Assessment of the Quality of Bystander Cardiopulmonary Resuscitation Instructions Provided to Callers by 9-1-1 Telecommunicators to Improve Out-of-Hospital Cardiac Arrest Outcomes

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Abstract

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The purpose of this research was to evaluate if 9-1-1 telecommunicators provide T-CPR instructions that reflect best practices identified in the literature by assessing rate, depth, hand position, and coaching instructions delivered during simulated calls. The study aims: 1) How close are T-CPR instructions provided to best practices, and 2) How much variation is there among call centers using similar guidelines? The data for the study were collected as part of a large randomized controlled trial with 128 telecommunicator participants from 13 call centers. Each had two assessment calls; a total of 256 calls in the study sample. Data was analyzed using descriptive statistics. Results show T-CPR instructions for depth and hand position are close to best practices. Only one of 13 call centers provided best practice for rate. Also, despite using similar guidelines, there are variations between call centers. Further research is needed to understand why call centers do not provide rate with best practice and to determine if coaching improves bystander CPR and identify coaching best practices.

Introduction

Out-of-hospital- cardiac arrest (OHCA) is a significant public health problem in the United States (US).[1] According to the Heart Disease and Stroke Statistics published by the American Heart Association (AHA), there were more than 350,000 incidences of OHCA in 2016, with a survival rate of 12 percent.[2] Given the high incidence of OHCA and low survival rate, research in this area should be prioritized to improve public health interventions to save lives from OHCA.

Cardiopulmonary Pulmonary Resuscitation (CPR) is a lifesaving intervention recognized to increase OHCA survival rate.[3] Early initiation of CPR, preceding emergency medical services (EMS) arrival, increases the probability of survival by 200 to 300 percent.[3] 9-1-1 telecommunicators play a vital role in delivering lifesaving instructions to increase the rate of bystander CPR, also known as telephone CPR (T-CPR). T-CPR can save lives when done correctly.[3] Despite these significant findings, the percentage of OHCA patients who receive bystander CPR continues to be low. In 2016, only 46.1 percent of OHCA patients in the U.S. received bystander CPR. [2]

T-CPR has been cited as a key element in increasing OHCA survival rate by 50 percent.[5] It allows the brain and heart to stay alive until EMS arrives at the scene to provide advanced interventions, such as defibrillation.[3] T-CPR can guide callers, with or without previous training, on how to efficaciously deliver high-quality CPR.[3] Most 9-1-1 telecommunicators receive T-CPR training per their respective Emergency Dispatch Center's training program. The AHA recommends that Emergency Dispatch Centers provide initial training, as well as annual continuing education to ensure they can effectively assess the need for T-CPR and facilitate timely instructions to callers.[6]

Little research on the quality of T-CPR instructions provided by 9-1-1 telecommunicators has been conducted. Ristagno et al. (2007) found that high quality chest compressions are a determinant of successful CPR, and its effectiveness may allow delay of defibrillation without endangering patient outcomes.[4] One study suggests that CPR quality is highly inconsistent during actual OHCA events[8]; this supports that further research should be conducted to provide high-quality T-CPR.

The literature suggests that specific T-CPR instructions can improve quality of bystander CPR, as measured on a manikin in a study setting. Although there is no guarantee that results obtained in a study setting translates perfectly to real-life, these studies do suggest that certain best-practices might improve CPR performance during T-CPR.

There is evidence for the following:

1. Shorter all-caller interrogation (Establishing patient consciousness and breathing status to determine the need for T-CPR before asking patient characteristics such as age, gender, medical history, etc.) reduces time to start of T-CPR. [9]

2. Not including instructions related to removal of the patient's clothing reduces time to start of T-CPR and does not appear to compromise quality of CPR.[10]

3. Hand position – Instructions on the bystander's arm position and using the patient's nipples as landmarks improves hand position over other types of hand position instructions (e.g., center of the chest)[12]

4. Compression Depth – the instruction to "push as hard as you can" improves compression depth over other types of instructions [13, 14]

5. Compression Rate – the use of a metronome improves bystander CPR and appears to be a preferred feedback mechanism for bystanders who are performing CPR [15, 16]

6. Coaching (continued and repeated instructions on rate, depth, and continuous compressions after the bystander receives the initial instructions and starts CPR) – Currently, there is insufficient evidence related to T-CPR performance coaching that includes ongoing encouragement or re-emphasizes the importance of rate and depth to make recommendations. There is some literature to suggest that repeating the depth instruction every 20 seconds does not improve depth and as such is not recommended (right now). [17] There was a 63% success rate in instructing the caller to put the phone down and use the speaker phone function, which resulted in continuous dialogue between the caller and telecommunicator while performing T-CPR. However, it has not shown to improve quality of CPR and as such should not be included until more research shows its benefit.[11]

The purpose of this research was to evaluate the extent to which 9-1-1 telecommunicators are providing T-CPR instructions that reflect best practices identified in the literature. The quality of T-CPR will be evaluated by assessing the rate, depth, and hand position instructions, as well as coaching techniques delivered during simulated (mock) calls and comparing these to best-practices identified in the literature. The study aims to determine:

1) How close are the T-CPR instructions provided by 9-1-1 telecommunicators to the best practices identified in the literature?

2) How much variation in T-CPR instructions is there among call centers that use similar guidelines (Criteria-Based Dispatch [CBD] guidelines)?

Although not a great deal of literature is available at this time, coaching during T-CPR may improve ongoing CPR until help arrives, which may prove to be a critical part in providing high quality T-CPR. It is imperative to evaluate the quality of T-CPR instructions provided by EMS telecommunicators, as there is evidence this will improve bystander CPR's effectiveness and the survival of OHCA patients

2. Methods

2.1. Design, setting, and participants

The data for the current study were collected as part of a large randomized controlled trial to evaluate the effectiveness of a simulation training on 9-1-1 telecommunicators' ability to promptly recognize the need for T-CPR during several mock calls. This training did NOT include any feedback on T-CPR instructions as the focus was on the interrogation questions that are used to identify the need for T-CPR. As such there was no expected intervention effect on T-CPR delivery.

Thirteen 9-1-1 call-centers across Washington, Oregon, Alaska, and Arizona participated in the study. All call centers used the Criteria-Based Dispatch (CBD) Guidelines for T-CPR instructions. CBD guidelines are based on the following: 1) "level of care required for a patient," 2) "the urgency for the care to be given", and 3) "the specified medical criteria for determining the appropriate response."[18] When 9-1-1 telecommunicators receive calls, they make decisions on the appropriate level of response based on certain "signs and symptoms or mechanism of injury" (also known

as “symptom criteria”) that callers report during the call. Symptom criteria allows 9-1-1 telecommunicators to prioritize life-threatening calls which require Advanced Life Support (ALS) care, while less serious calls receive Basic Life Support (BLS) care.

128 telecommunicators participated in the study. 66 telecommunicators were randomly selected and received the intervention training, “Simulation Training to Assist Triage of 9-1-1 calls” [STAT 9-1-1] (intervention group), and 62 participants did not receive the training and were the control group.

Simulation training sessions were conducted from September 2013 to April 2016. After four simulation training sessions, all participants (intervention and control) participated in a simulated call assessment, which consisted of three simulated calls. Two of the calls were OHCA scenarios and were scored to test the main outcome. As a result, there were 256 calls (128 participants x 2 calls= 256) included in the study sample. One call was not completed due to static (technical difficulties) and was not included for analysis.

The parent study received IRB approval and this study fell under and was covered by that initial approval.

2.2. Abstraction form and procedure

After a comprehensive review of the literature on T-CPR instructions and coaching, an abstraction form was developed which primarily focused on rate, depth, hand position instructions, and coaching techniques for T-CPR. These coding categories were chosen to compare the T-CPR instructions provided during the simulated calls to best-practices identified in the literature. The research team reviewed

the form and made revisions until it met the intent of the study. The form was divided in two sections: quality of T-CPR instructions and coaching. To assess the quality of T-CPR instructions in each call, three main questions were asked: “Did the dispatcher provide…”: 1) “the rate for chest compressions?”; 2) “instructions on the depth of compressions?”; 3) “instructions on hand position for compressions?” Within these categories we coded how the instructions were delivered using the evidence-based practices identified in the literature as a guide, (e.g., use of metronome) and the exact wording of the instructions (e.g., “push as hard as you can” versus “push down two and half inches”, etc.).

The fourth question asked if the dispatcher provide coaching techniques to the caller. The abstraction form is shown in Appendix A. A code book was also developed and reviewed simultaneously, Appendix B. This final version of the code book was used to guide the research team in call abstraction.

To establish coder reliability, two members of the research team separately coded the same set of 10 calls using the abstraction form. Once the members completed coding each set of calls, members compared the results. The process was repeated until both members reached 100% coding agreement.

The abstraction of calls was completed in December 2017. Ten percent of the calls (n= 26) were revisited to confirm the accuracy of the abstraction procedure. An existing Microsoft Office Access ® database from the original STAT 9-1-1 study was utilized to enter the data from the abstraction. The data was then exported to Microsoft Excel.

3. Data (Statistical) Analysis

The Microsoft excel ® file was uploaded into the statistical analysis program R Version 3.3.2 ®. [19] We used descriptive statistics to analyze the data.

4. Results

Study Aim 1 Analysis: How close are T-CPR instructions provided by 9-1-1 telecommunicators to the best practices identified in the literature?

Study Aim 1 analyzed how close to 100% instructions on rate, depth, and hand position at each call center were to the best practices identified in the literature. A grid was developed during the literature review to identify key components of T-CPR instructions and best practices for each of them. The information from the grid was compared to result of the analysis. T-CPR instructions provided by the telecommunicators were close to the best practices identified in the literature for depth and hand position, but not for rate of compression and coaching.

Compression rate instruction

Best Practice: the use of a metronome improves bystander CPR compression rate and appears to be a preferred feedback mechanism for bystanders who are performing T-CPR.

This study shows that telecommunicators provide instructions for rate of compression, for 83% to 100% of calls, as detailed in Table 1. Out of 13 call centers, only one call center (Call center ‘A’) used the metronome while providing instructions for T-CPR (100% of calls). Along with the metronome, call center A also provided verbal

demonstration for the rate. All call centers provided verbal demonstration rather than the other type of instructions for rate of compression.

Table 1. Rate for Chest Compressions

Call Centers	Telecommunicators (n)	Provide the rate for chest compressions (%)	Instructed caller on how fast to push (%)	Verbally demo to caller how fast to push (%)	Demonstrated caller on how fast to push using a metronome (%)
A	9	100	0	100	100
B	5	90	80	90	0
C	6	100	25	100	0
D	3	100	0	100	0
E	6	92	25	92	0
F	13	92	77	77	0
G	15	90	7	90	0
H	19	97	95	61	0
I	2	100	100	50	0
J	18	97	33	89	0
K	11	96	0	96	0
L	18	97	67	94	0
M	3	83	83	50	0
Average %		95	46	84	8

Compression Depth Instruction

Best Practice: the instruction to "*push as hard as you can"* improves depth over other types of instructions.

Telecommunicators provided compression depth instructions for 73% to 100% of calls. To determine how close the instructions were to best practices identified in the literature, depth instructions were categorized into three types: 1) "push as hard as you can," 2) depth instructions other than "push as hard as you can," and 3) no depth instructions (Table 2). The study found that "push as hard as you can" was the instruction used for depth by most telecommunicators.

Table 2. Best Practice on Depth Instruction

Call Centers	Telecommunicators (n)	"Push as hard as you can" (%)	Depth Instruction other than "Push as hard as you can" (%)	No Depth Instructions (%)
A	9	100	0	0
B	5	80	10	10
C	6	100	0	0
D	3	50	30	20
E	6	80	0	20
F	13	0	80	20
G	15	90	10	10
H	19	0	100	0
I	2	100	0	0
J	18	90	0	10
K	11	70	0	30
L	18	80	20	0
M	3	0	80	20
Average %		65	25	11

Hand Position for Compressions

Best Practice: instructions that use arm and nipple references improve hand position over other types of instructions (e.g., center of the chest).

Telecommunicators provided instructions for hand position for chest compressions for 84% to 100% of calls. More than half of the call centers (7 out of 13) provided hand position instruction 100% of the time. Detailed notes were taken during the abstraction of calls which showed use of bystander's arm and patient's nipple reference was the preferred instruction for hand position for compressions. These hand position instructions consisted of: "*Put your hands on the center of his (or her) chest, right between the nipples; place your other hand on top of that hand*;" "*with straight arms*…"

Coaching

As stated previously, there is currently insufficient evidence that coaching (e.g., ongoing encouragement or re-emphasizing the importance of correct rate and depth) is an effective method in improving the quality of T-CPR. This study shows that 9-1-1 telecommunicators delivered some type of coaching for 67% to 100% of calls. Six out of 13 call centers provided coaching for 100% of calls. Further research is needed to determine if coaching is an effective method to improve the quality of T-CPR, as well as to identify best practices that can be recommended to call centers.

Study Aim 2 Analysis: how much variations in T-CPR instructions is there among call centers that use similar guidelines (CBD)?

Study aim 2 analyzed variations in the instructions provided between call centers. Table 3 illustrates delivery of instruction for rate, depth, hand position, and coaching techniques by telecommunicators from participating call centers.

Rate

Using the same results table from the data analysis used for Study Aim 1, Table 1, we were able to compare rate for chest compressions instructions provided between call centers. Twelve out of the 13 call centers provided some type of instruction for chest compression rate between 90 to 100% of the time. Call Center M provided instruction for rate only at 67%. The type of rate instructions was coded into four categories: 1) instructed caller how fast to push; 2) verbally demonstrated to caller how fast to push; 3) demonstrated to caller how fast to push using a metronome; and 4) other type of rate instruction. Among the four types, call centers prefer to provide verbal

demonstration on how fast to push. As noted in the results for Study Aim 1, only Call Center A demonstrated how fast to push using a metronome.

Table 3. Delivery of instructions by telecommunicators from participating call centers

Call Centers	Telecommunicators (n)	Dispatcher provide the rate for chest compressions (%)	Dispatcher provide instructions on the depth of compressions (%)	Dispatcher provide instructions on hand position for compression (%)	Dispatcher provide coaching techniques to the caller (%)
A	9	100	100	100	100
B	5	90	90	90	90
C	6	100	100	100	100
D	3	100	83	100	100
E	6	92	92	100	100
F	13	92	85	92	89
G	15	90	93	97	97
H	19	97	100	100	90
I	2	100	100	100	100
J	18	97	94	100	100
K	11	96	73	96	96
L	18	97	94	95	95
M	3	83	83	83	67
Average %		95	92	96	94

Depth

Four of the call centers provided instructions on the depth of the compressions 100% of the time: call centers A, C, H, and I (Table 4). Most often, 9-1-1 telecommunicators used the instruction, "*push down as hard as you can*." Other types of depth instructions varied, and included "*push down firmly*," "*push down 1 ½ to 2 inches*," and combinations of push down firmly and inches (Table 5).

Table 4. Depth of Compressions

Call Centers	Telecommunicators (n)	In percentages (%)
A	9	100
B	5	90
C	6	100
D	3	83
E	6	92
F	13	85
G	15	93
H	19	100
I	2	100
J	18	94
K	11	73
L	18	94
M	3	83
Average %		92

Table 5. Depth Instruction Types

Call Centers	Telecommunicators (n)	"Push as hard as you can" (%)	"Push down firmly" (%)	Inches (%)	Combo – "Push down firmly" and inches (%)	Other combo (combo of depth instruction other than previous column ((%)	Other (other depth instruction other than columns 1, 2, 3, 4) (%)	No instruction provided (%)
A	9	100	0	0	0	0	0	0
B	5	80	0	0	0	0	10	10
C	6	100	0	0	0	0	0	0
D	3	50	0	20	0	20	0	20
E	6	80	0	0	0	0	0	20
F	13	0	0	80	0	0	0	20
G	15	90	0	0	0	0	0	10
H	19	0	0	10	90	0	0	0
I	2	0	0	0	0	100	0	0
J	18	90	0	0	0	10	0	10
K	11	70	0	0	0	0	0	30
L	18	0	0	0	20	80	0	0
M	3	0	0	30	0	50	0	20
Average %		51	0	11	9	20	1	11

Hand Position

There was not much variation in the instructions provided on hand position for compression between call centers except Center M, providing hand position instructions in 83% of calls (Table 6). The rest of the call centers provided hand position instructions in 90% to 100% of calls. Similar to what was reported in Study Aim 1, the most recurrent hand position instruction that 9-1-1 telecommunicators used during the mock calls was, "*Put your hand on the center of her/his chest, right between the nipples, and put your other hand on top of that hand" … "with straight arm…"*

Table 6. Hand Position for Compressions

Call Centers	Telecommunicators (n)	In percentages (%)
A	9	100
B	5	90
C	6	100
D	3	100
E	6	100
F	13	92
G	15	97
H	19	100
I	2	100
J	18	100
K	11	96
L	18	94
M	3	83
Average %		96

Coaching

Similar to the results for hand position instructions, call centers, except for call center M, provided some type of coaching techniques for 89 to 100% of calls, as detailed in Table 7. However, variations in T-CPR instructions among call centers were seen when coaching techniques were divided into the categories compression rate coaching, compression depth coaching, and continuous compressions coaching.

Coaching on hand position was not included in the study, although a small number of callers were noted providing coaching on hand position.

Of the three types of coaching techniques, coaching on continuous compressions (which means that the telecommunicator instructed caller to continuously perform CPR until help arrives), at least once during the mock call, was most frequently provided by 9-1-1 telecommunicators, followed by coaching on rate. Coaching on depth was the least provided coaching technique; the highest call center rate was at 20%.

Table 7. Coaching Techniques

Call Centers/ Telecommunicators (n)	Provided coaching on rate (%)	Provided coaching on depth (%)	Provided coaching on continuous compressions (%)	Stayed on the phone until EMS arrived (%)	Provided coaching on rate more than once (%)	Provided coaching on depth more than once (%)	Provided continuous coaching more than once (%)	No coaching provided, but remained on the line (%)	Dispatcher hung up (%)
A / 9	59	18	100	100	53	0	94	0	0
B / 5	40	20	90	90	20	0	90	10	0
C / 6	42	17	100	100	17	0	83	0	0
D / 3	50	17	100	100	33	0	100	0	0
E / 6	67	17	100	100	67	0	75	0	0
F / 13	35	12	89	39	15	0	69	0	12
G / 15	43	20	97	97	23	0	87	0	3
H / 19	26	0	87	90	5	0	58	11	0
I / 2	25	0	100	100	0	0	100	0	0
J / 18	28	14	100	100	11	0	83	0	0
K / 11	64	0	96	96	46	0	86	0	0
L / 18	67	6	89	95	42	3	70	3	0
M / 3	33	17	67	67	17	0	33	33	0
Average %	44	12	93	90	27	< 1	79	4	1

5. Discussion

Study Aim 1: ***How close are T-CPR instructions provided by 9-1-1 telecommunicators to the best practices identified in the literature*****?**

In this study, using simulated 9-1-1 calls, T-CPR instructions provided by telecommunicators were close to the best practices identified in the literature. This is true for providing the rate, depth, and hand position of compressions. However, only one call center out of 13 participating call centers met the best practice criteria for providing rate using a metronome. It would be interesting to study why only one call center was using a mechanical device for providing this type of instruction. Is the use of a metronome in a busy call center too noisy or distracting? Was the use of metronome presented as optional to telecommunicators? According to the literature, the use of metronome improves bystander CPR, thus the use of a metronome in T-CPR appears to be a best practice that should be part of the current practice by all call centers.

The instructions for depth and hand position for compression were consistent with the best practices in the literature. One study showed that “push down as hard as you can” seems just as good as “push down firmly 2 inches” when providing instructions for depth of compressions. But given that another study showed that the instruction “push down as hard as you can” improved the quality of T-CPR, such evidence suggest that it should be considered as best practice for depth instruction. However, it is worth mentioning that data certainly shows there are still quite a few telecommunicators who use other types of depth instructions such as “*push down 1 ½ to 2 inches*,” and combination of push down firmly and inches, other than “*push as hard as you can*.”

One study suggests that use of the bystander’s arm and the patient’s nipple as landmarks to guide callers in performing T-CPR is effective over other types of hand position instructions. Based on the notes taken during the abstraction of calls, most of telecommunicators provided these landmarks for hand position instructions. For that

reason, it is worth exploring how current guidelines used by call centers be improved to ensure that all can provide the arm and nipple landmarks as the hand position of choice for performing compressions.

Current literature does not provide best practices for T-CPR coaching techniques. Based on this finding, it warrants further study to determine if coaching improves bystander CPR in real life. Moreover, inclusion of coaching techniques in the telecommunicators' guidelines for OHCA calls should be explored to validate its impact in performing T-CPR. It is important to study coaching during T-CPR to learn about its effectiveness in improving bystander CPR performance and determining "best practices" for T-CPR coaching.

Noteworthy, the literature also explores the use of speaker phone feature during T-CPR. One article suggests that including an instruction on use of speaker phone improves ongoing communication between call taker and caller.[11] The study observed a 63% success rate at enabling speakerphone, which allowed continuous communication between the 9-1-1 telecommunicator and the caller, but did not affect the quality of CPR. This does not appear to be the current guidelines of call centers who participated in this study, but it was noted that in a small amount of calls, the telecommunicator asked the caller for this feature and advised them to use it, if available. Further study regarding this type of instruction should be considered in determining its effectiveness in communication while performing T-CPR.

Study Aim 2***: Study Aim 2 Analysis: how much variations in T-CPR instructions is there among call centers that use similar guidelines (CBD)?***

Other than the instruction for hand position, there was considerable variations in T-CPR instructions among call centers, despite using similar guidelines. The instructions for rate varied between instructing the caller on how fast to push for rate, verbally demonstrating how fast to push, and using the ticking of the metronome to guide caller on how fast to push. Although use of metronome has been cited in the literature as an effective way to provide the rate for compressions, instructing how fast to push by explaining the rate (e.g., “do it 10 times,” two times per second,” etc.) and verbally demonstrating on how fast to push were the preferred choice for providing the rate of compression instructions.

Depth instructions varied among call centers. Telecommunicators used the following instructions in providing depth of compressions: 1) “push as hard as you can,” 2) “push down firmly,” 3) “push down 1 to 2 inches,” 4) “combination of “push down firmly” and 1 to 2 inches; and 5) combination of depth instructions other than push down firmly and inches. Also, there were call centers where depth instructions were not provided in up to 30% of calls. Managers and supervisors of each call center should review their current guidelines to ensure that the most effective instructions are delivered by their call takers.

6. Limitations

Our study found that in simulation calls, telecommunicators from a variety of call centers provide T-CPR instructions that are close to the best practices provided by the literature. However, there are limitations to this study. Limitations include: data collected were generated from simulated calls, little is known about the benefit of providing

coaching to callers, and there is a limited amount of literature on “best-practices” for T-CPR instructions.

Simulated calls rather than real-life calls. Although the simulated calls were made to mimic real OHCA calls as close as possible, it is impossible to know if telecommunicators would have delivered the instructions in the same way during real cardiac arrest calls. However, telecommunicators were instructed to engage with the mock callers in same way as they would during real-life calls and given that much of a telecommunicators’ inquiry is protocol-driven, it is plausible that their instructions during the simulation resembled their protocols for T-CPR. Thus, the results cannot be generalized but can only serve as a guide to future studies in this area and assist with the revision and improvement of current instructions provided by telecommunicators to caller when responding to 9-1-1 OHCA calls.

Lack of literature on best practices for coaching and continuous coaching. As mentioned earlier, there is a lack of research on if coaching can improve T-CPR performance, which limits our ability to compare the results of this study with a “best practice” for coaching that could help determine its effectiveness in improving the quality of T-CPR. Further research specific to coaching during actual 9-1-1 OHCA calls is warranted. This study provides preliminary results on how often coaching was heard in a simulated setting, which can be used to predict future studies that are interested in the importance of coaching while providing instructions for T-CPR to callers. The coaching categories presented in this study may also be useful for future research with regards to coaching during T-CPR.

Limited amount of available literature on "best-practices" for T-CPR instructions. All call centers in the study used CBD guidelines. Although there is some literature for what practices can best improve the quality of T-CPR, such as the rate, depth, and hand placement, the amount found in literature was limited, which made it challenging to compare the results of this study and make a strong association between what was observed in the study with what was found in the literature. As more research is conducted in this area of emergency medicine, more accurate determinations can be made and can improve current CBD guidelines and other protocols that are used in the nation to provide instructions for T-CPR during OHCA calls.

7. Conclusion

This study concludes that most of the T-CPR instructions provided by telecommunicators across 13 call centers that use CBD criteria for T-CPR instructions are close to the best practices found in the literature. We also found that despite using similar guidelines for providing T-CPR instruction during OHCA, there are variations between call centers. The study suggest that further research is needed to understand why call centers do not provide rate with best practice and to determine if coaching improves bystander CPR and identify coaching best practices.

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Appendix A

STAT 911 ABSTRACTION SHEET

Call ID: _____

I: QUALITY:

1) **Did the dispatcher provide the rate for chest compressions?**

a) ___ Yes Check all that apply: ___ instructed caller on how fast to push ___ verbally demonstrated to caller how fast to push ___ demonstrated caller on how fast to push using a metronome ___ other *Notes:*	b) ___ No (the dispatcher did not provide any instructions regarding the rate for chest compressions.)

2) **Did the dispatcher provide instructions on the depth of compressions?**

a) ___ Yes *Notes:*	b) ___ No

3) **Did the dispatcher provide instructions on hand position for compression?**

a) ___ Yes *Notes:*	b) ___ No

II: COACHING:

1) Did the dispatcher provide coaching techniques to the caller?

a) ___ Yes Check all that apply if performed at least once: ___ Coaching on rate ___ Coaching on depth ___ Coaching continuous ___ Stayed on the phone until arrival of EMS *Notes:*	Check all that apply if performed more than once: ___ Coaching on rate ___ Coaching on depth ___ Coaching continuous *Notes:*	b) ___ No Check all that apply: ___ No coaching provided, but remained in the line) ___ Dispatcher hung up

Appendix B

Code Book for Abstraction

1) **RATE:** any mention related to how fast to push.
    - Caller counted with caller on how fast to push: e.g., "need to go faster," "go slower," demonstrated rate
        - **Instructed caller on how fast to push:** the dispatcher instructed caller to push "10 times," "push fast," "do it 10 times", "count 1-4"
        - **Verbally demonstrated caller on how to push**: dispatcher counted compressions with the caller; e.g., counted compressions by fours, counted compressions by tens, counted continuously 1….10, 11, 12, ……
        - **Demonstrated caller on how fast to push:** a metronome was used to exhibit rate of compressions

2) **DEPTH:** the strength or distance on how hard to push
    - e.g., "push as hard as you can," "press as hard as you can," "pump the chest as hard as you can," "Are you pushing really hard?"

3) **HAND POSITION:** where the hand goes on the chest
    - e.g., "put one hand on the center of the chest," place your hands between the nipples"

4) **COACHING:** provided instructions to caller throughout the call to keep and/or improve quality of CPR
    - **Dispatcher instructed caller to continuously perform CPR until help arrives:** e.g., keep going until help arrives," "don't stop, keep going," "count out loud,"
        - **Coaching on rate:** dispatcher provides coaching on rate (as described above, #1) beyond initial instruction.
        - **Coaching on depth:** dispatcher provides coaching on depth (as described above, #2) beyond initial instruction.
        - **Coaching on continuous compressions:** dispatcher instructed caller to continuously perform CPR until help arrives
        - **Coaching until arrival of EMS:** dispatcher counted/provided coaching throughout the whole call