

CASE STUDY

Using Ambu® BlueSensor P electrocardiogram (ECG) electrodes in the pre-hospital emergency setting



About London Ambulance Service NHS Trust

The London Ambulance Service is the busiest emergency ambulance service in the UK, answering more than two million 999 calls a year with crews attending more than 3000 emergencies per day. It is the only NHS provider trust to serve the whole of London and the nine million people who live in, work in or visit the city.

The trust aims to provide patients with the highest quality of care, which will contribute towards Londoners having health outcomes that are amongst the best in the world.

Pre-hospital challenges: Poor electrode adhesion

The main goal of the pre-hospital ECG is to generate an early diagnosis of acute ST-elevation myocardial infarction (STEMI).¹ Although the ECG is non-invasive and easy to perform, the correct interpretation of cardiac pathologies can be challenging, evidenced by the incidences of 'false-positive' triages.² One cause of 'false positive' triage is the presence of artefacts in ECG signals, which can lead to misleading interpretations of cardiovascular status, resulting in the incorrect activations of emergency services. These incidents can have both clinical and financial ramifications to health care systems.²

There are various causes of ECG signal artefacts, and one of the key problems for the emergency services is the artefacts caused by poor skin contact due to inappropriate adhesion. The electrode may slide due to the sweat and movement of a patient, causing the electrode to lose contact with the skin if the ECG electrode fails to provide adequate adhesion.³

Simple tasks that are routine in hospitals become increasingly difficult in the back of an active ambulance, as patients are exposed to unstable circumstances due to the vehicle's movement and vibration during emergency transportation. Using high-quality electrodes ensures good contact between the skin and electrode which is critical for ambulance services due to the confined space, high occupancy rates, and minimal downtime.

The London Ambulance Service was not exempt from these challenges. Mr. Fisher, a London Ambulance Service Paramedic Incident Response Officer, who frequently attends to a varying scope of patients in the pre-hospital emergency setting, had stated that for several years the ECG dots in use were of poor quality as the adhesive properties were not appropriate for the pre-hospital setting. In the pre-hospital emergency setting, time is of the essence, leaving no margin for errors caused by poor electrode adhesion.

"The adhesion and gel are very good"



Ensures excellent trace quality

Benefits of BlueSensor P ECG electrode: The perspective of a London Ambulance Service Paramedic

According to Mr. Fisher, there are multiple advantages to using the BlueSensor P ECG electrode. As a result of sweat on the skin surface or repositioning of the ECG, adhesion can be lost, particularly in diaphoretic patients. This process can result in the need to discard and replace the problematic electrodes. Mr. Fisher conveyed that having to replace dots due to perspiring patients had reduced, resulting in a potential cost saving since the introduction of the BlueSensor P ECG electrode.

Speaking on behalf of himself and his colleagues, who have had the experience of using the old-style dots, Mr. Fisher suggested that collectively they most definitely preferred the BlueSensor P ECG electrode product. He also said: **"The number of dots in the package (12) is far more suitable to our pre-hospital requirements, this has cut down on wastage also."**



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The ideal solution: BlueSensor P ECG electrode

The BlueSensor P ECG electrode features highly conductive wet gel, superior adhesion, and silver/silver sensor to ensure optimal signal quality during short to medium-term monitoring applications. The comfortable foam backing material means the electrode is gentle to the skin, alongside the offset connector that prevents artefacts from disturbing the readout and allows for movement of the connected cable without affecting the electrode's performance. These attributes are just a few of the many reasons the BlueSensor P ECG electrode is well equipped to cater to the different patient profiles encountered in the highly pressurised, pre-hospital emergency setting. The BlueSensor is the world's most time and cost-efficient range of electrodes that deliver unmatched readings, user convenience, and patient comfort, ensuring that workflow is not disrupted by false alarms and time is not wasted resolving issues concerning electrode adhesion.

Mr. Fisher expressed that they have been using BlueSensor P ECG electrodes continuously over the past 5 years and since switching to this device, the ECG signal artefacts and poor traces due to inappropriate adhesion had reduced considerably.

"less artefact leads to better diagnosis"

The outcome: improved diagnosis

Improving pre-hospital ECG diagnostic performance will translate into significant patient benefit. When Mr. Fisher was asked directly about the impact of the product, he replied by saying there was increased ECG interpretation and fewer artefacts, thus leading to a better diagnosis. He added: **"For better ECG interpretation with less artefact I would highly recommend this product"**

Key Features

- Highly conductive wet gel - ensures reliable traces
- Superior adhesion - prevents false alarms
- Comfortable foam backing - is easy to use
- Unique offset connector - prevents artifacts from disrupting the readouts
- High quality Ag/AgCl sensor - ensures excellent trace quality

References:

- ¹ Daiber H, Sauerberg N, Gnugnoli D. EMS Utilization Of Electrocardiogram In The Field. StatPearls. 2020.
- ² Swan PY, Nighswonger B, Boswell GL, Stratton SJ. Factors associated with false-positive emergency medical services triage for percutaneous coronary intervention. West J Emerg Med. 2009;10(4):208-12.
- ³ Ghaleb FA, Kamat MB, Salleh M, Rohani MF, Abd Razak S. Two-stage motion artefact reduction algorithm for electrocardiogram using weighted adaptive noise cancelling and recursive Hampel filter. PLoS One. 2018;13(11):e0207176.