

Telephone CPR: Compressing the Time to First Compression



Why T-CPR?



Study: King County, Wa.

Circulation November 20, 2001

Clinical Investigation and Reports

Dispatcher-Assisted Cardiopulmonary Resuscitation and Survival in Cardiac Arrest

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Background—Early cardiopulmonary resuscitation (CPR) improves survival in out-of-hospital cardiac arrest, and dispatcher-delivered instruction in CPR can increase the proportion of arrest victims who receive bystander CPR before emergency medical service (EMS) arrival. However, little is known about the survival effectiveness of dispatcher-delivered telephone CPR instruction.

Methods and Results—We evaluated a population-based cohort of EMS-attended adult cardiac arrests (n=7265) from 1983 through 2000 in King County, Washington, to assess the association between survival to hospital discharge and 3 distinct CPR groups: no bystander CPR before EMS arrival (no bystander CPR), bystander CPR before EMS arrival requiring dispatcher instruction (dispatcher-assisted bystander CPR), and bystander CPR before EMS arrival not requiring dispatcher instruction (bystander CPR without dispatcher assistance). In this cohort, 44.1% received no bystander CPR before EMS arrival, 25.7% received dispatcher-assisted bystander CPR, and 30.2% received bystander CPR without dispatcher assistance. Overall survival was 15.3%. Using no bystander CPR as the reference group, the multivariate adjusted odds ratio of survival was 1.45 (95% confidence interval [CI], 1.21, 1.73) for dispatcher-assisted bystander CPR and 1.69 (95% CI, 1.42, 2.01) for bystander CPR without dispatcher assistance.

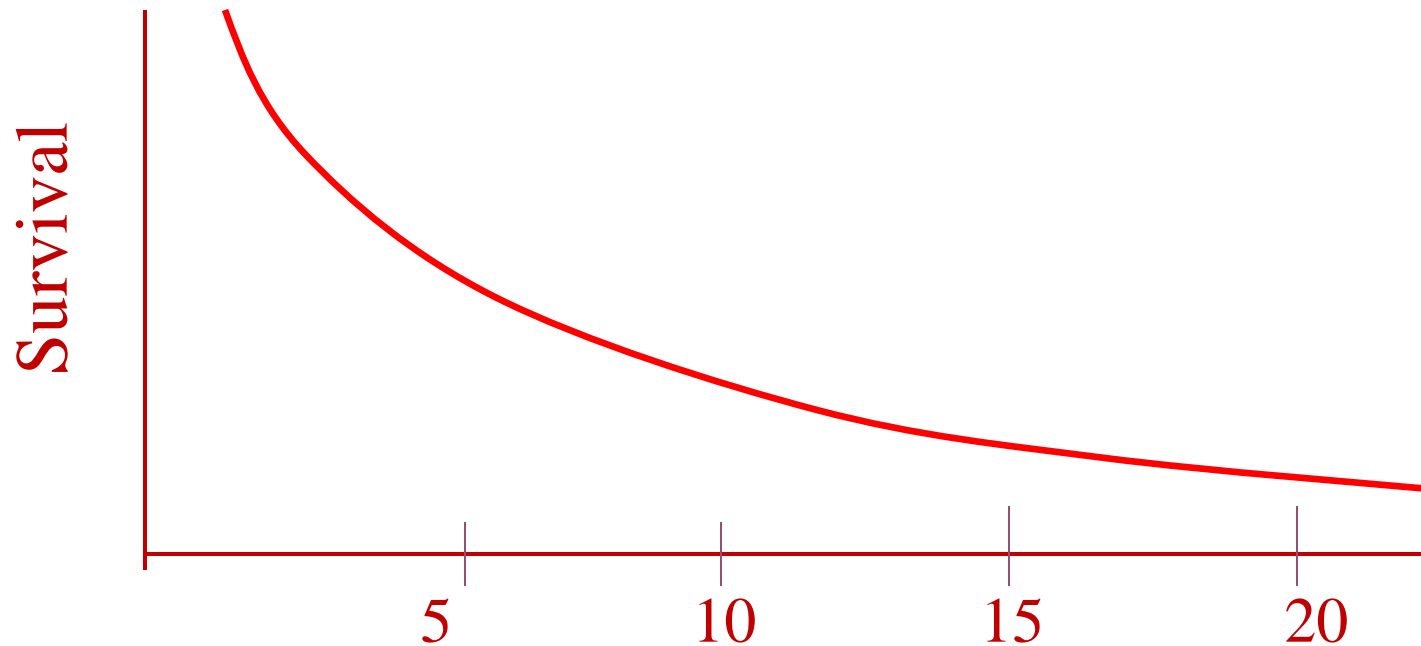
A Dismal Reality

8 %

The Race is On ...

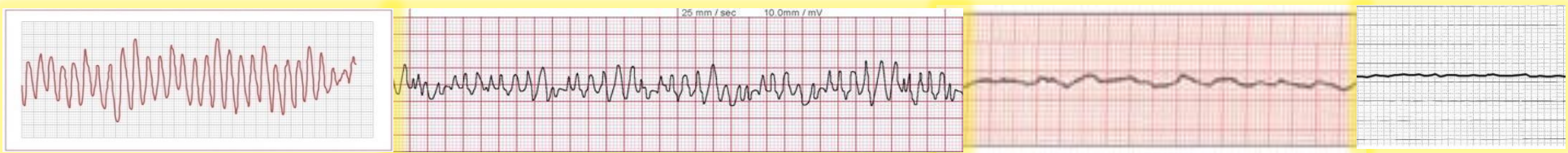
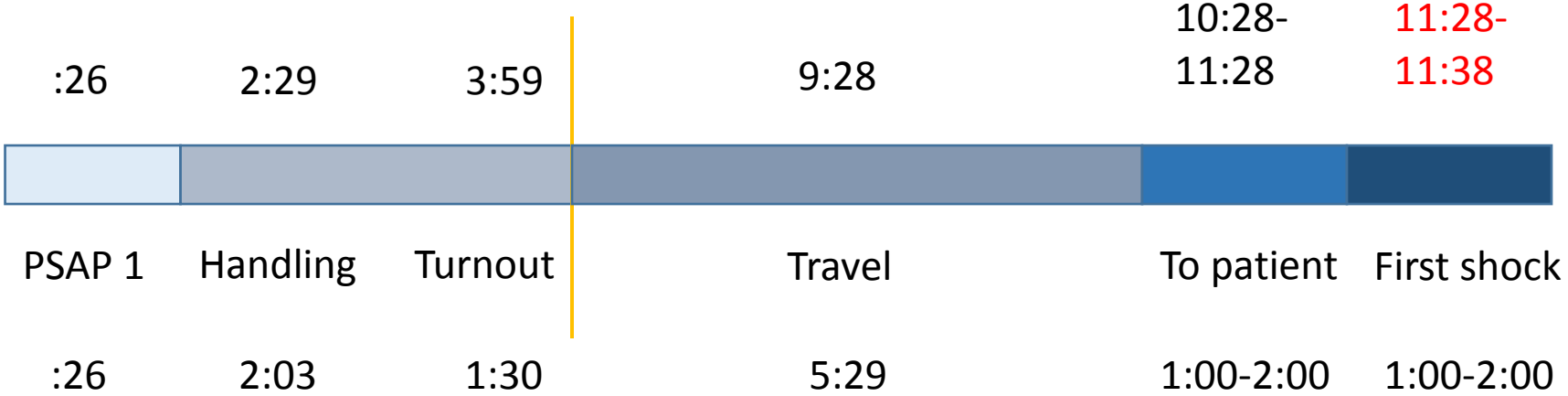


Chances of survival decrease 7-10% for every minute without CPR



A Case-Level View

Typical Urban EMS Response Timeline in Minutes



Why T-CPR?

Importance of Bystander CPR

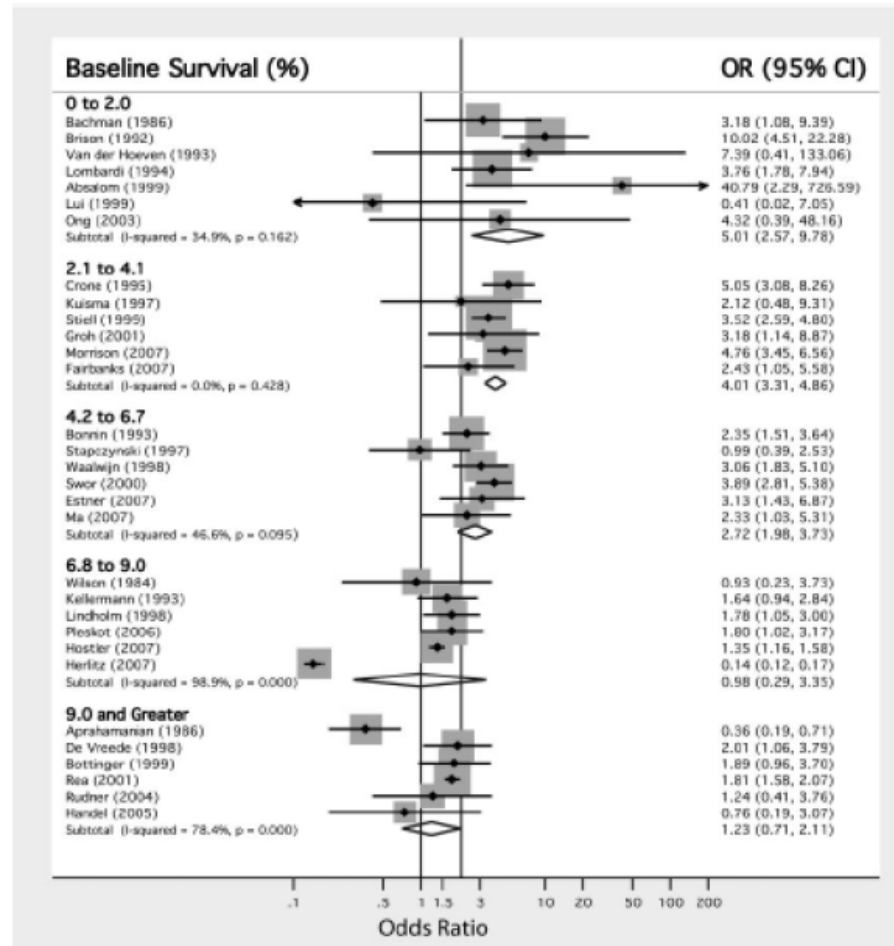
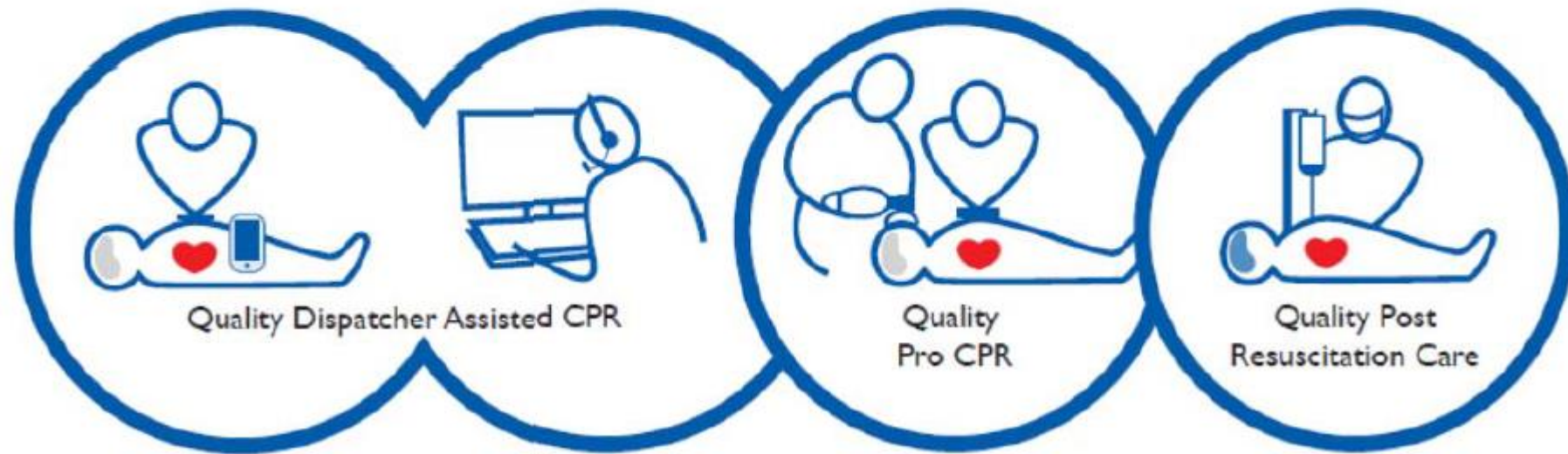


Figure 5. Forest plot of studies reporting bystander CPR stratified by baseline survival.

The OR for Bystander CPR was **2.44** (95% CI, 1.69-3.19)

(Sasson et. al. *Circulation: Cardiovascular Quality and Outcomes* Nov. 2009.)

The Anchor Link in Chain of Survival



Quality Improvement Program

Six key process measures:

1. % cases arrest recognized
2. % cases CPR instructions started
3. % cases compressions started
4. Time to recognition
5. Time to start of CPR instructions
6. Time to first bystander compression

PATIENT

Patient Age (Numeric, C/Child, A/Adult)

Conscious

Breathing Normally?

Agonals Heard?

Timestamp

 :

Agonals Described?

Timestamp

 :

Agonals Description

- Gasping
- Groaning
- Gurgling
- Heavy
- Labored
- Moaning
- ...

Other Agonal Description

Patient Status Change?

TIME MEASURES

Timestamp QI Recognized need for CPR

 :

Timestamp dispatch requested patient be placed on back

 :

Timestamp dispatch recognized need for CPR

 :

Timestamp Dispatcher began instructions

 :

Timestamp to first compressions

 :

Timestamp to first rescue breaths

 :

If Secondary Breathing Assessment:

Timestamp to Start Assessment

 :

Timestamp to End Assessment

 :

Timestamp to end of call

 :

BARRIERS TO CPR

If CPR Was Delayed or Was Not Given:

Caller left the phone

Caller not with patient

CPR already in progress

Patient's status changed

Refused CPR instructions

Why were CPR instructions refused

- NA
- Afraid to hurt patient
- Didn't think CPR was needed
- DNR
- Trained rescuer was present
- CPR already in progress
- ...

Dangerous Environment

Unable to calm caller

Difficult access to patient

Language line use

Language Barrier

Language was:

CPR not indicated

Obviously dead

Dispatcher didn't recognize need for CPR

Unable to get patient to hard, flat surface

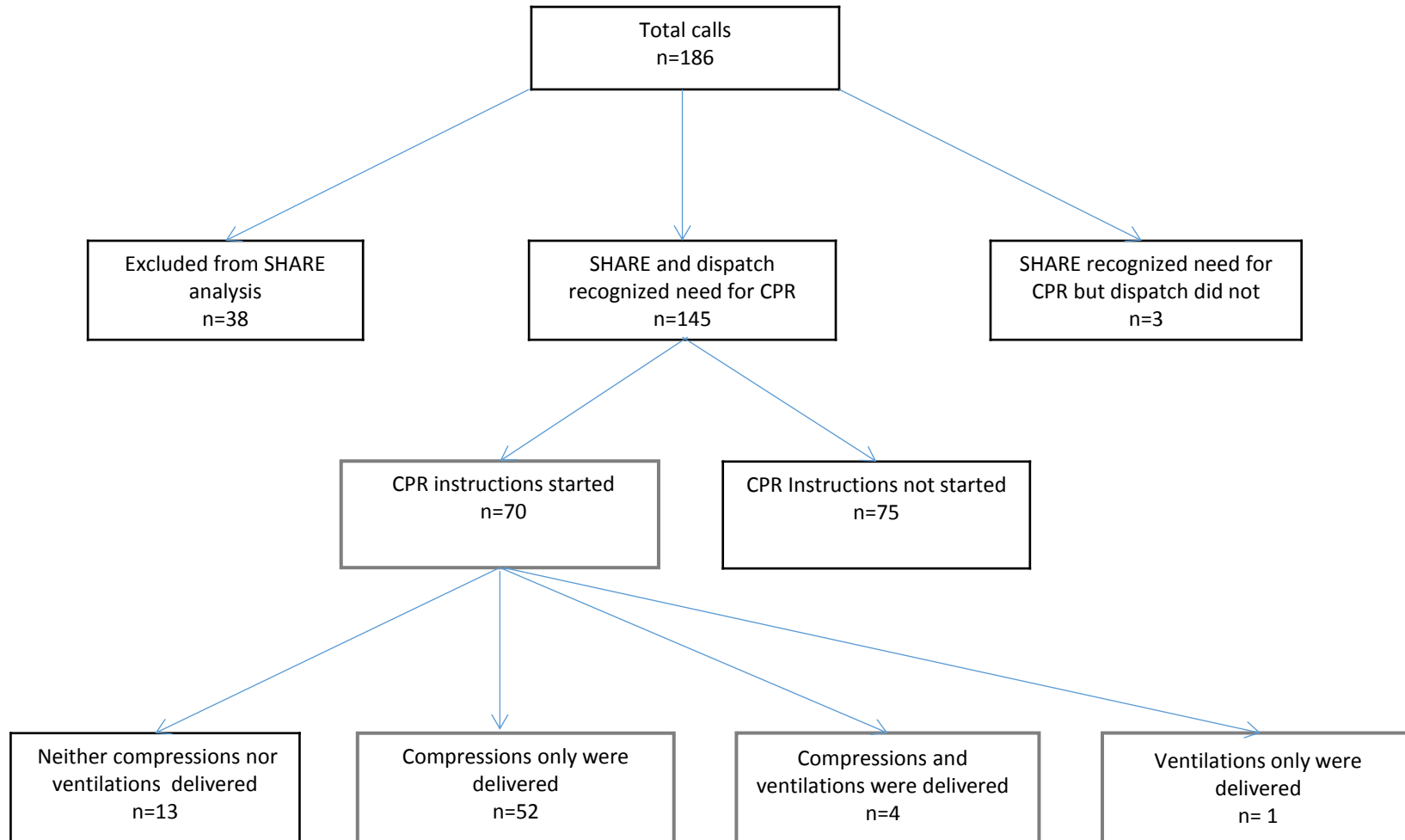
Caller physically unable to perform CPR

Caller hung up phone

Other

Other, explain:

Breakdown of Total Calls



Protocol

- Implemented AHA guideline-based protocols:
 - Focus on 2-Question Model
 - Is the patient conscious?
 - Is the patient breathing normally?
- Emphasis on early ID of gasping, being assertive, and starting CPR as early as possible

AHA Scientific Statement

**Emergency Medical Service Dispatch Cardiopulmonary
Resuscitation Prearrival Instructions to Improve Survival
From Out-of-Hospital Cardiac Arrest**

A Scientific Statement From the American Heart Association

Importance of the First Link

Description and Recognition of an Out-of-Hospital Cardiac Arrest in an Emergency Call

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Background—The content of emergency calls for suspected cardiac arrest is rarely analyzed. This study investigated the recognition of a cardiac arrest by dispatchers and its influence on survival rates.

Methods and Results—During 8 months, voice recordings of 14 800 consecutive emergency calls were collected to audit content and cardiac arrest recognition. The presence of cardiac arrest during the call was assessed from the ambulance crew report. Included calls were placed by laypersons on site and did not involve trauma. Prevalence of cardiac arrest was 3.0%. Of the 285 cardiac arrests, 82 (29%) were not recognized during the call, and 64 of 267 suspected calls (24%) were not cardiac arrest. We analyzed a random sample (n=506) of 9230 control calls. Three-month survival was 5% when a cardiac arrest was not recognized versus 14% when it was recognized ($P=0.04$). If the dispatcher did not recognize the cardiac arrest, the ambulance was dispatched a mean of 0.94 minute later ($P<0.001$) and arrived 1.40 minutes later on scene ($P=0.01$) compared with recognized calls. The main reason for not recognizing the cardiac arrest was not asking if the patient was breathing (42 of 82) and not asking to describe the type of breathing (16 of 82). Normal breathing was never mentioned in true cardiac arrest calls. A logistic regression model identified spontaneous trigger words like facial color that could contribute to cardiac arrest recognition (odds ratio, 7.8 to 9.7).

Conclusions—Not recognizing a cardiac arrest during emergency calls decreases survival. Spontaneous words that the caller uses to describe the patient may aid in faster and better recognition of a cardiac arrest. (*Circulation*. 2009;119:2096-2102.)

Key Words: cardiopulmonary resuscitation ■ death, sudden ■ heart arrest ■ resuscitation ■ survival

“Three-month survival was 5% when a cardiac arrest was not recognized versus 14 % when it was recognized.”

Signs of Cardiac Arrest

- Sudden, unexpected collapse
- Unconsciousness, NO sign of life
- Abnormal breathing (**gasp**ing) common
- **Brief seizure** - lack of oxygen to brain

Taking the Lead: Controlling the Call

- Active Listening: The First Seconds
 - Caller often volunteers 2/3 of critical information
- Callers are often frantic
 - Be ASSERTIVE
 - Be CALM
- Tell them help is on the way
- Get and use caller's name
 - Establishes trust

Taking the Lead: The Right Approach – AHA's Two Question Model

- Is the patient conscious?
 - If necessary, ask if “responsive” or “awake”
 - If necessary, ask to speak to patient
- Is the patient breathing NORMALLY?
 - Allows you to catch agonal breathing
- If “no” to both, start CPR instructions^{1,2}
 - Be assertive: Don't ask – TELL
 - “You need to do CPR, I will help you”

What to Avoid

- Extra questions which delay the identification of cardiac arrest and initiation of CPR



Taking the Lead in Identifying Cardiac Arrest Over the Phone: A Summary

- Be calm & assertive to control the call
- Identify cardiac arrest using 2-question model
- Provide appropriate Compression-Only CPR instructions for adults
- Start CPR as early as possible
 - Goal within 2 minutes of call receipt

What is agonal breathing?

- **Agonal breathing** is an abnormal pattern of breathing characterized by shallow, slow (3-4 per minute), irregular inspirations followed by irregular pauses. They may also be characterized as grasping, labored breathing, accompanied by strange vocalizations and myoclonus.
- The cause for agonal breathing is due to **cerebral ischemia, due to extreme hypoxia or even anoxia.**

How common is agonal breathing?

- 40% (196/445) Dispatch records
- 55% of witnessed cases
 - Clark Ann Emerg Med 1992
- 39% (44/113) Witnessed and unwitnessed, dispatch text files
- After EMS arrival, n=1218:
 - < 7 min. 20% (73/363)
 - 7-9 min. 14% (50/360)
 - > 9 min. 7 % (25/338)
 - Bobrow Circulation 2008
- 38% (38/100) Dispatch records
 - Bång Resusc 2003

Survival

- The presence of agonal breathing indicates a **more favorable prognosis** than in cases of cardiac arrest without agonal breathing:
- 27% of patients with agonal breathing were discharged alive compared with 9% without them (p<.001)
 - Clark Ann Emerg Med 1992
- 28% vs 8% (adjusted OR 3.4 95% CI 2.2, 5.2)
 - Bobrow Circ 2008

How does it present in emergency calls?

- Audible examples
- Description: "he's making noises" ... "humming ... like a humming sound"
- Description: "he's gasping for air"
- Description: "he's snoring like he's in a deep sleep"
- Descriptor: "she's moaning"
- Descriptor: "she's groaning"

Conclusion

- Agonal breathing is a positive prognostic sign and is associated with patient survival
- Agonal breathing has different manifestations but is always NOT NORMAL

	<u>BARRIER</u>	<u>TACTIC</u>
1	Bystander panicked, making CPR instruction problematic	Use confidence and assertiveness to take control of the situation
2	Bystander squeamish about M-T- M contact	Provide compression-only instructions
3	Bystander fears legal ramification	Assure bystander of Good Samaritan laws safeguarding citizen action
4	Bystander fearful of hurting the patient in getting them to a the floor.	<u>TELL</u> bystander he <u>MUST</u> . Engage help if multiple rescuers present. Use pillows.
5	Bystander fears CPR will hurt patient	Assure bystander that CPR is safe and won't hurt patient

Barrier: Bystander Panic

- Bystander panic, which could well be expected in the cardiac arrest of a family member, was identified as the most frequent reason for CPR nonprovision.

* Swor et al. Acad Emerg Med 2006

- High stress and panicked situations can lead to a breakdown in communication between dispatch and bystander.

Tactic: Use Confident Assertiveness

- 75 % of recently-trained bystanders stated that instructions from a dispatcher would make it easier for them to start CPR.

* Axelsson et al. Resuscitation 2000

- The dispatcher's stern confidence in the situation becomes the bystander's confidence when coached assertively.
- Assertiveness is key!

Barrier: Squeamish about M-T-M CPR

- Bystanders often hesitate or are resistant when confronted with the idea of performing CPR with mouth-to-mouth breathing.
- Without clear verbal specification of chest compression-only CPR, it's reasonable to believe bystanders will think M-T-M when you say CPR.

Tactic: Compression-Only

- Instruct Compression-Only
 - Use key phrases like:
 - **“No Mouth-to-Mouth”**
 - **“No Breaths”**
 - **“Only Chest Compressions”**
 - Tell the bystander that the patient needs chest compressions
 - Or... just begin step-by-step compression-only instructions

Barrier: Getting the Patient to the Floor

- In more than 40% of calls where there is a barrier to starting CPR, the barrier is that the caller can't get the patient to the floor.
- Most frequently the patient needs to be moved from the bed to floor.

Tactic: Emphasize the emergency situation.

- Assert that no injury to the patient is comparable or relevant when facing a suspected cardiac arrest.
- Instruct the help of other bystanders around.
- When encountering a barrier, bystanders are 3.4 times more likely to overcome the barrier and start compressions when there are multiple bystanders present (95% OR CI: 2.01, 5.67).
- Tell the bystander to push, pull, tug, or roll the patient to a hard, flat surface.

Getting the patient to the floor

Pillow Method:

1. Put pillow on floor where available
2. Bring patient's legs to floor
3. Bring patient's head down onto pillow

Barrier: Fearful of CPR hurting the patient

- Thoughts of harming the patient can instill fear in the rescuer which may hinder the start of compressions.
- Noises from compressions may lead the rescuer to believe they are hurting the patient.

Justification

Dispatcher-Assisted Cardiopulmonary Resuscitation Risks for Patients Not in Cardiac Arrest

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Background—Dispatcher-assisted cardiopulmonary resuscitation (CPR) instructions can increase bystander CPR and thereby increase the rate of survival from cardiac arrest. The risk of bystander CPR for patients not in arrest is uncertain and has implications for how assertive dispatch is in instructing CPR. We determined the frequency of dispatcher-assisted CPR for patients not in arrest and the frequency and severity of injury related to chest compressions.

Methods and Results—The investigation was a prospective cohort study of adult patients not in cardiac arrest for whom dispatchers provided CPR instructions in King County, Washington, between June 1, 2004, and January 31, 2007. The study focused on those who received chest compressions. Information was collected through review of the audio and written dispatch report, written emergency medical services report, hospital record, and telephone survey. Of the 1700 patients for whom dispatcher CPR instructions were initiated, 55% (938 of 1700) were in arrest, 45% (762 of 1700) were not in arrest, and 18% (313 of 1700) were not in arrest and received bystander chest compressions. Of the 247 not in arrest who received chest compressions and had complete outcome ascertainment, 12% (29 of 247) experienced discomfort, and 2% (6 of 247) sustained injuries likely or possibly caused by bystander CPR. Only 2% (5 of 247) suffered a fracture, and no patients suffered visceral organ injury.

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Focus: Creating & Maintaining CPR Quality

“Continuous Coaching”

Keep going. Push **HARD AND FAST AND COUNT OUT LOUD**. I'll stay on the phone. Keep going until help arrives.

- If caller is tired, ask if they are keeping their arms straight. If necessary, suggest a short rest but tell them to resume compressions as soon as possible.
- If the caller reports vomiting, tell him/her to turn the patient's head to one side and sweep out the contents of patient's mouth with fingers and resume compressions.

Continuous Coaching: Tactics & Tips

- Count out rate at 100 beats/minute
 - The beat to the disco classic “Stayin’ Alive”
- Let caller take over counting
 - Allows you to monitor and speed rate if needed
- Remind rescuer to press “hard and fast”
- Shhhhh! Don’t talk too much!
 - Let rescuers focus on what they’re doing!
- Tell them to switch if tired & multiple rescuers
 - Research at Laerdal suggests elderly rescuers can perform quality compressions for up to 10 minutes
- Stay with caller until EMS takes over

CPR Quality Matters!

Conclusion.—The association between bystander CPR and survival in out-of-hospital cardiac arrest appears to be confounded by CPR quality. Effective CPR is independently associated with a quantitatively and statistically significant improvement in survival.

(JAMA. 1995;274:1922-1925)

The quality of bystander CPR affected the hospital discharge rate after prehospital cardiac arrest. Good bystander CPR was associated with a higher proportion of patients who left the hospital alive than no good bystander CPR or no bystander CPR at all.

Resuscitation 28 (1994) 195-203

ADHS recommendation on AEDs

- Ask if an AED is available only if the event is in a public place with more than one rescuer present. If using an AED, instruct the rescuers to bare the patient's chest.

Regional Variation in Survival

Nichol JAMA 2008

