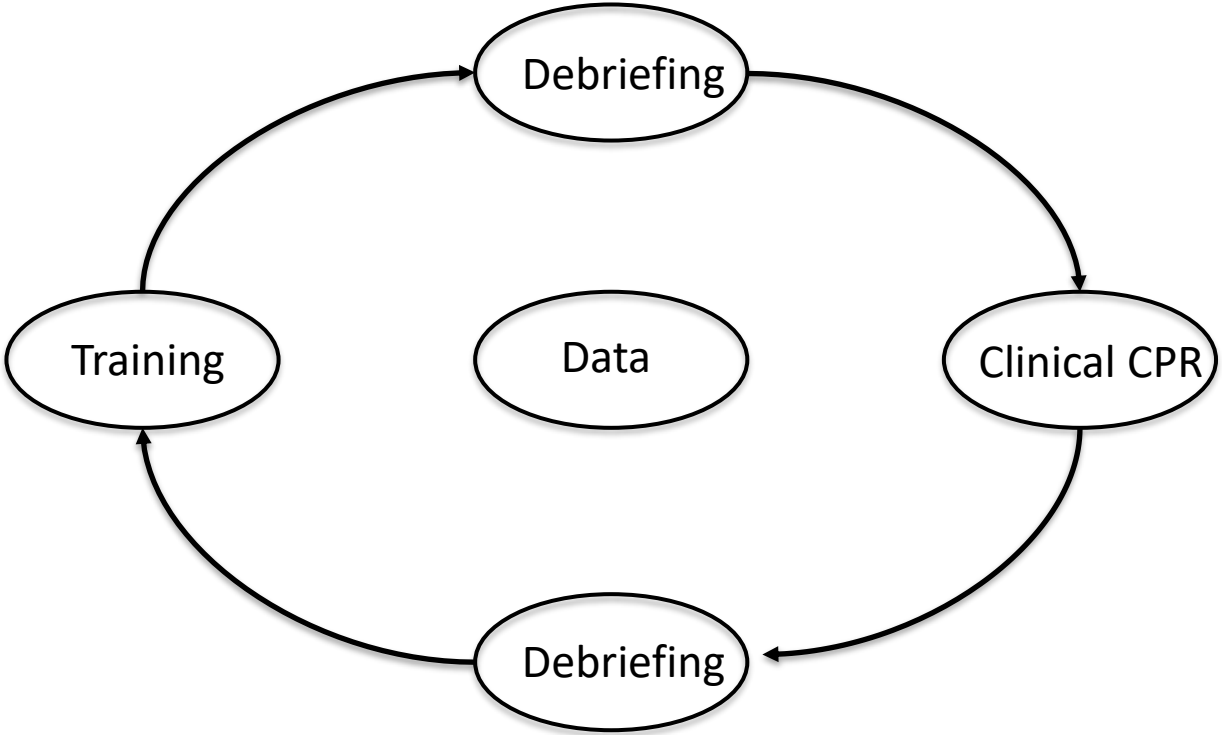
How do we optimally give the feedback?

Practical issues when measuring ventilation

- Fragmented airflow
- What is true leakage?
- Fusion of breaths
- How do we optimally provide the feedback?



Improving survival vs. quality improvement?



Take-home messages

- Feedback for compressions improves performance and learning when used in training
- Feedback for ventilations may improve performance but effect in training is unknown
- No evidence for improved survival when using feedback devices clinically
- Be aware of accuracy of the feedback you get

Questions

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