Protocol development for Video-Call based DACPR

TaeHan Kim, M.D
Department of Emergency Medicine
Seoul National University Hospital

Background

- Traditional DA-CPR
  - Successfully increased rate of bystander CPR & survival
- Limitations of current DA-CPR
  - Quality of CPR ??
    - High quality CPR emphasized for EMS and in-hospital CPR
    - High quality bystander CPR??
  - Difficulty of recognizing agonal breathing for dispatchers with audio only

Data from Seoul

All adult OHCA with cardiac origin	2013		2014		2015		2016		2017		Total	
DA-CPR instructed	1,211	38.9	1,840	53.9	1,867	55.1	1,788	55.7	1,756	54.6	8,462	51.8
CA recognized but CPR not possible by bystanders	64	2.1	266	7.8	322	9.5	306	9.5	425	13.2	1,383	8.5
CA not recognized by dispatcher	279	9.0	321	9.4	639	18.8	723	22.5	415	12.9	2377	14.5
CA not recognized By call-taker	1,563	50.1	984	28.8	559	16.5	395	12.3	618	19.2	4,119	25.2
Total	3,117	100.0	3,411	100.0	3,387	100.0	3,212	100.0	3,214	100.0	16,341	100.0

Video-call technology

- Widely spread smartphone
- Improved video-call technology and quality
  - More information can be transferred
- Video-call are starting to be used in emergency medical dispatch

Use of video-call in Dispatch

1. Evaluation of bystander CPR performance & quality

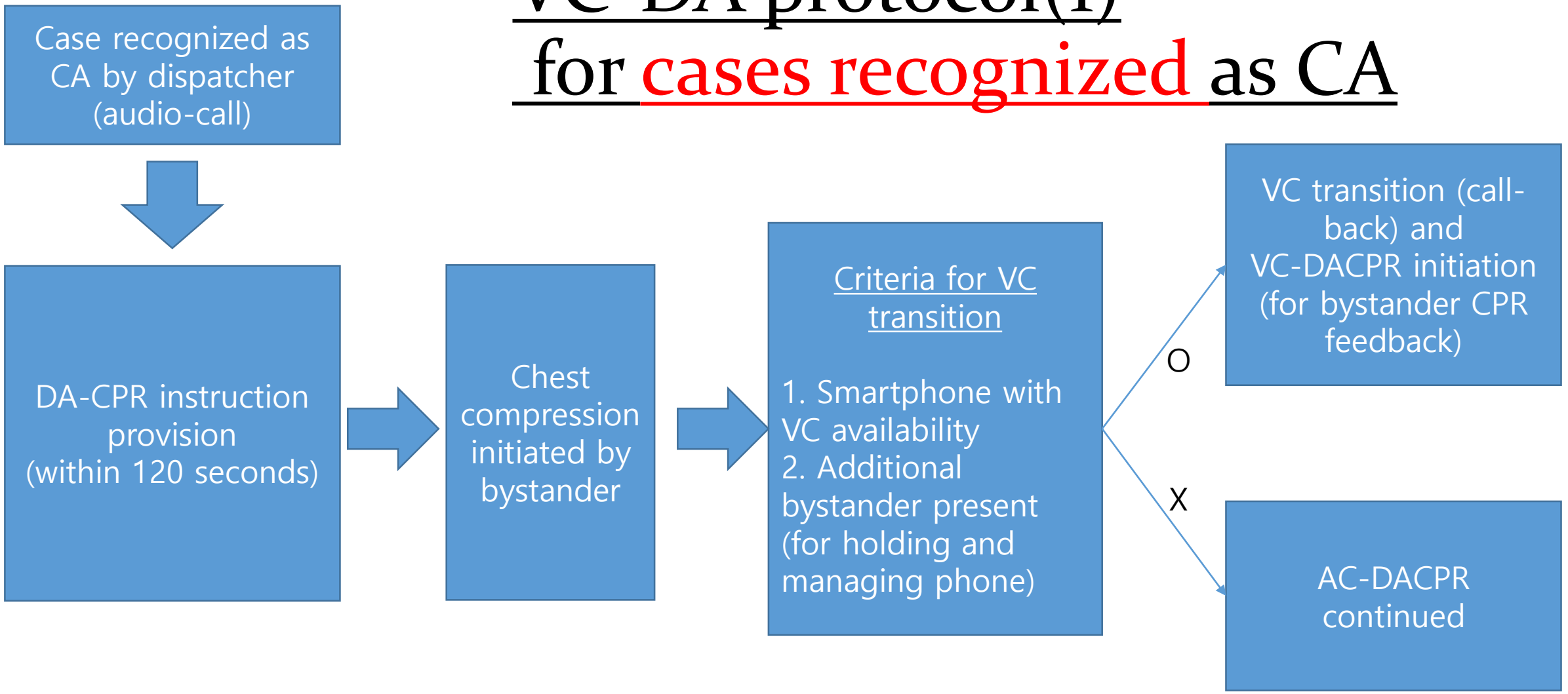
2.Giving audio/visual instructions to bystander for better quality CPR

3. Recognition in difficulty case (ex>agonal breathing)

Video-call based dispatcher assisted CPR (VC-DACPR) system development

- Contents
  1. Development of VC-DACPR protocol for dispatchers
     - Calls recognized as CA during audio-call
       - Video-call used for feedback of CPR quality
     - Calls not recognized as CA during audio-call
  2. Measuring effectiveness of VC-DACPR
     - Quality of bystander CPR in simulation environment
     - Effect on clinical outcome in real OHCAs

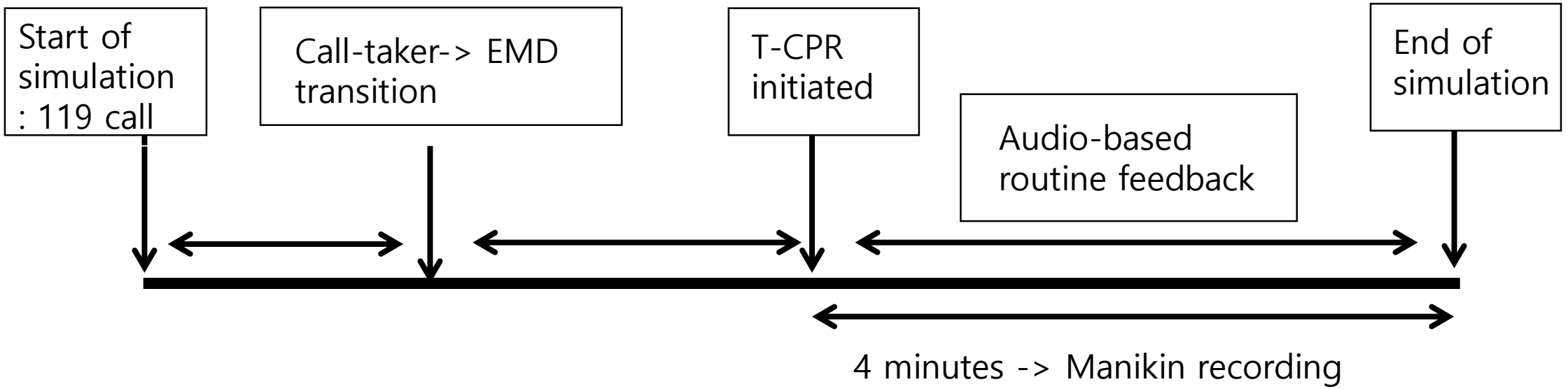
VC-DA protocol(1) for cases recognized as CA



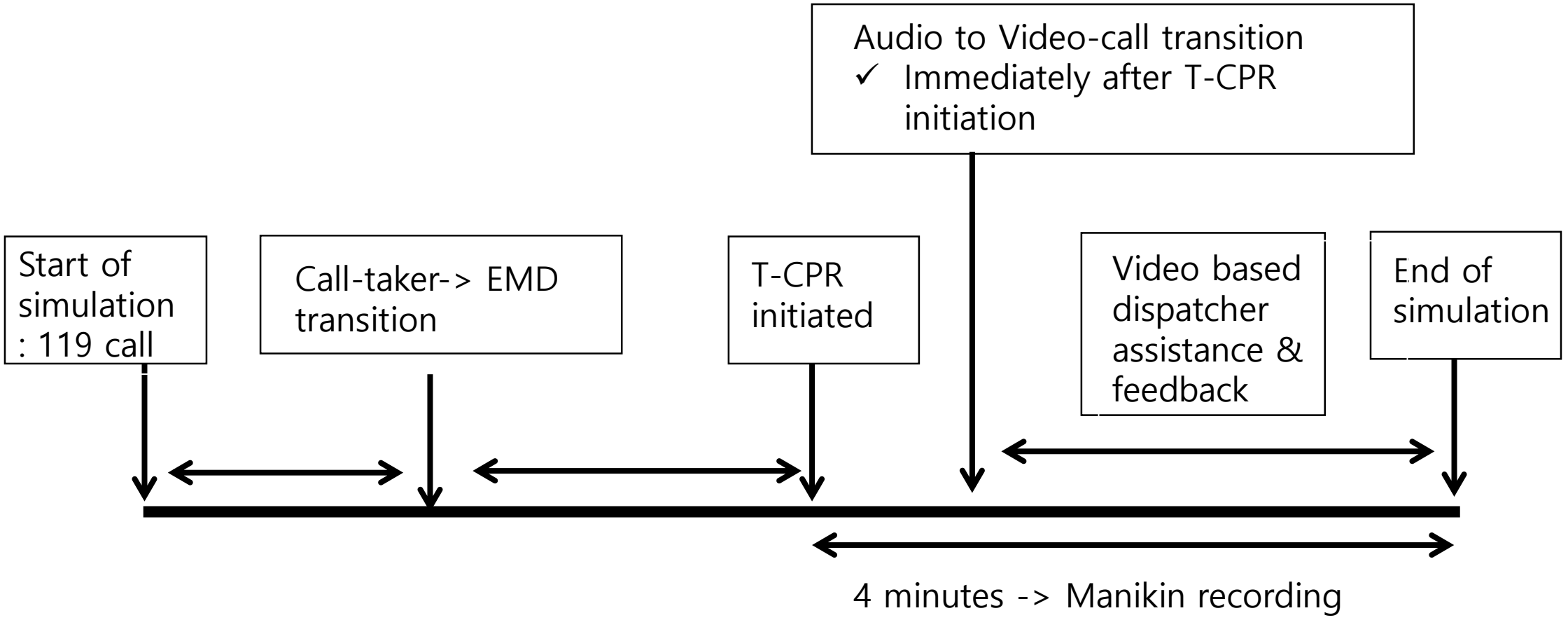
Pilot trial

- Population
  - 18 CPR training participant with various type of CPR training experience
- Intervention & Control
  ① Audio call based Recognition DA instruction ->
  Transition to Video-call (immediately after instruction) -> CPR feedback
  ② Audio call based Recognition DA instruction
  -> Transition to Video-call (after 60 compressions) -> Video-based CPR feedback
  ③ Audio call based Recognition DA instruction -> Audio-call based feedback

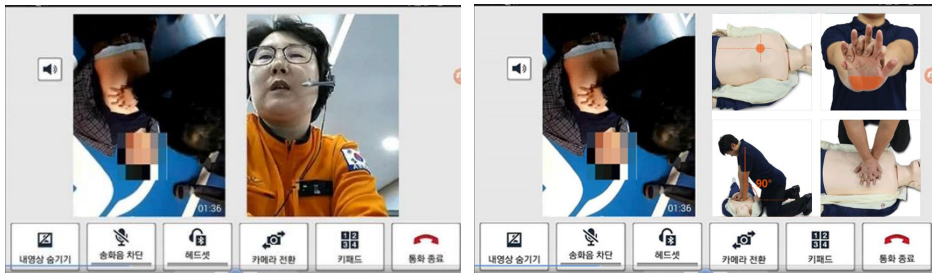
Scenario (1)
– Standard audio call based DA-CPR

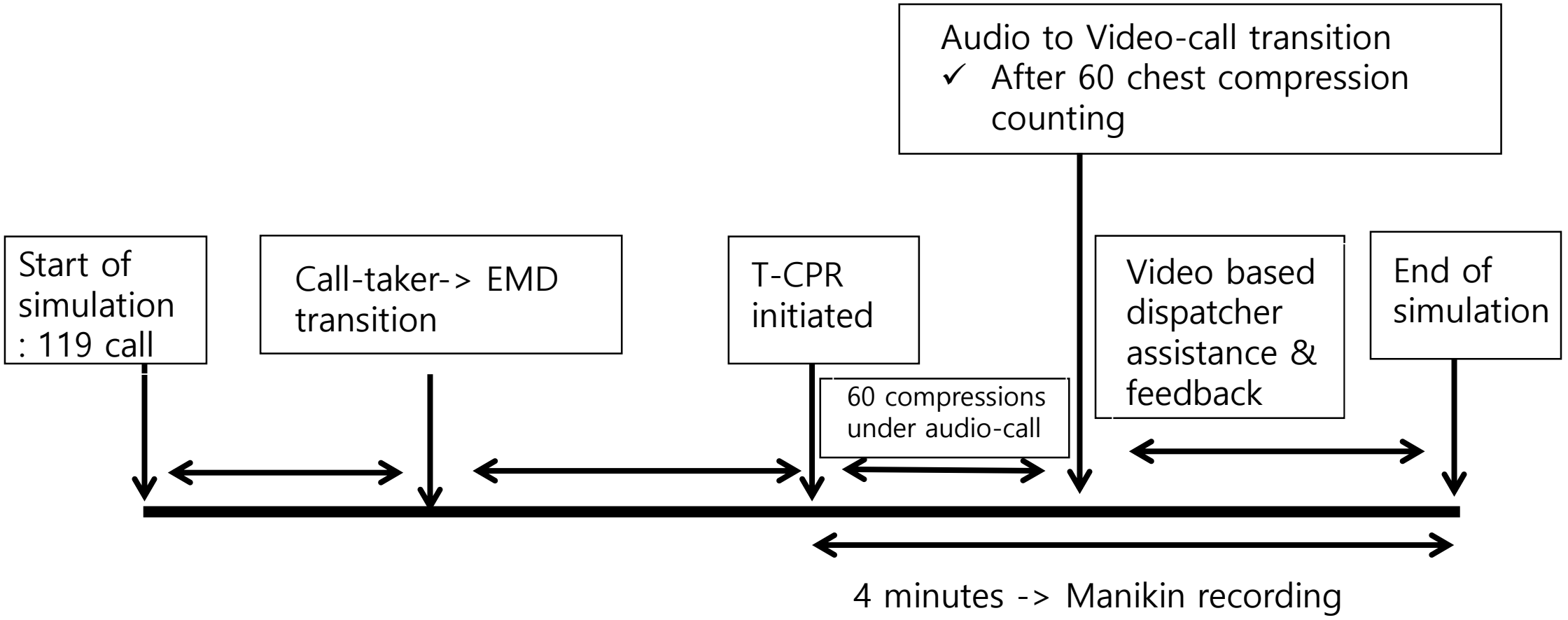


Scenario (2)
– Video-call based DA-CPR



Scenario (3)
– Video-call based DA-CPR



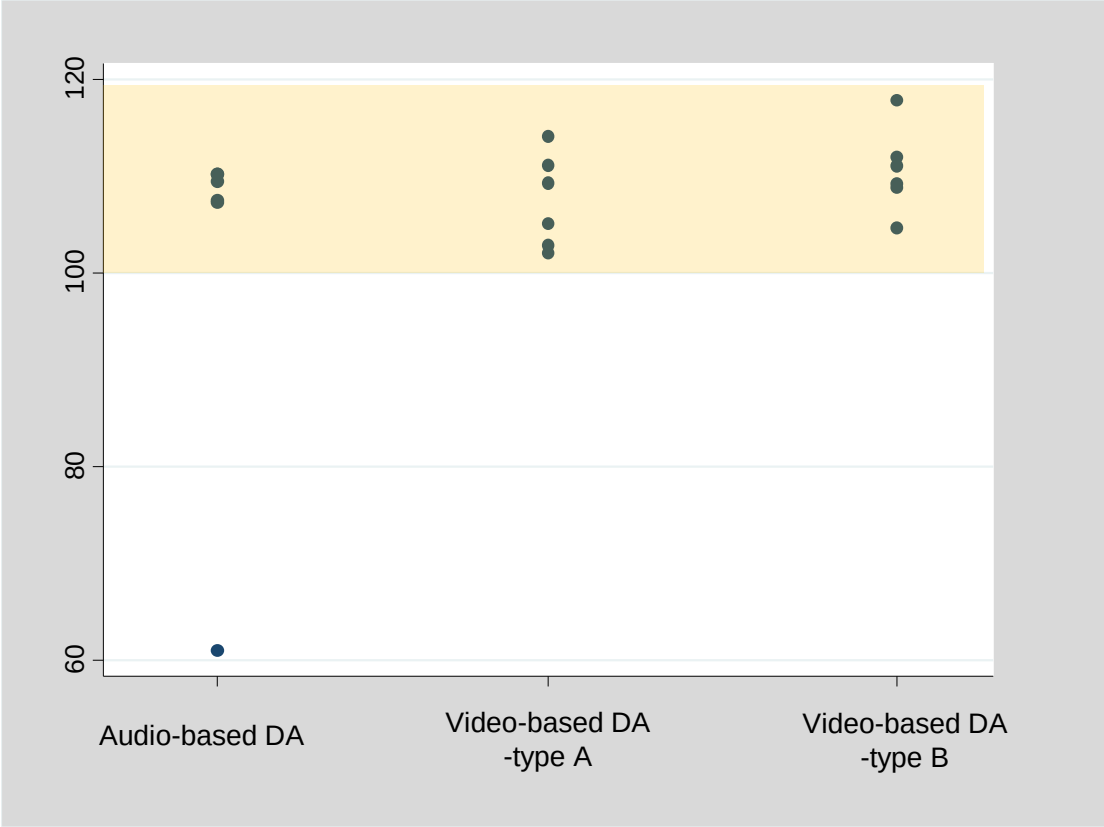


Proportion of compression with appropriate rate(%)

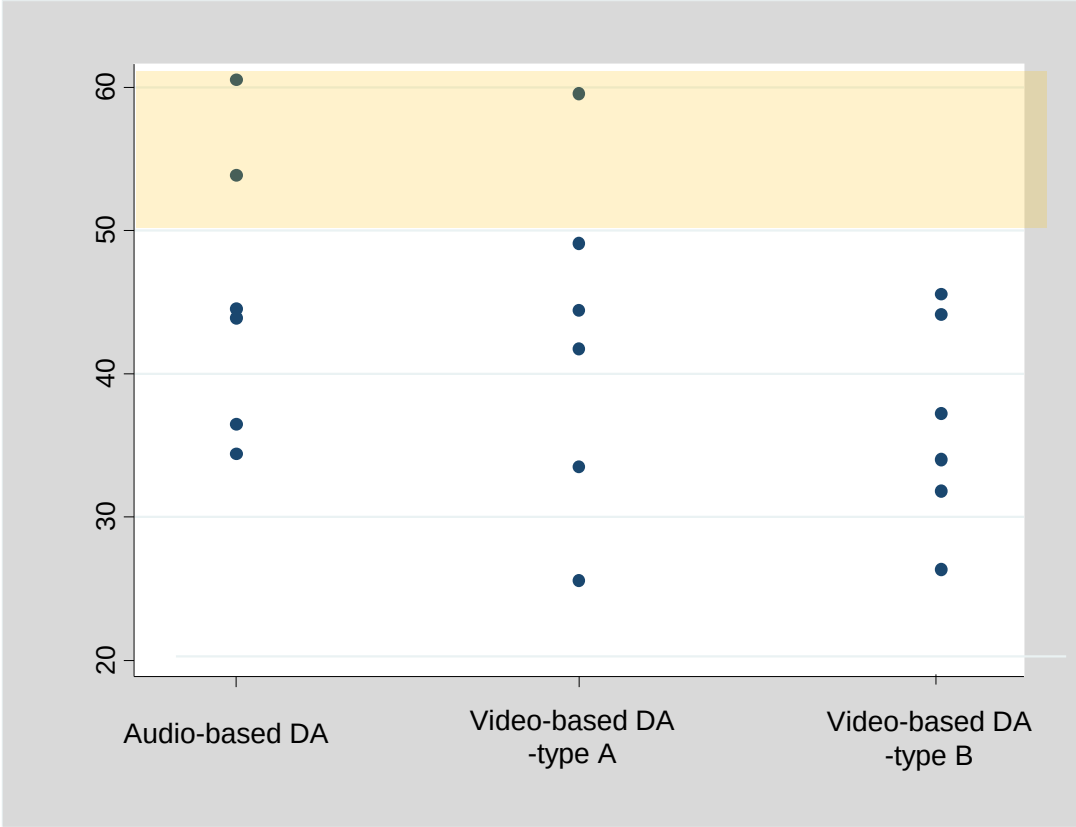
	N	Mean	SD	Median	Q25	Q75
Audio-call	6	76.5	36.5	90.6	85.5	93.3
Video-call A	6	82.4	11.4	82.6	74.0	92.9
Video-call B	6	72.3	20.8	82.4	46.0	86.0
Total	18	77.1	24.0	85.3	74.0	91.6

Unpublished data

Mean compression rate



Mean compression depth



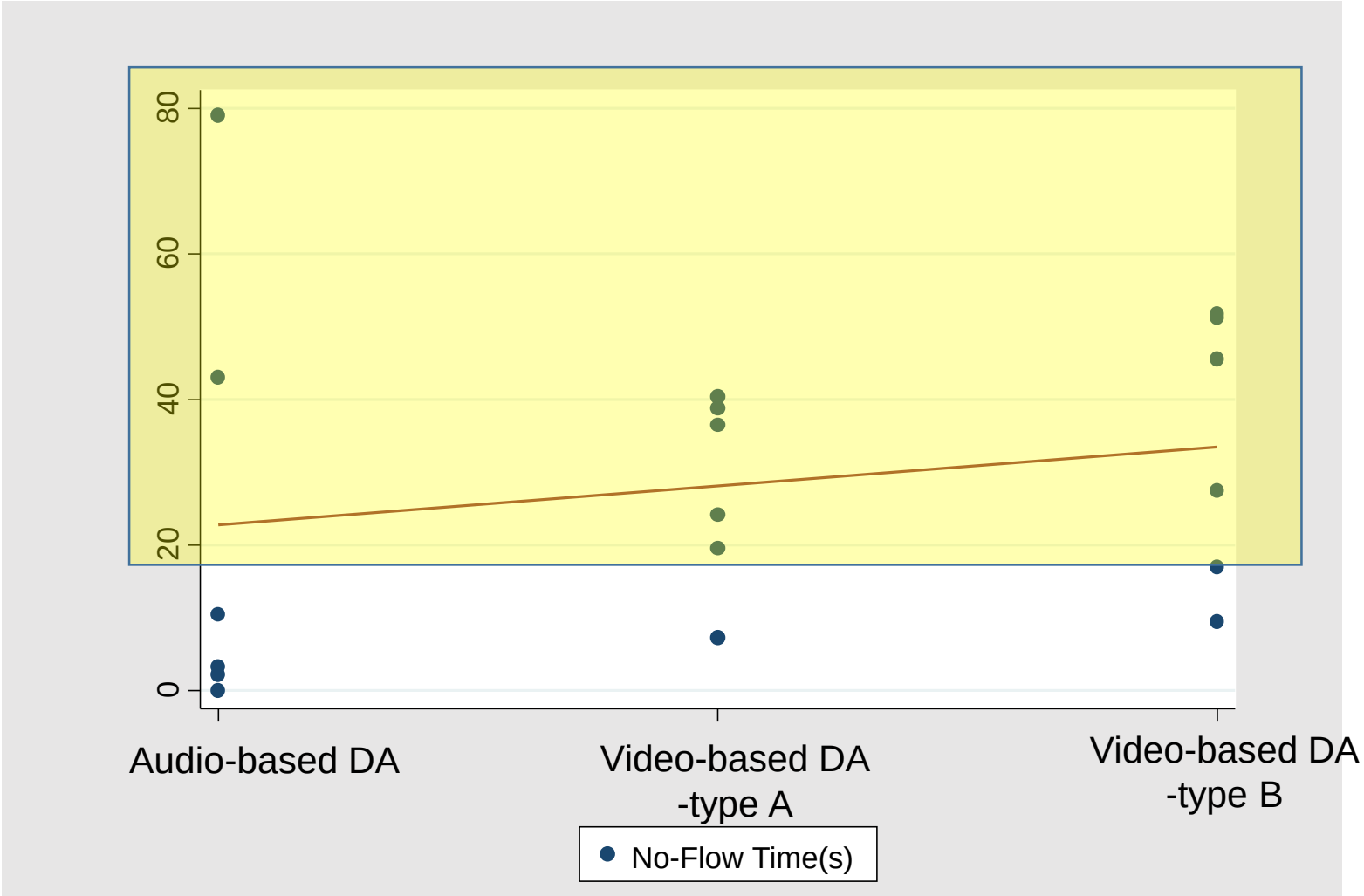
Unpublished data

No-flow time (s) in 4 minute CPR

	N	Mean	SD	Median	Q25	Q75
Audio-call	6	23.0	31.8	6.8	2.1	43.0
Video-call A	6	27.7	13.1	30.3	19.5	38.8
Video-call B	6	33.7	18.4	36.5	16.9	51.2
Total	18	28.2	21.6	25.8	9.5	43.0

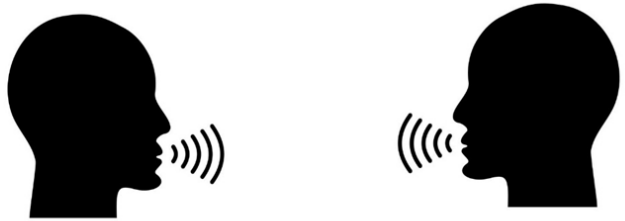
Unpublished data

No-flow time



Unpublished data

Technical limitation of video-call transition

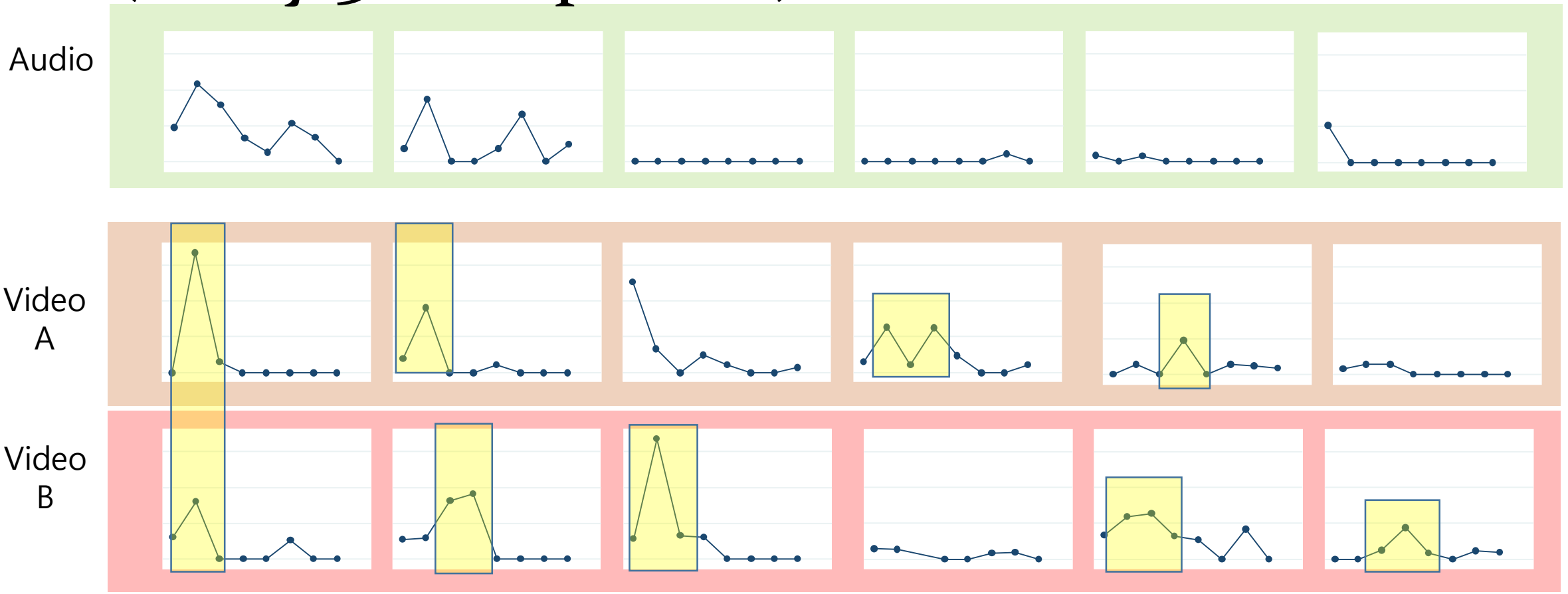


AC-DACPR

Transition to VC-DACPR

Call back by dispatcher after hanging-up

No-flow time during bystander CPR (every 30 sec period)



Unpublished data

VC-DA protocol(2) for cases not recognized as CA

Case not recognized as CA by dispatcher (Audio-call)

Indication for VC

① Irregular breathing (but no definitely agonal)
② Seizure
③ Difficulty in questioning and recognizing due to caller factor
④ Any case not recognized as CA but dispatcher felt video evaluation is needed

VC transition (call-back)

CA recogniztion attempt using video-feed

CA → DA –CPR instruction

Not CA → Continue routine pre-arrival instrution

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Further study and challenge

- Technical improvement
  - Minimized video-call transition process
    - Avoid no-flow time during transition (AC->VC)
  - Video motion-recognition technology (Laerdal T-CPR LINK)
    - For automatic recognition of low-quality bystander CPR
    - Implementation in dispatch center

Further study and challenge

- Detailed protocol & script development
  - For uniformed and protocolized instruction
- Training program development for dispatcher
  - Minimize no-flow time during dispatching
  - Listing and training most efficient methods for giving feedback to bystander during video-call

Thank you for attention