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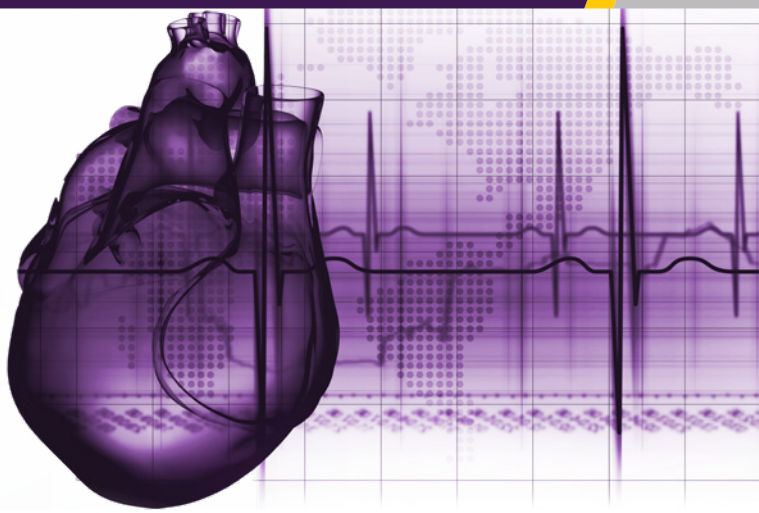
EMERGENCY DISPATCH RESEARCH AT WORK

RESEARCH BRIEF



WHEN PROVIDED WITH EXPERT, SCRIPTED INSTRUCTIONS BY AN EMD OVER THE PHONE, A LAYPERSON-CALLER CAN CORRECTLY DETERMINE A PATIENT'S PULSE RATE.

Measuring a pulse

FIRST: Count the number of beats in 15 seconds.

SECOND: Multiply that count by 4.

HOW WELL DOES THE PULSE CHECK DIAGNOSTIC TOOL (PCDxT) WORK?

Extremely well! In a study of PCDxT, most layperson-callers were able to accurately measure the pulse rates of patients.

The problem of measuring a pulse. A heart rate is the rate at which a heart beats. A pulse rate is the actual count of that heartbeat creating an actual, physically determinable felt pulse. **Electrical heart rate and peripheral pulse are not always the same.** Measuring a physical pulse can give us important information about the health of a patient, such as signaling that a person has an infection or is dehydrated. For emergency medical dispatchers (EMDs) in particular, **the pulse rate can tell us about the potential severity** of the patient's condition and **what type of prehospital help** is needed.

There are many places on a body where you can locate a pulse. Two locations that are commonly used are the **radial artery in the wrist** and the **carotid artery in the neck**.

Radial Artery

Carotid Artery

Once the pulse is found, you can measure the beats per minute with a little bit of counting and arithmetic. A common method is to **1) count the number of beats in 15 seconds**, then **2) multiply that count by 4**.

Even though this method sounds simple, in practice there are many problems associated with correctly determining a patient's pulse rate. For instance, a person might not know where to look for the pulse, or if they find a pulse, they may press their fingers too hard and obstruct blood flow. During counting, some might confuse beats with seconds, resulting in a not-so-useful count of beats per beat, rather than a more useful count of beats per minute. Overall, the literature suggests that **even EMTs or paramedics can have trouble** accurately measuring pulse rates.[1]

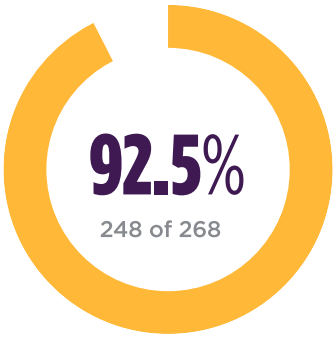
Enter the Medical Priority Dispatch System™ (MPDS®). This system provides EMDs with a Tool (the PCDxT) to help a 911 caller locate a pulse then accurately measure its rate of beating. While the pulse check key question has been on P-19 since 1986, the electronic diagnostic process has been an essential part of the protocol since 2004. But a skeptic might ask, does it work? And, how well? **A scientific optimist asks, how can we make it better**.

A scientifically tested solution. A research team from the International Academies of Emergency Dispatch® (IAED™) scientifically examined the PCDxT, a long-used solution to the problem of measuring a patient's pulse over the phone.[2] Using a pre-designed simulation approach that included mock patients who were healthy and conscious, the team looked at two critical aspects of the PCDxT: **1) its ability to help callers find the patient pulse**, and **2) the accuracy of pulse rate determining measures after the pulse is found**.

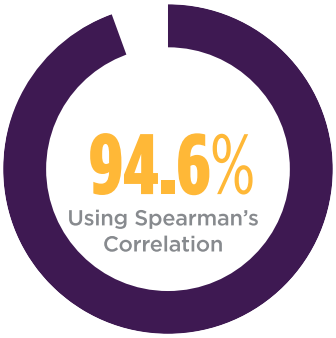
Of the 268 layperson-callers that participated in the study, **248 (92.5%) found the pulse of the mock patient** (albeit healthy) with the assistance of the PCDxT (and the EMD).

Overall, how quickly did these participants find these pulses? **The median time to detect a pulse was 15 seconds**. The average time was slightly longer, 18.3 seconds. The median time is the middle value if you were to lay out all the recorded times from shortest to longest in a row.

Finally, the team determined how accurate these pulse rates were by comparing measurements of pulse rates done by layperson-callers with measurements done by electrocardiogram (ECG) monitor of the same patients. Using a statistical method called Spearman's correlation, they found that **the layperson-caller measurements were very highly correlated with the ECG measurements (94.6% correlated)**.



PCDxT Assist



Correlation Accuracy with ECG

One limitation of this study is that it was done with 2nd party callers only. Could a 1st party caller check his or her own pulse? Likely yes. You may want to try this on yourself using the instructions in the PCDxT.

What does it all mean? The study showed that, with assistance of EMDs using the PCDxT, layperson-callers usually can find the pulses of patients **within a reasonably short amount of time**. Not only that, but **the measurements of these pulses tend to be very accurate**. For those who have used the Tool or will use it, be reassured that the PCDxT is indeed a **scientifically tested solution**.

Using the PCDxT in the MPDS. In the MPDS, the PCDxT is used on Protocol 19 (Heart Problems/A.I.C.D.) **to distinguish between the ALPHA-level determinant coding of 19-A-1 and the higher CHARLIE-level determinant coding of 19-C-6**. A heart rate under 50 beats per minute or 130 and above is considered clinically abnormal and will require assessment by an Advanced Life Support (ALS) crew, hence the higher-level code for patients in this category.

FOR MORE INFORMATION:

1. Eberle B, Dick WF, Schneider T, Wisser G, Doetsch S, Tzanova I. Checking the carotid pulse check: diagnostic accuracy of first responders in patients with and without a pulse. Resuscitation. 1996;33(2):107-116. doi:10.1016/s0300-9572(96)01016-7
2. Scott G, Clawson J, Rector M, Massengale D, Thompson M, Patterson B, Olola CH. The accuracy of emergency medical dispatcher-assisted layperson-caller pulse check using the medical priority dispatch system protocol. Prehosp Disaster Med. 2012;27(3):252-259. doi:10.1017/S1049023X12000805

TAKE THE QUIZ FOR CDE CREDIT:

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- LOG IN with your Username and Password, click COURSES, and click RESEARCH BRIEF

Pulse Check Evolution on Protocol 19

1979	**v1: Nothing** regarding Pulse or Heart Rate
1983	**v3: Heart rate?** Paraphrased Key Question
1986	**v8: Can you take a pulse?** Full Key Question with PDI Instructions
1990	**v10: I want you to take his/her pulse (heart rate).** Key Statement with PDI Instructions
1995	**v10.2: I want you to take her/his pulse (heart rate).** Key Statement with AI Instructions and new Rule 1
2006	**v11.3: I'm going to tell you how to check her/his pulse (heart rate).** ***(Read Instructions below or use the Pulse Check pop-up tool.)*** Key Statements with AI Instructions and modified Rule 1
2012	**v12.2: I'm going to tell you how to check her/his pulse (heart rate). Get right next to her/him.** Key Statements with AI Instructions and modified Rule 1
2019	**v13.2: I'm going to tell you how to check her/his pulse (heart rate). Get right next to her/him.** Key Statements with new Answer Choice: **Heart rate reported by caller**

NOTE: This list doesn't include any of the actual changes that have been made within the Pulse Rate Dx itself over time.

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