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Spoiler Alert

Is the eCall emergency alerting system fulfilling its road safety promise?

Dr Nick Reed
Reed Mobility

August 2025

The Royal Automobile Club Foundation for Motoring Ltd is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

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About the Author

Dr Nick Reed, is a chartered scientist and psychologist who led research as Academy Director at TRL (the UK's Transport Research Laboratory) and as Head of Mobility R&D at Bosch (the world's largest automotive supplier). In 2019, he established Reed Mobility to work independently on road safety and transport technology projects. From 2021-2024, Nick was National Highways' first ever independent Chief Road Safety Adviser and thereafter was recruited to the Department for Transport Science Advisory Council. Active in road safety research for more than twenty years and with more than 100 published papers and articles, he is a Fellow of the Chartered Institution of Highways and Transportation and a Member of the Association for Road Risk Management. In 2024, Nick received the Kevin Storey Award for Outstanding Commitment to Road Safety from the charity, Brake.

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Disclaimer

This report has been prepared for the RAC Foundation by Dr Nick Reed. Any errors or omissions are the author's sole responsibility.

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Foreword

At a time when every possible avenue should be explored to reverse the rise in road casualties, eCall stands out as a tool with untapped potential that deserves renewed attention.

Originally conceived as a means of alerting emergency services to the location of crashes in relatively remote areas, eCall may not, at first glance, seem an obvious solution to our road safety challenges – it is not, in itself, likely to be a game-changer on the scale of seatbelt wearing. Yet it could still play a valuable role beyond its original purpose – one significant enough to warrant addressing the two very important questions this report begs.

The first question is whether the most useful data is being conveyed swiftly to the responders who need it most. Could the protocols established by the 999-112 Liaison Committee be improved, and perhaps be augmented with training, to ensure the 'workflow' mapped out in this report functions effectively in practice? Does the system's design fully recognise the potentially crucial role that other responders (particularly National Highways' Traffic Officers) might play in reacting quickly to prevent a collision? For instance, when a vehicle has come to a stop in a live lane on a motorway, early intervention can be critical. This does not appear to be a matter of technical or regulatory change, but rather one of working practices, practices that could be reviewed and refined at relatively minimal cost.

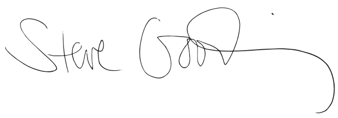
The second question is whether we are making full use of the system's potential to enable drivers to alert the emergency services when they witness an incident. This could include a crash that has already happened in a live-lane, or pedestrians spotted on a motorway verge. eCall offers clear advantages for such notifications: it does not require the driver to use their own mobile phone (something the DfT rightly discourages) and it automatically generates accurate location data.

Whilst there is the need to address the issue of false alarms and risk of misuse, eCall presents a promising channel for sourcing information that could complement initiatives such as stopped-vehicle detection and traffic-camera surveillance – while routine vehicle breakdowns should not prompt 999 calls, we know only too well that a breakdown in a dangerous location can quickly escalate to something far more serious.

Nick's report raises a number of detailed issues, including the challenge of navigating the interface between our data protection rules and the pressing need to understand the detailed circumstances of road crashes. His work suggests there is, in fact, a navigable way through these concerns, which could lead to valuable insights.

Meantime, the headline message is clear: there is untapped potential in eCall that we cannot afford to overlook if we are serious about making our roads safer.

Steve Gooding



Director, RAC Foundation

Executive summary

The eCall system became mandatory in all new type-approved cars and light goods vehicles in the UK and EU from April 2018. Designed to expedite emergency response through automatic or manual crash alerts, eCall sends both a voice call and a data packet to emergency services, providing location, vehicle information and crash details. Despite near-universal installation in new vehicles and a growing presence across the UK fleet, this review questions whether eCall is fulfilling its road safety potential.

Key achievements

- **High adoption:** eCall is present in over 99.5% of new cars sold in the UK, ensuring growing market penetration and expanding coverage over time.
- **Standardisation:** Deployment follows a harmonised EU-wide technical and regulatory framework, ensuring interoperability.
- **Robust functionality:** eCall offers a critical safety function, especially in rural or concealed crash scenarios, potentially saving lives by reducing the time to first response.

System limitations

Despite its promise, eCall's impact remains limited by operational, technical and awareness-related issues:

- **False alarms:** High rates of false alarms (especially from manual activations) undermine trust and can increase the burden on emergency services. Common causes include button misuse, poor interface design, system faults and demonstration presses at dealerships. This issue also affects other devices (such as smartwatches and smartphones) offering emergency alert functionality.
- **Limited understanding and training:** Understanding of eCall's function and value could be improved for both the public and emergency responders. The system is rarely discussed during vehicle sales or driver training, and most emergency call centre staff report minimal or no formal training.
- **Emergency response integration:** Although improvement work is ongoing, the Minimum Set of Data (MSD) transmitted with an eCall is not fully exploited by emergency services. The current Public Safety Answering Point (PSAP) system, managed by BT and working to parameters specified by the 999-112 Liaison Committee, is limited in its ability to fully process and distribute eCall data effectively, particularly from third-party service providers (TPSPs).
- **Data use and access issues:** Concerns about data privacy and system constraints limit the ability of stakeholders, such as National Highways, to access or use eCall data for road safety interventions and further analysis. Legacy systems and interim standards (e.g. voice-transmitted data from third-party eCall providers) introduce the potential for delays and errors that could be avoided by automated transmission of data.

- **Impact unproven:** While theoretical and simulation-based studies suggest eCall could reduce fatalities by 4–8% (Sihvola et al., 2009), there is little real-world data post-mandate to verify actual outcomes.

Key use cases highlighted

The report explores notable crash cases (e.g. Selby, Sheppey Crossing, Cardiff, Llanfrothen) where eCall, had it been installed, may have reduced casualties or improved response time. In several incidents, vehicles went undiscovered for hours or even days – scenarios where automatic eCall alerts could have dramatically changed the outcome.

Other systems providing emergency alerts

Smartphones and other devices now offer similar alerting capabilities (e.g. Apple and Google Crash Detection). While these have broader accessibility, they lack the standardised data structure and reliability of vehicle-based eCall systems and can result in false alarms (e.g. Download Festival; see Hayward, 2025). Integration and interoperability between these systems and emergency services remain weak, though they could offer complementary functionality in the future. Their growing adoption highlights the proliferation of relevant data that could be exploited to improve road safety.

Challenges ahead

2G/3G phase-out: From 2027, only 4G/5G-compatible eCall systems will be permitted in new vehicles. Without retrofitting of compatible systems, vehicles with older eCall systems (typically 2020 and earlier) will cease to offer emergency alert functionality when the 2G network is subsequently switched off (by 2033 at the latest).

Infrastructure modernisation: Upgrades such as BT's upgraded Enhanced Information System for Emergency Calls (EISEC2) and Next Generation eCall (NG-eCall) are planned, potentially offering richer data (e.g. video, medical information, real-time text (RTT) support), but these require co-ordination and investment by regulators, the emergency services and the emergency call service provider.

Recommendations

Evaluate eCall effectiveness: Conduct a systematic study on eCall's actual impact on crash outcomes, emergency response times and system efficiency in the UK.

Workflow and data review: Review and optimise the full eCall workflow from the triggering of an alert to dispatch of the emergency services. Expand data sharing to include other responders like National Highways and other road authorities under strict privacy controls.

Public and professional training: Develop awareness campaigns and integrate eCall education into driver training, vehicle sales and National Driver Offender Retraining Scheme (NDORS) courses. Provide emergency services with regular training and simulated drills.

Tackle false alarms: Improve interface design (e.g. better SOS button placement). Ensure system faults are addressed during servicing; consider making eCall functionality part of

MOT checks. Reduce misuse by standardising privacy setting interfaces that do not involve the eCall button.

System modernisation: Support rapid deployment of EISEC2 and NG-eCall. Push for automated and electronic data exchange between TPSPs and PSAPs.

Leverage eCall data: Use anonymised eCall data for broader road safety analytics (e.g. identifying crash hotspots, assessing manufacturer/system faults). Align with initiatives like International Road Assessment Programme (iRAP) and potential artificial intelligence (AI) systems trained to predict and prevent crashes.

Conclusion

The eCall system is a powerful tool that can save lives by accelerating emergency responses to collisions involving vehicles fitted with it. However, there are improvements that could be made to the UK's current implementation of eCall that could enable greater exploitation of underused data resources, deliver better understanding of eCall by users and call centre operatives, and reduce false alarm rates, thereby improving trust and efficiency. The recommendations provided outline how such improvements could be made.

1. This report

The eCall emergency alert system has been fitted to all cars and light goods vehicles type-approved from April 2018 onwards[1]. In a serious crash or in response to an in-vehicle button press, a prescribed dataset is sent to the emergency services and a voice call is opened to accelerate and enhance emergency responses to serious road crashes. The purpose of this report is to explore the extent to which the eCall system is delivering on the potential for it to improve road safety – and, if not, to identify where potential blockages may lie. It is informed by desk-based research, interviews with key stakeholders (see Appendix A) and a survey of emergency service control centre call handlers (see Appendix B).

1 There are a few new vehicles on sale today that were type-approved before April 2018 and therefore do not need to be fitted with eCall (e.g. Caterham 7).

2. Background to eCall

The concept of the ‘golden hour’ – the idea that trauma patients have a significantly higher chance of survival if they receive medical care within the first hour after injury – revolutionised emergency medicine. Popularised by a landmark paper (Cowley, 1975), this principle highlighted the critical link between timely intervention and patient outcomes. Its author, American trauma surgeon R. Adams Cowley, helped shape modern trauma systems around this insight. The idea has since been refined to the ‘platinum 15 minutes’, further emphasising the life-saving urgency of rapid medical response.

The eCall system is designed to reduce the likelihood of death and serious injury from road crashes by accelerating and enhancing the emergency response, and thereby increasing the likelihood that medical treatment will be delivered within the ‘platinum 15 minutes’ or at least within the ‘golden hour’. Importantly, the eCall connection consists of both a voice call and data packet. Even in a situation where vehicle occupants are all unconscious and there are no other observers of a crash, this data, which includes information on vehicle type and location, should direct the emergency services to the scene of the incident.

The development of eCall can be traced back more than 25 years to the launch of the European global navigation system, Galileo, where it was identified as a possible use case for the service. European Directive 2010/40/EU (European

Parliament and Council of the European Union, 2010) set out a co-ordinated approach to intelligent transport systems, including “harmonised provision for an interoperable EU-wide eCall” as a priority action. In 2012, Mercedes-Benz, working in partnership with Bosch, was an early adopter of an in-vehicle emergency service button, and the future adoption of eCall was formalised the same year with the adoption of Regulation (EU) 305/2013 (European Parliament and Council of the European Union, 2013). This supplemented Directive 2010/40/EU, mandating that all Member States develop common technical solutions and practices for emergency call services to facilitate the introduction and interoperability of the eCall service across the EU. The regulation also addressed the processing of personal data within the eCall system, ensuring compliance with data protection directives.

A variety of pilot trials across Europe followed, which led to Regulation (EU) 2015/758 (European Parliament and Council of the European Union, 2015) – the regulation that mandated the installation of eCall systems in all M1 (passenger cars) and N1 (light commercial) category vehicles type-approved from 31 March 2018.

Figure 2.1: eCall button in a 2024 Kia EV6

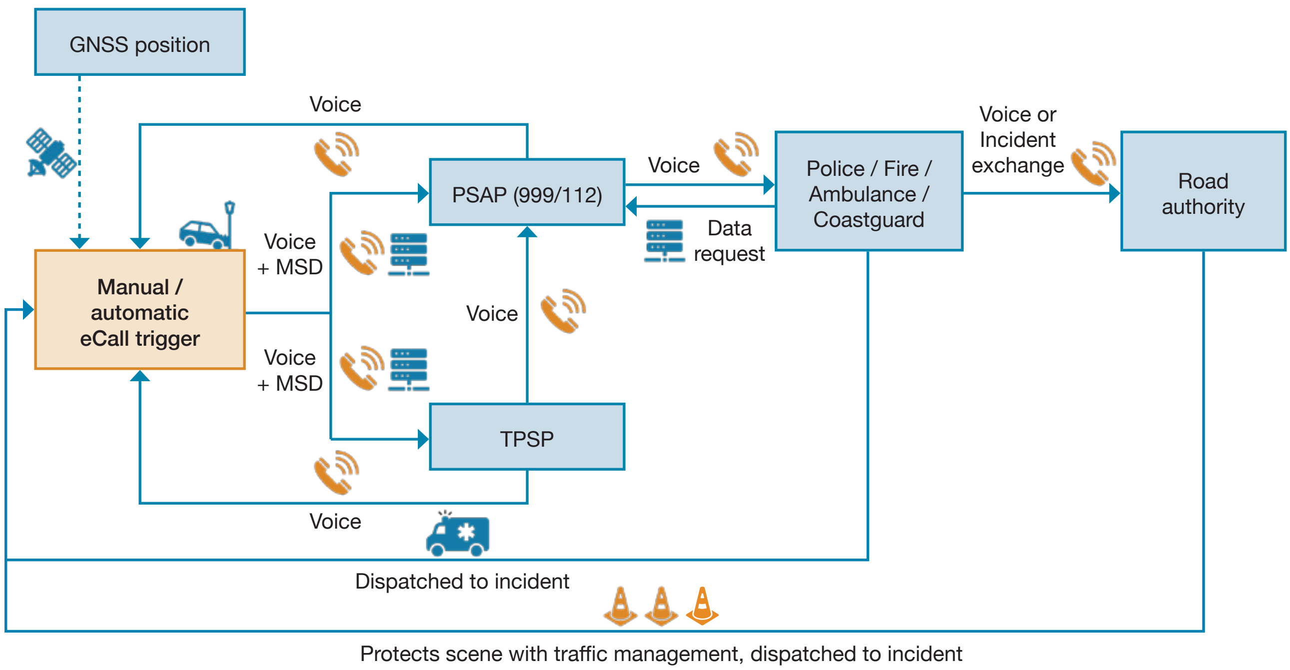
Source: VESOS

The eCall system provides direct voice and data connections from the affected vehicle(s) to a specified recipient and can be 1) triggered automatically by a severe collision (e.g. sufficient to trigger airbag deployment) or sudden changes in vehicle capability (e.g. fuel pump shutoff), or 2) activated manually by a button within the vehicle (typically labelled ‘SOS’, see Figure 2.1).

Once triggered, the system enables stranded or seriously injured vehicle occupants to speak to control room operatives. The system also delivers vehicle and incident location information to facilitate dispatch of first responders. The connection may be made direct to a Public Safety Answering Point (PSAP) – the standard emergency telephone service in the location (e.g. 999 for the UK or 112, which is the pan-European emergency services number). Alternatively, it may be mediated via a third-party service provider (TPSP), depending on the service model adopted by the vehicle manufacturer. TPSPs operate according to guidance set out in EN16102 (European Committee for Standardization, 2012), which is a standard that regulates how TPSPs manage eCall alerts and interact with PSAPs. Some manufacturers opt to use TPSPs because of the data that can be collected on vehicle incidents, the value-added services that call centres can provide, and the customer perception and relationship benefits.

Whether direct to PSAPs or via TPSPs, the data sent by eCall systems is governed by EN15722 (European Committee for Standardization, 2020), which defines the content and format of a Minimum Set of Data (MSD) to be included in the packet of information transmitted from the vehicle. Limited to a maximum of only 140 bytes of data, the standard MSD includes vehicle identification, last three locations, direction of travel, timestamp, number of passengers with fastened seat belts and other potentially relevant details like vehicle type. This data is transmitted either directly to the PSAP alongside the emergency call or to the TPSP associated with that vehicle, which then has a responsibility under EN16102 to pass that data to the PSAP as required (see Figure 2.2).

Figure 2.2: Flow diagram to show the passage of information and response following the triggering of an eCall alert



The intention of eCall alerts is to facilitate the emergency response to vehicle crashes and increase the likelihood that timely medical attention can be provided before serious, life-changing and potentially fatal injury occurs. It is particularly effective for single-vehicle incidents in rural locations where vehicle occupants may be unable to call the emergency services and where there may be few witnesses to the incident who could summon help. The activation of an eCall alert provides vehicle occupants with a voice connection to emergency responders but, even if no-one in the vehicle is able to speak, the MSD provides sufficient information to the emergency services to locate and respond to the incident.

3. eCall adoption and use

Following the emergence in the 1990s of early safety and diagnostic features based on connectivity such as GM's OnStar system in the U.S., the journey of adoption for eCall began when it was cited as a potential use case at the launch of Europe's Galileo global navigation satellite system in 1999. However, eCall had a firm focus on safety, particularly to help tackle deaths and serious injuries resulting from collisions in rural locations where the emergency services may not be summoned until long after an incident has taken place.

In the years that followed, the European Commission actively promoted the voluntary adoption of eCall systems by car manufacturers. Initial plans sought to align eCall standards and specifications by the end of 2005, undertake full scale field tests in 2006 and for all new vehicles to be fitted with the system by 2009 (European Commission, 2005a). However, the Commission soon recognised that Member States and the automotive industry were not progressing quickly enough to keep to this timeline for voluntary adoption (European Commission, 2005b), noting that:

> "…many Member States need to upgrade their electronic infrastructure to enable the emergency services to receive and process the car's location report…"
>
> (European Commission, 2005c)

By the end of 2006, an action plan was launched to try to get the voluntary adoption of eCall back on track (European Commission, 2006). But in 2009, the Commission published a note indicating a 'last call' for the voluntary approach (European Commission, 2009), with the UK cited as one of six countries that had not committed to implementation due to cost-related concerns.

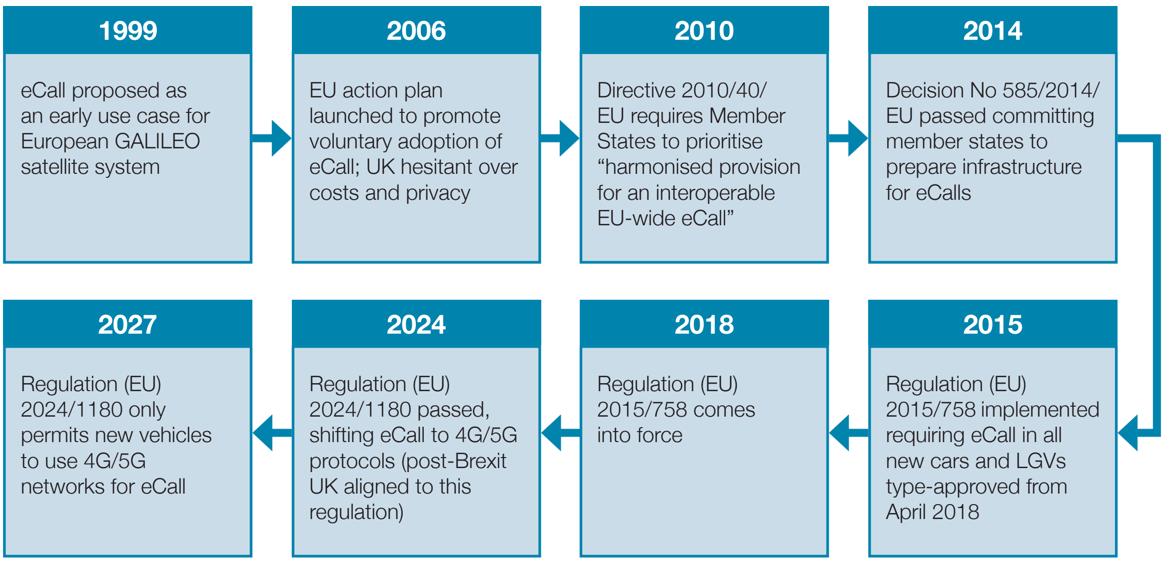
Despite this action plan, progress on a voluntary basis remained slow and so the Commission shifted focus to introducing regulations that would mandate the installation of eCall systems in new vehicles. In 2014, the Commission laid the groundwork for mandatory implementation with Decision No. 585/2014/EU, which committed Member States to preparing infrastructure for the management of eCalls (European Parliament and Council of the European Union, 2014). This specified which organisations could receive eCall data, defining these 'service partners' as public or private organisations recognised by national authorities with a role in handling incidents related to an eCall (e.g. road operator, assistance service):

> "Data can be transferred to service partners, defined as above which should be subject to the same privacy and data protection rules applicable to PSAPs."
>
> (European Parliament and Council of the European Union, 2014)

In 2015, Regulation (EU) 2015/758 was implemented, which required eCall to be fitted in all new type-approved passenger cars and light goods vehicles from 31 March 2018.

Figure 3.1 shows a timeline of key events in the adoption of eCall.

Figure 3.1: Timeline of key events in the adoption of eCall



3.1 UK adoption of eCall

Following Brexit, the UK rolled the eCall legislation into the Electronic Communication and Wireless Telegraphy (Amendment etc.) (EU Exit) Regulations 2019, Schedule 3 (United Kingdom, 2019). This amounted to no more than the substitution of references to "Member State" and "EU" with "United Kingdom" and "The Secretary of State" as appropriate, and removing references to services operating "EU-wide".

Oversight of the eCall service in the UK falls under the remit of the 999-112 Liaison Committee (999LC), which represents all users of emergency call services. This is hosted by the Department for Science Innovation and Technology (DSIT), and its members are organisations involved in delivering and managing the 999-112 service, including The Home Office, Department for Transport, Department for Health & Social Care, the emergency services, Ofcom, and the fixed and mobile communications providers. Included in this committee is BT, which is the PSAP for the UK, responsible for answering emergency calls, gathering initial information and routing calls to the appropriate emergency service (police, ambulance, fire, coastguard).

Since 2003, caller location based on mobile network cell towers has been available to the emergency services via BT's Enhanced Information System for Emergency Calls (EISEC) service (EENA, 2015). The MSD generated by eCall is converted into the EISEC format but contains only the information that the 999LC has specified should be shared with the relevant emergency services. EISEC is in the process of being upgraded (to EISEC2) and it is understood that this will support all data within the MSD and is more capable of supporting future developments of eCall as it is based on Extensible Markup Language (XML)[2]. The final specification will be overseen by the 999LC.

For reasons of data protection, eCall data is held for a limited period – the raw MSD is held for three months, while the EISEC data is accessible to the emergency services for 30 minutes before being deleted[3]. The Committee also has responsibility for the Code of Practice for the Public Emergency Call Service (PECS) between communications providers and the emergency services, which outlines the key roles and responsibilities of stakeholders involved in the conveyance of emergency calls from caller to the relevant emergency service.

To support understanding and effective use of eCall, the strategic road operator for England, National Highways, worked with the Society of Motor Manufacturers and Traders (SMMT) to develop resources that would educate the public about the purpose and use of the eCall system (National Highways, 2022a). The eCall service is particularly important for National Highways as it is responsible for high-speed roads, so it needs to be aware of vehicles stopped in vulnerable locations – the effective use of eCall can expedite the response of National Highways to such vehicles.

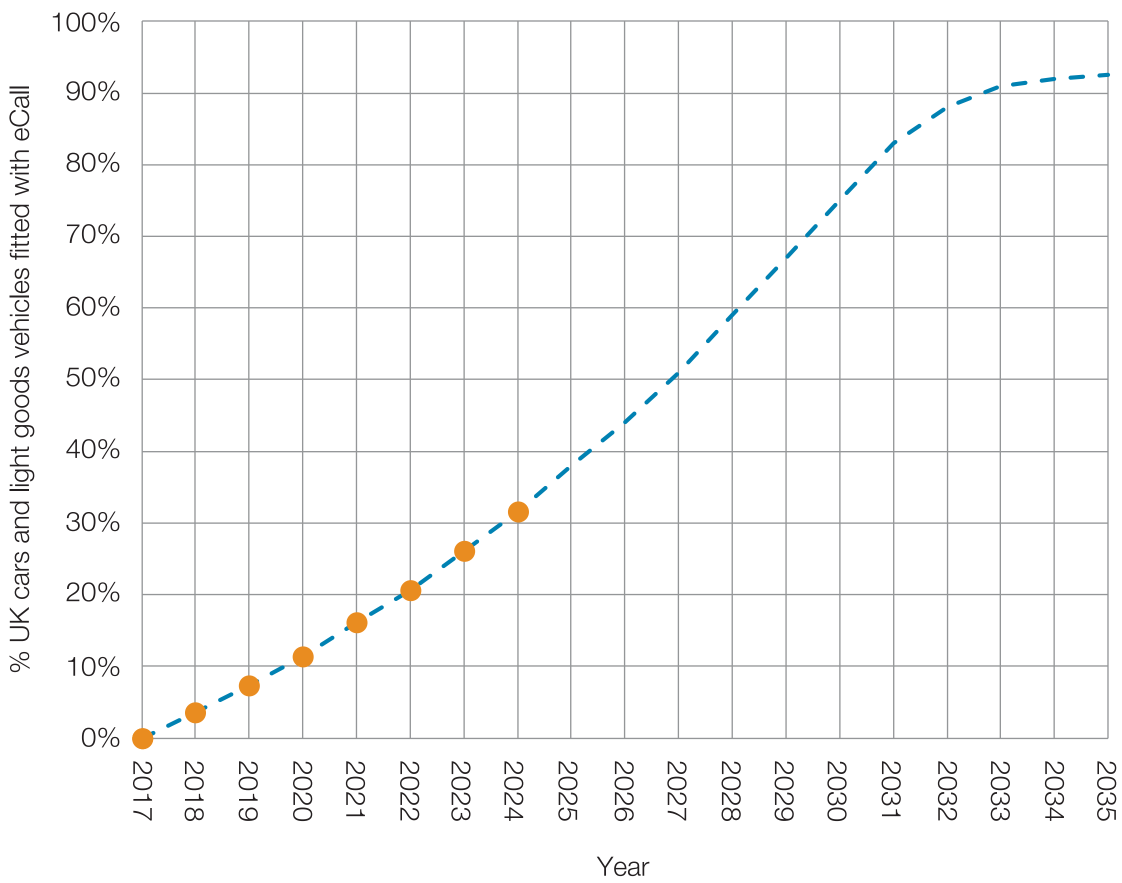
2 The UK emergency services are upgrading to the Multi-Agency Incident Transfer (MAIT) format, which is also XML-based. This is a data-sharing protocol designed to allow emergency services and partner agencies (like National Highways) to exchange incident information in real time using a standard format. Compatibility between the MAIT format for incidents and XML-format eCall alert data could be considered to reduce the need for manual phone calls or repeated data entry, and to accelerate multi-agency responses.

3 Note that in the Republic of Ireland, eCall data is retained for longer (with records kept since standardised eCall alerts began in 2018). Data is GDPR-compliant by being anonymised, kept confidential and held in-country, with VIN data modified to prevent identification of individual vehicles.

3.1.1 Market penetration and use

With the system mandated on M1- and N1-category vehicles type-approved since April 2018, the proportion of vehicles with eCall in these categories sold each year has continually risen. Data from SBD found that 99.5% of cars sold in 2024 were equipped with eCall (see Hutton, 2025). Figure 3.2 uses data on vehicle sales from SMMT and on vehicle numbers from the Department for Transport (DfT) to show how the proportion of vehicles fitted with eCall has progressed in the UK since adoption of Regulation (EU) 2015/758, with a dashed line projecting forwards to show the anticipated presence of eCall in cars and light goods vehicles by the mid-2030s[4]. Efforts to promote the adoption of vehicles with electrified powertrains may accelerate eCall's presence in the vehicle fleet.

Figure 3.2: Graph to show the percentage of cars and light goods vehicles on UK roads fitted with eCall since regulations required fitment in 2018. The dashed green line shows a predicted percentage of vehicles in the fleet that will have eCall over the next decade.



4 Of course, there is always likely to be a small but non-trivial number of vehicles operating on the roads that pre-date the legislation. Alternative options exist to retrofit systems that provide functionality analogous to eCall (see section 10 'Other Systems Offering eCall-like Functionality';
e.g. a dashcam with an emergency SOS function: http://nextbase.co.uk/emergency-sos-feature).

The trend shown in Figure 3.2 aligns with SMMT's experience of technology adoption, which suggests a mandatory vehicle feature achieves near 100% market penetration around 15 to 20 years after introduction. Furthermore, newer vehicles tend to cover more miles than older vehicles – MOT data for Great Britain indicates that vehicles cover 21% more miles in the three years before their first MOT test (an average of 8,086 miles per year) than in the three years following their first MOT test (an average of 6,399 miles per year), with average annual mileages continuing to tail off thereafter (Hesketh & Powis, 2019). This means that the proportion of miles covered on British roads by vehicles with the eCall system will grow at an even faster rate than the proportion of vehicles equipped with eCall.

Commensurate with the growth in vehicles travelling on our roads equipped with eCall is the number of eCall alerts that are triggered each month. The eCall consultancy VESOS has collated data from the 999LC on eCall alerts. They estimate that more than 350,000 eCall alerts have been triggered in the UK since April 2018 (VESOS, 2025), with the rate of alerts gradually increasing as the system permeates into the vehicle fleet. Against this general trend, there are some seasonal fluctuations, with a higher rate of alerts during the winter months. To some extent, this reflects higher risk driving conditions (reduced daylight, poor weather, lower friction road surfaces; see Gill & Goldacre, 2009) but also a higher risk of false alarms from eCall due to battery depletion.

UK statistics for 2024[5] indicate that the majority of alerts (over 85%) were from manual activations (i.e. a vehicle occupant has pressed the SOS button), with the remainder being automatic activations (e.g. due to airbag deployment). For the manual activations, around a quarter were connected to the appropriate emergency service by the PSAP. The remainder were not connected and therefore considered to be false alarms. For automatic activations, connection rates were much higher, with two-thirds connected to the appropriate emergency service by the PSAP. The remainder were not connected and therefore considered to be false alarms.

The vast majority of calls connected by the PSAP are to the police (over 95%), with around 2% connected to the ambulance service and less than 1% going to the fire service. Where a TPSP is the first point of contact, it can often filter unintentional button presses or situations where eCall was triggered automatically in a non-emergency situation (e.g. a vehicle experiences kinematics above the threshold used to indicate a crash by driving over a speed bump too quickly). Thereby, this prevents the PSAP/emergency services from dealing with (some but not all) false alarms.

3.1.2 2G/3G switch-off

Mobile network operators are updating their infrastructure and, in doing so, are gradually withdrawing support for older network architectures. By the end of 2025, all major networks will have turned off 3G services and 2G will follow, with services expected to end by 2033 at the latest. This presents a challenge for connected services that rely on these networks, including the eCall systems of many vehicles sold since 2018.

5 Unpublished. Provided within conversations with BT.

In 2020, the UK left the EU but aligned with Regulation (EU) 2024/1180 (European Commission, 2024). This regulation allows vehicles to use eCall systems based on 4G/5G communications networks from 2025 and, from 2027, prohibits the sale of vehicles with eCall based on 2G/3G networks.

From 2020 onwards, manufacturers began to anticipate this change and began fitting eCall systems that used more modern network protocols. However, with more than four million cars and vans fitted with eCall added to the UK vehicle parc between 2018 and 2020, and in the absence of any retrofit solution, the switch-off of the 2G/3G network could disable eCall functionality for a significant number of older vehicles.

4. Previous valuations of eCall

The eCall system has been the subject of many evaluations, focusing on its potential safety, economic and social impacts. These evaluations have employed various methodologies and considered different geographical scopes. As a system intended to reduce death and serious injury in road crashes, the safety benefit is critical. Several studies have aimed to quantify the potential for eCall to reduce road casualties by achieving faster notification of emergency services and the provision of accurate location data.

A Finnish study (Virtanen et al., 2006) estimated that the eCall system could 'very probably' (in the opinion of a medical doctor) have prevented 4.6% of fatalities in collisions involving motor vehicle occupants in Finland between 2001 and 2003. Including incidents where prevention of fatality was considered 'possible' alongside those where it was 'very probable' led to an estimate that eCall could have prevented 5–10% of fatalities involving motor vehicle occupants in Finland. Based on findings of the study, the authors called for the immediate and widespread implementation of the eCall system in Finland. A European-level impact assessment reviewed multiple studies and estimated that eCall could reduce the number of fatalities in road collisions in EU25 countries by 5.8%, if 100% of passenger vehicles were equipped with it (Baum et al., 2008; Wilmink et al., 2008). A UK study in 2006 indicated a potential 3% reduction in all road fatalities in the UK (around 70 lives saved per year), assuming two-thirds of compatible vehicles had eCall by 2020 (McClure & Graham, 2006). A national study in the Czech Republic estimated that eCall could reduce fatalities by 3–9% (Riley & Holubová, 2006), while a Swedish evaluation suggested a 2–4% reduction in road traffic fatalities in Sweden.

The differences between countries highlight one of the original motivations for deploying eCall – to support improved collision response in countries that have a higher proportion of quiet, rural roads where a collision may not be seen for hours or even days by other road users. An eCall alert may be critical for the occupant of a crashed vehicle who is unable to contact the emergency services for themselves. This is less of an issue in the UK where roads are often busier and less isolated, meaning that incidents are more likely to be noticed by other observers who can summon help. However, there are still examples where eCall could potentially save lives (see next section), and there is significant value in having the ability to collate data that eCall provides on the locations and circumstances of serious crashes.

From an economic standpoint, the initial evidence in support of eCall was less strong, with a 2014 appraisal (Atkins, 2014) suggesting that there was only a weakly positive potential benefit from the mandatory adoption of eCall in Europe (mandatory fitment of eCall was estimated to give a benefit–cost ratio of 1.74). Zirra et al. (2022) conducted a cost-benefit analysis for voluntary and mandatory aftermarket fitment of eCall to all passenger vehicles, finding a modest positive benefit:cost ratio, dependent upon the estimated cost of the equipment and its installation. Historically, concerns were raised about the cost of installation of the equipment and maintenance of the mobile network infrastructure needed to deliver eCall (McClure & Graham, 2006). However, since eCall has been a mandatory feature since 2018, the costs for fitment have now been absorbed and benefit–cost ratios that were calculated based on the costs for installation are now out of date. The question that remains is whether the anticipated safety benefits are being achieved.

From that perspective, it is notable that while there were numerous studies identifying potential benefits of eCall prior to implementation, there are very few studies that have assessed actual benefits observed since it was made mandatory. Indeed, one recent study from Sweden (Andersson, 2024) suggested that there was no advantage in terms of speed of emergency response or injury outcomes for incidents where notification was made via automatic eCall alert, compared to those where a traditional telephone call was used to summon the emergency services. However, this analysis was purely based on response times and did not explore if/how the data from automatic eCall activations was being used. The authors concluded that more research is required to understand this result.

5. UK examples where eCall could have helped

Numerous high-profile fatal incidents highlight the potential value of eCall in providing timely information to the emergency services about critical crashes.

5.1 Death of ten, Selby train crash – February 2001

The Selby train crash occurred on 28 February 2001 near Great Heck, North Yorkshire, when the fatigue-affected driver of a Land Rover caused the vehicle to leave the M62 motorway and travel down an embankment, coming to rest on a high-speed railway line. The crash shook the driver awake who exited the vehicle and called 999. While making the call, a GNER InterCity 225 passenger train collided with the Land Rover and was derailed. This was then struck by a fully loaded freight train travelling in the opposite direction, resulting in ten deaths and over 80 injuries.

This crash took place well before eCall was anything like a practical reality. However, it is possible to imagine how things could have been different were eCall present. The crash of the Land Rover could have been severe enough to trigger an automatic eCall alert or, if not, the driver could have pressed the eCall button. Either alert would have significantly accelerated a potential response by the emergency services and onward notification of rail and road operators with accurate location data of the incident site. This may have given enough time to allow both trains to be slowed on approach to the incident site. Although this may not have prevented the collision, it could have greatly reduced its severity and the likelihood of deaths or serious injuries. Even if the collision occurred with the same kinematics, the eCall alert could have accelerated the emergency response of the police, ambulance, and fire and rescue services, potentially improving the outcomes for passengers on the InterCity service and the drivers of both trains.

5.2 Sheppey Crossing crash – September 2013

The Sheppey Crossing crash occurred on 5 September 2013 at approximately 07:15. In dense fog, over 130 vehicles were involved in a series of collisions on the southbound carriageway of the Sheppey Crossing in Kent, England. Remarkably, there were no fatalities but 68 people sustained injuries, with eight classified as serious.

Clearly, the incident took place before eCall was a requirement on new type-approved vehicles, but were it available, emergency responders could have been notified about the crash sooner, potentially reducing response times. They would have received better information about the location and characteristics of the vehicles involved, improving preparedness and resource allocation. This is particularly important for incidents at confined locations (bridges, tunnels, cuttings etc.) where access, evacuation routes and safe refuges for vehicle occupants may be restricted. Again, were this incident to occur today, vehicles approaching the site could have been notified of the incident via live navigation systems (e.g. Waze) and slowed their approach to the site.

5.3 Death of three, Cardiff – March 2023

On Saturday 4 March 2023, a car crash took place at approximately 02:03 on the A48(M) near the St Mellons area of Cardiff, Wales. The vehicle involved was a white Volkswagen Tiguan manufactured in 2016 and therefore not fitted with eCall.

Reports indicated that the driver caused the vehicle to veer off a slip road as it approached a roundabout and crashed into trees. Although close to busy roads, the vehicle was obscured from view in the wooded area and was not discovered until the early hours of Monday 6 March 2023, approximately 46 hours after the crash occurred. Three vehicle occupants were pronounced dead at the crash site while two further occupants sustained serious injuries and were transported to hospital for treatment. The significant delay in locating the vehicle prompted considerable concern and scrutiny regarding the initial response to the missing persons reports.

5.4 Death of four, Llanfrothen – November 2023

On Sunday 19 November 2023, four young male adults were travelling along the A4085 in Garreg, Llanfrothen, Wales in a silver Ford Fiesta manufactured in 2016 and therefore not fitted with eCall.

At around 11:40, reports suggested that the driver experienced understeer in wet road conditions, causing the vehicle to veer onto the nearside grass verge. It tumbled down a short slope and rolled into a water-filled drainage ditch, which led to the deaths of all four occupants. With the vehicle difficult to see from the A4085 and no pedestrians or cyclists passing by, the vehicle was not found until two days later on Tuesday 21 November 2023. Notably, the Prevention of Future Deaths report (Robertson, 2024) focuses on legal restrictions for young and novice drivers, and does not recognise the potential improvements to post-crash response.

In each case, rather than waiting for calls to the emergency services, an eCall alert could have provided emergency services with information about the location of the incident and expedited emergency responses and medical treatment for injured parties. It will never be known if this would have saved any lives in these incidents but treatment would certainly have been provided closer to the 'golden hour' than was otherwise observed in the absence of eCall. For the latter two cases, it would also have reduced the uncertainty and distress for friends and family of not knowing where their loved ones were, and prevented the emergency services from expending considerable resources in searching for the lost vehicles.

6. False alarms

An eCall false alarm is when an eCall alert is triggered and the vehicle is connected to a PSAP or TPSP in a non-emergency situation. A false alarm may be triggered by a variety of causes:

- An adult pressing the SOS button to report non-emergencies.
- An adult pressing the SOS button by mistake.
- A dealership demonstrating the use of the eCall SOS button during sales.
- A driver in a hire vehicle unfamiliar with the SOS function and pressing the button for other purposes.
- A child playing with the SOS button.
- System faults (e.g. water ingress or vehicle battery depletion).
- Vehicle scrappage.

False alarms represent around three-quarters of manual activations and a third of automatic activations. They are a serious cause for concern for a variety of reasons. Firstly, there is the risk that they add to the workloads of PSAPs and TPSPs, as well as leading to the unnecessary dispatch of emergency services. Clearly, this has cost implications and can divert resources from genuine emergencies. Secondly, a high proportion of false alarms might result in eCall alerts being given a lower priority compared to other emergency calls received by a PSAP, potentially delaying the response to genuine emergencies.

To mitigate these challenges, possible solutions include:

- Careful design of the system and the positioning of buttons to avoid accidental activation.
- Clear labelling of buttons, especially when both breakdown and eCall buttons are present in the vehicle, to avoid confusion.
- Driver education to ensure correct usage of the system and minimise false alarms.
- Pre-screening processes to guarantee that only calls requiring effective intervention reach the emergency services.
- Technology certification to ensure that only high-quality and reliable devices are brought to market, thereby reducing technical false alarms.
- The ability to block faulty or misused devices remotely.

Effectively managing and minimising false alarms is crucial for the successful deployment and acceptance of the eCall system by both the emergency services and the public. It is also worth noting that some eCall alerts considered to be false alarms from an emergency service perspective may be of critical interest to road operators – for example, a broken down vehicle obstructing a busy intersection may not represent an immediate threat to life (assuming the vehicle occupants have safely exited the vehicle to a secure location) but may still require urgent attention to maintain traffic flow and prevent risks due to traffic conflicts.

BT handles calls to the emergency services in the UK and is required to collate statistics on use of the emergency number for the 999LC, which has oversight of the service. BT notes the risk that false alarms could potentially delay 999 response to genuine emergency calls – several call handlers might receive calls for a false alarm and be working to resolve it, reducing bandwidth for responses to genuine calls. As the number of vehicles with eCall increases, BT is seeing a commensurate increase in the number of false alarms.

False alarms of automatic eCall activations can result in repeated alerts being received. If repeated calls are received, BT works with the emergency services to identify a suitable approach for resolving the issue, which may differ from standard operating procedures. However, there is no systematic analysis of false alarms to help understand why they might be occurring.

6.1 Interface design

A key contributor to the triggering of false alarms is the design of the eCall interface. The precise appearance and location of the eCall button is not strictly regulated, so manufacturers have some freedom in how it is integrated into the interior design. The eCall button is usually sited near the internal rearview mirror or sometimes in the centre console. It is often red and labelled 'SOS', sometimes with an icon of a telephone handset. Some manufacturers locate the eCall button behind a small flap (either with the same labelling or transparent – see Figure 6.1) to prevent accidental operation.

Integrating the design and operation of the eCall button into the vehicle interior presents competing challenges. Although events requiring the eCall function are relatively rare, manufacturers want the button to be accessible so that it is easy to locate and operate in the event of an emergency. However, they also want to minimise the risk of accidental button presses and to create a visually appealing and cohesive interior. Therefore, they must strike a balance between these demands.

In tackling any risk, the hierarchy of control (ISO45001; International Organization for Standardization, 2018) suggests that if a hazard cannot be eliminated or substituted, engineering measures should be taken to prevent or minimise the risk of the hazard occurring. To eliminate erroneous button presses, it would therefore be sensible to minimise situations where the eCall button should be pressed for any reason other than a genuine emergency. It is surprising therefore that some manufacturers require use of the eCall button to enable users to adjust the privacy settings of their vehicle. Quoting from the 2023 owner's manual of the Vauxhall Corsa (the version on sale at time of publication):

> **Privacy settings**
>
> Privacy settings of Vauxhall Connect can be configured. This will impact the set of data being sent, e.g., in case a breakdown call is triggered. The emergency call function and the traffic sign assistant will not be impacted. Depending on version, the privacy settings can be changed by simultaneously pressing [breakdown call button] and SOS in the overhead console or via the system settings menu in the Info Display.
>
> (Vauxhall Motors Ltd., 2023)

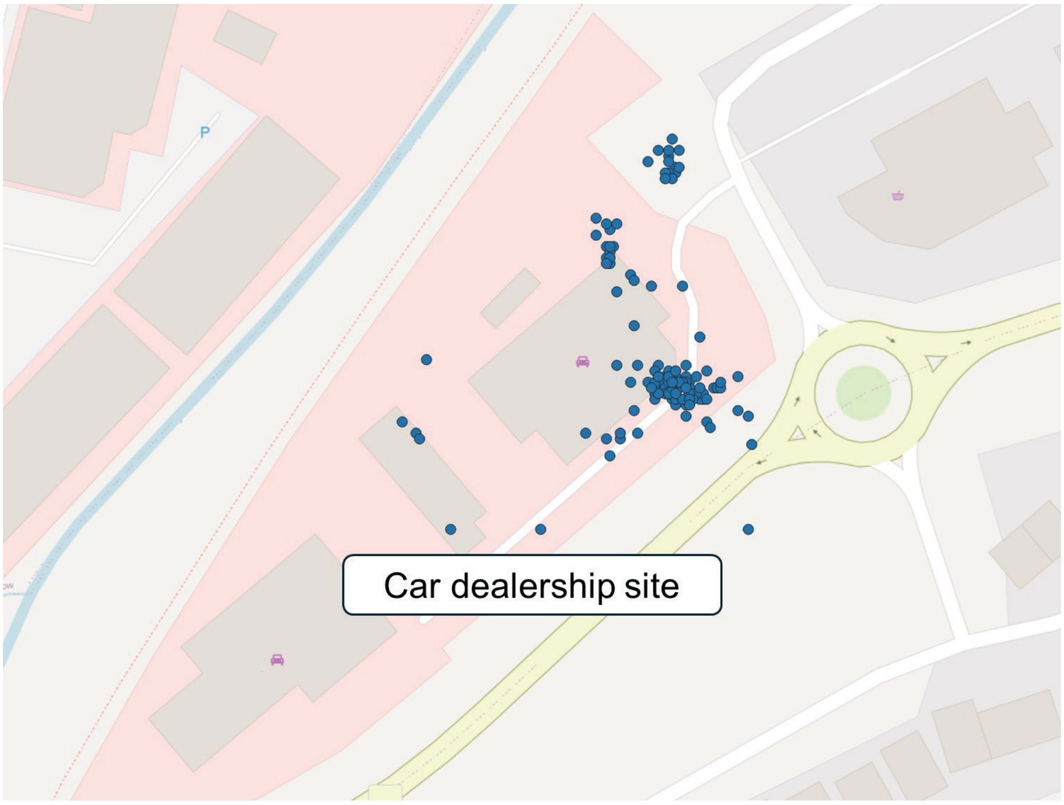
In one of the top five selling vehicles in the UK (SMMT, 2025), owners are being encouraged to press the eCall button to adjust the privacy settings of the Vauxhall Connect infotainment platform – with the obvious risk that the eCall button is mistakenly pressed alone, thereby triggering an emergency alert. But it is not just the Vauxhall Corsa. In a non-exhaustive search, the Vauxhall Astra and Mokka models both feature the same instructions, as do the Peugeot 208 and 308 models, with which they share common components. Figure 6.1 shows the eCall button in the Peugeot 208.

Figure 6.1: eCall (red with ‘SOS’ inscription) and Peugeot Connect Assistance (black with Peugeot lion motif) buttons mounted above the rearview mirror in a 2022 Peugeot 208

This approach is clearly misaligned with best practice from a human factors perspective and while mistaken button presses resulting in eCall alerts could be considered to be ‘user error’, it is also reasonable to consider that interface design plays a significant role in that error being made.

Figure 6.2 gives an indication of one source of false alarms, from work undertaken by VESOS for Transport Infrastructure Ireland (TII) – the organisation responsible for the Republic of Ireland’s national road network. Each blue dot represents a manual eCall activation in 2023. This clustering of eCall alerts could indicate a location of particular concern; however, the site shown is a car dealership and so these eCall alerts are likely to be the result of accidental presses of the eCall button or button presses made out of curiosity by customers exploring the functionality of new vehicles in the showroom or on the forecourt.

Figure 6.2: Clustered data showing manual activations of eCall at the site of a car dealership in the Republic of Ireland



Source: VESOS

VESOS's work for TII found similar clustering of manual eCall activations at car hire sites – again, with the supposition that vehicle occupants had mistakenly or curiously pressed the eCall alert button in the unfamiliar environment of a hire car.

Further consideration of the causes of eCall false alarms led VESOS to analyse the relative number of false alarms by vehicle brands. This was achieved by using a sample of the eCall MSD records and extracting the characters within the VIN that enabled the vehicle manufacturer for each alert to be identified (see Figure 6.3).

Figure 6.3: The number of eCall alerts and the relative proportion of automatic eCall activations for 18 (anonymised) vehicle manufacturers, referenced A–R, in the Republic of Ireland

Vehicle manufacturer reference	eCall alerts	% automatic activations
A	4924	13%
B	2942	14%
C	2305	5%
D	1420	7%
E	1335	12%
F	1155	4%
G	1128	7%
H	1114	4%
I	889	7%
J	829	5%
K	824	4%
L	653	2%
M	606	29%
N	440	18%
O	400	7%
P	374	21%
Q	358	25%
R	355	3%

If all brands were equally susceptible to false alerts, one would expect the percentage of automatic activations to be broadly similar across each manufacturer. But it is clear that there are markedly different percentages (brand R: 3% automatic activations vs. brand M: 29% automatic activations). There could be multiple reasons for such big discrepancies between brands. It could be due to differences in ergonomics, with some brands less likely to trigger mistaken manual activations. By contrast, some brands may be more susceptible to erroneous automatic activations by, for example, battery depletion or by having overly sensitive kinematic triggers for alerts. Either way, having records of anonymised eCall alerts is helpful for understanding the effectiveness of the system and may provide broader insights into road safety issues.

7. Vehicle maintenance

Regulation 2015/758 requires manufacturers to demonstrate that:

> "in the event of a critical system failure which would result in an inability to execute a 112-based eCall, a warning will be given to the occupants of the vehicle."
>
> (European Parliament and Council of the European Union, 2015)

Therefore, if the eCall system is not working, a fault warning light and/or error message should be displayed on the vehicle dashboard. The precise details of the warning and/or error message will depend on the make and model of the vehicle.

While this warning light may bring the failure of the eCall system to the attention of the driver, it does not require immediate action. The MOT inspection manual (DVSA, 2024) does not mention eCall, and while a fault with eCall may be noted by the MOT inspector, it would not cause the vehicle to fail the test. By contrast, electronic stability control (ESC) systems are specifically checked and any faults identified can cause a vehicle to fail its inspection. Any owner choosing not to get an eCall fault fixed faces the risk that the system will not trigger in the event of a serious collision. In the EU, Commission Delegated Directive (EU) 2021/1717 (European Commission, 2021) sets out the requirement for eCall to be included in periodic roadworthiness tests for vehicles in which it is fitted.

Some VW Group vehicles (e.g. Volkswagen, Audi, Skoda) were identified as experiencing specific faults with the eCall system when it was first introduced, and in 2020, Skoda issued a recall to rectify this issue for 26,000 vehicles (Brignall, 2021). Furthermore, it is possible to find unofficial guidance online suggesting that a fix or workaround for the issue involves pressing the eCall SOS button for 30–60 seconds while driving (CRD, 2021). This not only risks triggering a false alarm (the guidance also offers advice on how to explain to the PSAP/TPSP call centre operative that the button had been pushed in error) but also presents a significant visual, cognitive and manual distraction for the driver.

8. Survey of emergency call responders

The British Association of Public Safety Communications Officials (BAPCO) is the association for professionals in public safety technology in Great Britain. It allowed the distribution of a survey to its members, asking about their experiences with eCall alerts. Unfortunately, this only yielded nine responses from approximately 1,100 BAPCO members who received the survey, so our results can only be considered as anecdotal rather than statistically valid. However, the findings feed into the emerging picture that eCall implementation beyond the vehicle has not been as smooth and effective as it could be. The survey was delivered online and the majority of the questions required a selection from multiple-choice options (see Appendix B).

All nine respondents work in emergency services control centres in England, with the police (7/9), and fire and rescue services (2/9) represented, and all had 'answering emergency calls' as some or all of their role. All declared that they were either very familiar (4/9) or somewhat familiar (5/9) with eCall alerts. However, these alerts are seen as a relatively rare occurrence, with none of the respondents stating that they received eCalls 'daily'. Responses were equally distributed between 'Weekly' (3/9), 'Monthly' (3/9) and 'Rarely' (3/9).

Location accuracy was considered to be variable (Poor, 1/9; Fair, 3/9; Good, 2/9; Excellent, 2/9; 1/9, Unsure) and incident information was similarly patchy, as summed up by the response:

> "It's hit and miss; we get either E & N or Lat & Long, sometimes get a VIN or VRM, occasionally get driver details, and sometimes get information about a collision being detected. However, generally we get absolutely no information about the circumstances, just raw data as to objects and locations."
>
> (Respondent 3, Survey of BAPCO members)

False alarms for eCall alerts were considered infrequent but this reflects the relatively rare frequency of eCalls in general. However, as a proportion of the alerts received, the reported false alarm rates were more concerning (<25%, 1/9; 25-50%, 4/9; 50-75%, 2/9; >75%, 1/9; No response, 1/9).

Respondents stated that eCall alerts are swiftly received, with 8/9 respondents stating that they arrive in less than a minute and one respondent stating receipt is within one to five minutes. However, one of the key benefits of eCall is the transfer of data to help deliver a fast and effective emergency response. This feature does not seem to be exploited – 5/9 respondents stated that they do not see eCall data in their operational systems, 2/9 respondents stated that information was transferred verbally by BT, and the remaining 2/9 respondents indicated that eCall data is hard to understand and/or find.

Familiarity with other types of collision alerting system (such as Google Car Crash Detection and Apple Crash detection) was mixed (Very familiar, 2/9; Somewhat familiar, 5/9; Not familiar, 2/9). All those who had experience of such alerts (7/9) reported receiving them for collisions, but of those, the majority also reported receiving false alarms. The information from such alerts was predominantly perceived to be 'Somewhat accurate' but, as with eCall, operational systems do not seem to be compatible with receiving data from devices, with the majority of respondents stating that alert data is not presented in their operational systems.

Although eCall alerts number in the tens of thousands per month nationally, they are relatively rare at present for any individual call centre operator. By comparison, the 999 service receives more than two million calls per month (Department for Science, Innovation and Technology, 2024). Perhaps connected to the current rarity of the alerts, it was not surprising to find that formal training on the handling of eCall or other emergency collision alert systems was rare. Only 2/9 respondents to the survey stated they had received any such training. However, 5/9 respondents indicated that they would appreciate training on the handling of eCall/collision alerts, with role play suggested as a useful technique.

Respondents were asked what improvements they would like made to eCall alerts. It was telling that one recommendation was to include basically all the information that is specified in the MSD – suggesting that this data is not being received by the emergency services. One respondent suggested providing a recording of vehicle audio but appreciated the potential privacy concerns of doing so. Medical information was also suggested, which is known to be a potential feature for the next generation of eCall.

Participants were asked to rate the benefit of eCall to their role based on experience to date, on a scale of 1–10, where 1 indicated ‘No benefit’ and 10 indicated that the system was ‘Essential’. The mean of responses was 5.1, with a minimum of 1 and a maximum of 8, suggesting a somewhat ambivalent perception as to the value of eCall at present.

9. eCall handling

UN Regulation No. 144 Accident Emergency Call Systems (United Nations Economic Commission for Europe, 2023) establishes uniform provisions concerning the approval of vehicles with regard to their Accident Emergency Call Systems (AECS). It outlines requirements for the performance, installation and testing of AECS to ensure reliable operation across different countries. The regulation ensures that eCall systems meet stringent performance criteria relating to their durability, performance, interoperability, electromagnetic compatibility and human–machine interface.

However, there is a tension between the anticipated impact of eCall and the experiences of those receiving, processing and using the potential data that its alerts could provide. A critical link in the chain for getting the right assistance to the scene of a crash is the PSAP, which is responsible for receiving the incoming voice call and data, and then connecting to the appropriate emergency service (police, ambulance, fire or coastguard). In the UK, the PSAP service is provided by BT under the direction of the 999LC.

A particular challenge relates to the processing of the MSD associated with each eCall. The EISEC system is configured to accept a subset of the eCall data fields that have been specified by the 999LC. Further, the fields within EISEC are based on the BT Telematics emergency calls, a forerunner of eCall. The PSAP is therefore sharing a somewhat reduced version of the MSD using a system that was configured for a different form of emergency alert.

A second area of concern is the exploitation and onward communication of information held within the MSD. The vehicle identification number (VIN) is a unique 17-character code that provides specific information about the vehicle in a standardised format (according to ISO4030 and ISO3779; International Organization for Standardization, 1983, 2009). This includes the manufacturer and country of origin (characters 1–3); model, body type, engine type, transmission and safety features (characters 4–9); and model year, manufacturing plant and serial number (characters 10–17).

Information contained within the VIN, such as vehicle make, model and age, could be critically important to the emergency services. At present, when a PSAP passes an eCall to the fire, ambulance or coastguard service, it requests a VIN lookup by the police via a voice call and verbal transfer of the VIN – a process that takes time and is subject to human error. An automated VIN lookup function would be very helpful, even if this only provides a subset of the information available within the VIN. Such services are widely available commercially and while they may not have access to all the information available to the police (for example, whether the vehicle has been involved in any offences), they could certainly provide the basic information needed to support prompt action by the emergency services. A solution would be for the PSAP to perform an automatic lookup of VIN information and to make that it is accessible to any emergency service in a standardised format.

The raw MSD is held by BT for three months, whereas the data translated into the EISEC format is made available to the emergency services for 30 minutes only. This is a requirement specified by the 999LC in accordance with an interpretation of GDPR/UK Data Protection Act 2018 requirements. There is no evidence of any detailed statistical analysis of this data beyond monthly totals reported to the 999LC. This retention policy protects the privacy of those involved in collisions but potentially loses the opportunity to share long-term detailed data insights with other relevant services in the interests of improving the emergency response. It also means that the opportunity to analyse the data to understand patterns of incidents and sources of risk is lost.

Noting that the equivalent service in the Republic of Ireland (Emergency Call Answering Services) is also operated by BT, it seems a different conclusion has been reached. In its work for TII and under strictly controlled conditions, VESOS was able to access suitably anonymised eCall data dating back to 2018, when eCall-equipped vehicles first appeared on Ireland's roads. This enabled detailed historical analyses of eCall data to generate insights that helped TII to understand risk on its network, growth and volume profiles, potential vehicle design issues, and where false alarms are most likely to occur (see Figure 6.2 and Figure 13.1). Without the data to explore these issues, the UK is missing an opportunity to realise one aspect of the value of eCall.

9.1 Vehicles stopped in live lanes

One important use case for eCall is for vehicles stopped in live lanes. The Highway Code directs drivers that they should only stop in a live lane in an emergency or when directed by authorities (Rule 271; DfT, 2022). However, such emergencies do indeed occur and the associated risk is particularly significant on high-speed roads, where collisions may be severe and involve multiple vehicles.

Incidents involving stopped vehicles on live lanes on smart motorways have gained a high profile, with National Highways providing regular reports on their safety performance (e.g. National Highways, 2025). Its guidance (National Highways, 2022b) on what to do if there is no other alternative than to stop in a live lane directs vehicle occupants to stay in the vehicle and to dial 999. Smart motorways are equipped with stopped vehicle detection systems, which should identify the presence of a stranded vehicle in seconds. However, a driver or passenger manually using eCall would potentially provide the emergency services with better information more quickly about the type and location of the stopped vehicle than the driver or passenger in a stopped vehicle may be able to provide via a mobile phone call. This becomes even more vital if the stopped vehicle is struck, triggering an automatic alert.

At present, there is no distribution of eCall alert information by the PSAP or TPSP directly to National Highways as the road authority responsible for the strategic road network in England, or to other devolved road operators. The Civil Contingencies Act 2004 (United Kingdom, 2004) specifies category 1 responders to whom a PSAP can choose to direct emergency calls and associated information deriving from eCall alerts. However, the act also references the “strategic highways company” (and indeed Transport for London) as a category 2 responder. The sharing of validated eCall alert data would be of particular value for road authorities, especially on roads where stopped vehicle detection systems are not present or not working. This is because these authorities are responsible for high-speed roads where a stopped vehicle represents a significant risk and because they, more than any other road authority in the country, have the ability to use technology to inform road users about upcoming hazards and moderate their behaviour. Depending on the location of the incident, this could be through the use of matrix signs, variable speed limits, lane closures and/or distributing information via connections to mapping providers such as Waze, Google Maps and Apple Maps.

National Highways has safety as its number one priority, and it aims to eliminate death and serious injury from its network. With the assumption that it (and other road authorities) would need to manage eCall data with the same level of security and privacy as any other organisation with access to it (PSAP, TPSP, emergency services), better integration and use of the data provided by eCall alerts represents a significant opportunity to make progress against those ambitions. Furthermore, this could ultimately form a template as to how UK road authorities (and other relevant organisations) could exploit eCall data in the interests of road safety.

9.2 Third-party service providers

Vehicle manufacturers have two options for how their eCall alerts can be handled. One is to open a call and send the MSD to the PSAP, which for the UK is the 999-112 service operated by BT with oversight from the 999LC. Alternatively, they can direct the call and MSD data to a TPSP. This is a call centre to support contact from vehicle customers and to direct emergency calls and data on to the PSAP as needed. This may seem like an extra step in the chain of dispatching the appropriate emergency services to an incident but the call centre can provide additional services to the customer and can triage eCall alerts appropriately – which, given the number of false alarms, is helpful for the efficiency of call handling by the PSAP and emergency services.

For reasons of data security, a TPSP must be located in the country where the vehicle is being used. If a vehicle moves to another country, there must be an onboard directory of TPSPs such that the vehicle always calls the local in-country TPSP. If this were not present, a vehicle involved in an incident away from its country of registration would default to the home country TPSP call centre. The home country TPSP would likely be able to assist and redirect the call to the correct location but this would add significant delay to the process.

The TPSP-PSAP standard (EN 16102:2011) specifies that the eCall MSD should be transferred electronically between the TPSP and the PSAP, as well as providing a defined format for this electronic exchange. Although full electronic data transfer is not implemented in the UK, the standard allows transitional methods for MSD transmission when a direct electronic interface is not available – for example, reading the data over the voice channel during the eCall or sharing a secure web link to a TPSP-hosted location where the data can be accessed. One significant TPSP operating for multiple vehicle brands provides full MSD transmission in more than 12 European countries. However, in the UK, BT has confirmed that, since 2018, compliance with the EN16102 standard has been through the transitional voice method (where the TPSP operator reads the MSD aloud to the PSAP call-taker). Again, this process is subject to delay and potential human error. BT is working on automating MSD transmission from the TPSP to the PSAP but there is currently no defined delivery date.

Connections made to TPSPs are mediated over standard mobile networks, according to the contracts that exist between vehicle manufacturers and mobile network operators. If a vehicle activates eCall in an area without mobile coverage for its network, it can default to making a 999/112 call direct to the PSAP using any available mobile network, circumventing the TPSP. However, if an initial connection over the standard mobile network is dropped or if connection quality is poor (but not absent), it could lead to delays, loss of data and errors at the TPSP, which may then cascade to the PSAP or result in the TPSP having insufficient information to transfer the call. The PSAP needs a valid telephone number to transfer the call to the emergency services; if no valid number has been received associated with the incident (i.e. the telephone number of the eCall system in the vehicle), the PSAP has to transfer the call using the telephone number of the TPSP. This can potentially lead to misunderstandings about the location of the incident if the emergency service were to use the location of the TPSP telephone number to inform its response.

10. Other systems offering eCall-like functionality

An eCall alert is triggered by the system detecting features associated with crashes. However, since the introduction of eCall, there has been a proliferation of personal devices capable of detecting such features – for example, crash detection is available on Google Pixel phones, Apple iPhones, Apple and Garmin watches, and Nextbase dashcams. These aim to achieve a goal similar to that of eCall: to get help to people involved in serious crashes as quickly as possible. However, they achieve this through slightly different methods.

Phones, watches and dashcams use sensors (accelerometer, gyroscope, geolocation and microphone) and data processing to detect patterns indicative of a severe car crash, such as sudden changes in speed, impact forces and sound. If a crash is detected, the device will check with the user. If the user does not acknowledge the notification, the device can automatically contact emergency services, provide location information and notify designated emergency contacts.

Figure 10.1: Screen displayed by the Google Car Crash Detection system when an incident has been detected

Source: Google Store; image edited by author to show '999' as the UK emergency number (rather than '911' as shown in the original image)

For crash detection by eCall, a vehicle must have the system installed, whereas detection by a portable device depends on the user having such a device with them and having the feature activated. While eCall is very reliable for the detection of severe crashes, other devices can detect less severe incidents. The packet of data transmitted in an eCall alert is in a standardised format, whereas there is no standard for transmission of incident data from personal devices.

In a recent fatal crash, the potential value of emergency alerts from portable devices was highlighted. In May 2023, a driver died travelling south on Lee Lane, a rural road near Romsey in Hampshire. The driver lost control of his vehicle at speed and collided with a tree. Alone in the car, the driver's iPhone triggered an automated call to 999, indicating that the owner had been in a serious car crash and was not responding to their iPhone (Charles, 2024). In the Prevention of Future Deaths report produced following the inquest into the driver's death, the coroner noted that:

> "…the understanding, training and procedures need review to assist with appropriately prompt response in situations where there is an indication of a collision where a risk to life may exist."
>
> (Charles, 2024)

In a letter responding to the Prevention of Future Deaths report, the Chief Constable of Hampshire and Isle of Wight Constabulary recognised that work was required to enable the police to respond to such alerts but also stated that:

> "…false activations from telephones and watches was common place [sic] and the locations received often inaccurate and unreliable, to the extent the routine deployment of police resources without supporting evidence was not appropriate."
>
> (Hampshire and Isle of Wight Constabulary, 2024)

The letter goes on to describe how the constabulary had updated its working practices to respond more effectively to such alerts. Also writing in response to the Prevention of Future Deaths report, the National Police Chiefs' Council (NPCC) outlined how it and the 999LC would be reviewing their responses to automated crash detection notifications (NPCC, 2024).

It is unlikely that smartphones, wearable devices or dashcams could fully replace the mandatory fitment of eCall systems into vehicles, and we have to be mindful of the risk that such devices can present as a potential distraction to drivers. However, there is the potential for wearable devices to enhance eCall data to support effective emergency response, to validate eCall alerts as genuine or provide eCall functionality for those in older vehicles.

Starting in 2026, Spain will require all vehicles, including those driven by tourists, to carry an emergency beacon device, replacing traditional warning triangles. When fitted to the roof, the device emits a 360-degree flashing amber light visible from up to a kilometre and alerting other road users to the presence of the stranded vehicle. Notably, the beacon connects to the digital platform operated by Dirección General de Tráfico (DGT, Spain's national traffic authority). Like eCall, the beacon transmits the vehicle's real-time location to alert other drivers and facilitate quicker emergency responses. Failure to comply with this mandate may result in fines ranging from €80 to €200.

Note that portable devices are far from immune from false alarms. Leicestershire Police recorded that false alarms more than doubled during the 'Download' music festival when intense dancing in the crowd triggered smartwatches to activate an automatic 999 call (Hayward, 2025). The police stated that dealing with this increase in false alarms places a huge burden on call handlers and takes resources from genuine emergencies (ibid.)

With a growing number of eCall alerts and a proliferation of devices capable of sharing eCall-like data, it reinforces the need to have systems in place capable of effectively collating, filtering and responding to alert information coming from a variety of sources. The 999LC has a working group that has started to review the potential risks and benefits of taking emergency alerts received from wearable/portable devices.

11. The next generation of eCall

In 2023, the European Emergency Number Association (EENA) produced a report on Next Generation eCall (NG-eCall), focusing on the evolution of the eCall system to adapt to modern telecommunications technologies (EENA, 2023). NG-eCall aims to transition to IP Multimedia Subsystem (IMS) over packet-switched, higher bandwidth 4G and 5G networks. This creates an opportunity to expand the data that is shared by the vehicle from which the eCall was triggered. This might include:

- Faster and more reliable MSD transfer, with higher quality speech and greater capacity for including additional data over the existing 140-byte limit.
- Support for additional media (e.g. video from dashcams, speech-to-text translation or other media for hearing-impaired users).
- Two-way data communication enabling the PSAP to send instructions to the vehicle, e.g. sound horn, flash lights, lock/unlock doors, disable ignition.

- Expanding eCall to other vehicle categories where data beyond the MSD limit of 140 bytes would be needed to provide the necessary contextual data associated with the vehicle/emergency incident (e.g. multiple occupancy vehicles such as buses or heavy goods vehicles).
- Data from medical devices such as heart monitors, which could provide contextual information about the patient (e.g. blood type, existing medical conditions, allergies) to inform their future care.
- Improved accessibility for people with disabilities by supporting communication methods like real-time text (RTT).

This future expansion in the functionality of eCall and greater richness of the data it provides in each alert create significant opportunities to deliver faster and more effective emergency responses, as well as to gather more information about road crashes in general and the effectiveness of response. If the 999LC agrees to the sharing of such data fields in processing future eCall data, it could provide hugely valuable insights that would potentially help to eliminate future crashes and ensure emergency responders make the most effective use of the resources available to them.

12. Success of adoption, challenge of implementation?

A key challenge for this report was to investigate whether the UK has failed to capture the full benefit of the eCall system. Although legal enforcement was required to make it happen, the rollout of eCall across Europe generally and in the UK specifically has been a success. Almost every new M1- and N1-category vehicle sold is equipped with eCall and the system is present in an ever-increasing proportion of the vehicle fleet – and in an even higher proportion of vehicle-miles driven (due to the tendency for newer vehicles to cover more miles than older vehicles). However, the purpose of eCall is to shorten the time taken from a serious collision taking place to the arrival of appropriate medical care on the scene – and to avoid creating undue increases in cost or complexity in the process. When reviewed from this broader perspective, a more challenging picture emerges.

Overall, there can be no doubt that there have been (and continue to be) incidents and situations where, if a vehicle had been fitted with eCall, it would have accelerated the arrival of the emergency services and ultimately prevented fatalities. The ability to speak to an emergency call centre operative either directly or via a TPSP, and for that call to be associated with data about the vehicle type, occupants and location, represents a significant potential benefit to safety. However, no recent in-depth evaluation studies have been undertaken to prove the true value of eCall in the UK and this review has noted several matters for concern in the UK's implementation of eCall that prevent its full value from being realised.

The first issue is the relatively high rate of false alarms. This is a critical issue for numerous reasons. A high frequency of false alarms undermines the credibility of the system. In addition, even though eCall alerts are relatively infrequent at present, the bandwidth of call centre staff to handle genuine emergencies may be reduced by invalid eCall alerts. Plus, the frequency of alerts is only going to increase as the number of vehicles on our roads fitted with eCall increases and alerts are received from other personal devices as well. It is clear that the ability to manage alerts efficiently will be an important aspect of emergency call centre performance.

A second related issue is user awareness of eCall. The number of false alarms seems in part attributable to users' misunderstanding of what eCall is, how it works and what it does. This is not helped by some questionable design choices in the way the eCall button is presented and used in vehicles. The limited sample of emergency services call centre operatives suggests their understanding is also mixed, and they reported a desire for better training in management of and response to eCall alerts. A combination of raising user awareness, improving call centre operative training and providing better systems for managing eCalls is required.

A third issue is around data sharing. An eCall alert is a combination of a voice call and a data packet. The MSD contains critical information that can support an effective emergency response, even if no-one in the affected vehicle is able to speak. The MSD is easily configurable and shareable because it exists as a structured data packet. Of course, manipulating and sharing such sensitive data must be within strict guardrails but there is significant potential value for multiple stakeholders to derive value from this data for a variety of purposes. This could be in direct response to an individual incident (e.g. safety interventions by a road authority to protect other road users in response to a crash) or to understand thematic changes in road safety (e.g. investigating frequent crashes involving vehicles from a particular manufacturer).

13. Recommendations

The eCall system undoubtedly has huge potential. This research has found that some of this potential is being tapped but there is much more that could be gained by leaning harder into the exploitation and effective use of eCall and the data it produces.

13.1 Proving the effectiveness of eCall

As noted, there has been limited research into the true effectiveness of eCall since its implementation. A systematic and independent evaluation of effectiveness would help to identify whether the anticipated benefits are being achieved. This should include assessing the observed effect of eCall on:

- Relative frequency of fatalities and serious injuries;
    - A critical metric against which progress towards the elimination of death and serious injuries from our road network is measured.
    - eCall is intended to accelerate the arrival of emergency care, thereby potentially reducing injury severity.
    - Examining injury severity for incidents involving vehicles with and without eCall would help to determine whether this intended benefit is being achieved.

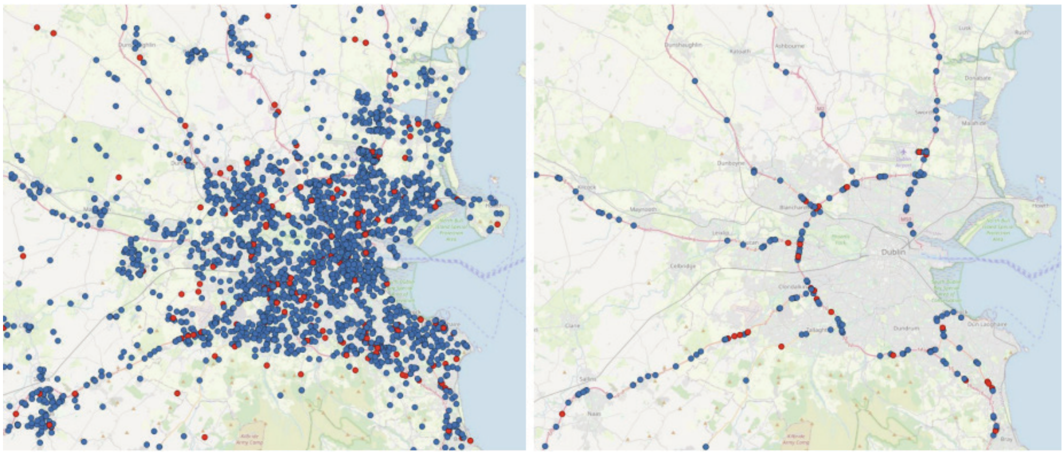
- Speed of emergency response;
    - A further measure of eCall effectiveness would be to measure the time from an incident occurring to the arrival of emergency responders.
- Congestion (potentially reduced by collisions being cleared more quickly due to eCall);
    - It may be possible to measure whether the congestion associated with incidents is reduced for collisions where vehicles involved had eCall such that emergency response was faster.
- Effectiveness of emergency response (e.g. fire crews managing vehicle access more effectively when they know what vehicle types were involved in collisions);
    - This would likely be achieved through surveys, interviews and workshops with emergency responders to understand the extent to which eCall supports their effective response.
- Public awareness and acceptance of the eCall system;
    - Similarly, this would involve surveys and workshops with members of the public to explore their understanding and use of eCall.

The outcome of the evaluation would provide insight into the extent to which eCall has achieved the benefits that were predicted by studies undertaken prior to its deployment and where work is necessary to maximise the benefits of eCall.

13.2 Reviewing the eCall process workflow

A corollary activity to the evaluation described above is a review of the process that starts with the triggering of an eCall alert and the effective resolution of whatever caused it. This should cover not only the effectiveness of the existing elements within this workflow but also the potential for additional value to be achieved through the inclusion of other stakeholders and the wider sharing of eCall data. For example, organisations such as National Highways, Transport Scotland, Transport for Wales, Transport for London and Network Rail could each derive benefit from access to eCall data, provided they were willing to manage the data within accepted standards and guidelines. Suitable anonymisation of eCall data could enable valuable analyses to be undertaken by third parties that support understanding of eCall effectiveness and any underlying issues with the system. Figure 13.1 shows an example of this, where eCall activations have been filtered by a third party to provide the road authority with incident data pertaining specifically to their network.

Figure 13.1: Filtering of clustered eCall alert data from TII roads in the Dublin area, 2023 (left panel shows all eCall activations; right panel shows all valid eCall activations on TII network; blue dots indicate manual activations, red dots indicate automatic activations)



All eCall activations in the Dublin area, 2023

All valid eCall activations on the TII network in the Dublin area, 2023

Source: VESOS

Such a review would require involvement from the 999LC to ensure that its scope and objectives were aligned to the fundamental purpose of the emergency services. However, as the role of data in evaluating, managing and delivering transport systems grows ever more significant, such a review should not be confined only to eCall's role in emergency service provision for individual incidents. It should also consider the wider benefit that eCall data could bring, if it were retained and made available for analysis under strict access conditions. This might include:

- Achieving an improved thematic understanding of UK road safety by using eCall data to inform the types of analyses that were planned for the Road Safety Investigation Branch, which is no longer being actively progressed.
- Using eCall data to train artificial intelligence (AI) systems in recognising the characteristics of road transport, traffic movements and environmental conditions that are associated with serious crashes.
- Validating the star ratings given to roads given by the International Road Assessment Programme (iRAP).

The review should investigate the training and systems used by emergency service call centres to respond to eCall alerts. Importantly, the review should also consider the extent to which the systems and stakeholders involved in the eCall process are prepared to deal with the growth of alerts coming from:

- The increasing numbers of M1- and N1-category vehicles equipped with eCall.
- The potential for other categories of vehicle to be equipped with eCall in future.
- The growing number of emergency alerts generated by other devices (smartphones, smartwatches, dashcams etc.).

Critically, such a review should also account for the anticipated developments in the sector, including:

- The development and deployment of the next generation of eCall.
- Updates to BT's systems for managing eCall alerts (e.g. EISEC2, automated transfer of eCall MSD from TPSP to PSAP etc.).
- The switch-off of the 2G/3G network.
- The switch to electric vehicles as an opportunity to inform consumers about eCall.

13.3 Tackling eCall false alarms

The issue of false alarms affects the credibility and effectiveness of eCall. SMMT and National Highways have provided some helpful online guidance to users about eCall. However, while their respective media channels can distribute these messages, they only scratch the surface of educating the wider public on the effective use of eCall. An 80-second explainer video (National Highways, 2022c) has only been viewed around 22,000 times.

Since eCall has been a mandatory safety system for all type-approved vehicles since 2018, it is now likely to be present for many new drivers in their first car. Consideration of how eCall could be better integrated into the Highway Code and curriculum for learning to drive would be worthwhile.

For qualified drivers, it could be possible for information on eCall to be included in the courses offered under the National Driver Offender Retraining Scheme (NDORS), such as the National Speed Awareness Course. NDORS courses are taken by nearly two million drivers per year (UKROEd, 2025) and, from November 2024, those who have taken the course are provided with follow-up materials through the 'Driver Top-Up' scheme. Both the courses and 'Driver Top-Up' materials could provide opportunities to educate drivers on the correct use and benefits of the eCall system. Similarly, when consumers are purchasing vehicles with the eCall system through recognised dealerships, there is an opportunity to provide information on the system and to ensure that customers do not push the button mistakenly[6].

Aside from drivers on NDORS courses, a co-ordinated public awareness campaign on the use and benefit of eCall from stakeholders across the road transport sector could be beneficial. Fictional road crashes often provide high drama in light entertainment. The use of eCall as an effective safety system in television, radio and film dramas might also help to elevate it in the public consciousness.

A further source of false alarms is faulty vehicles. Increased recognition of eCall as a critical safety system during scheduled vehicle servicing and inspections could help to ensure that the system is working effectively and when needed.

6 The road safety organisation Co-Pilot has developed some point-of-sale resources to support understanding of eCall through its AutoNinja brand (Co-Pilot, 2024).

13.4 Acting on evidence

The proposed evaluation and review would provide useful insights into the effectiveness of eCall. However, the real value of those insights would be in galvanising action to deliver improvements in eCall operations. Such action would require the influence of the 999LC as the guiding hand in overseeing the UK's national emergency call services, as well as requiring resources to enact the changes necessary to maximise the effectiveness of the eCall system. Although securing the resources could prove challenging, the evaluation and review should provide the evidence necessary to demonstrate the cost-effectiveness of the recommended changes. Further, it can be considered that the amount of funding needed to make such changes is likely to be a fraction of the investment already made in installing eCall in millions of vehicles, the mobile network infrastructure to connect them, and the value of the injuries prevented and lives saved by having truly effective eCall alerts and emergency responses.

References

Andersson, T. (2024). *Future road safety risks of 2G/3G eCall systems*. Transport Analysis. Retrieved April 2025 from https://www.trafa.se/globalassets/pm/2024/pm-2024-9-future-2g-3g-ecall-risks.pdf

Atkins (2014). *eCall UK 2013 Review and Appraisal – Final Report*. Prepared for the Department for Transport. Retrieved April 2025 from https://assets.publishing.service.gov.uk/media/5a81729d40f0b62305b8f018/ecall-uk-2013-report.pdf.

Baum, H. Geißler, T. Westerkamp, U. & Vitale, C. (2008). *Socio-economic Impact Assessment of Stand-alone and Co-operative Intelligent Vehicle Safety Systems (IVSS) in Europe, Cost-Benefit Analyses for standalone and co-operative Intelligent Vehicle Safety Systems*. eIMPACT Deliverable D6.

Brignall, M. (2021). *VW, Audi and Skoda owners angry over fault in SOS warning system*. The Guardian. Retrieved April 2025 from https://www.theguardian.com/money/2021/may/01/vw-audi-and-skoda-owners-angry-over-fault-in-sos-warning-system.

Charles, H. (2024). *George Dillon: Prevention of Future Deaths Report (1) (Ref: 2024-0488)*. Judiciary of England and Wales. Retrieved April 2025 from https://www.judiciary.uk/wp-content/uploads/2024/09/George-Dillion-1-Prevention-of-Future-Deaths-Report-2024-0488.pdf.

Co-Pilot (2024). *ECall*. Retrieved April 2025 from https://www.youtube.com/watch?v=S3m-e4GbR90.

Cowley, R. A. (1975). *The golden hour: A standard for optimal care of the critically injured patient*. Maryland Medical Journal, 24(11): 60.

CRD (2021). *How to clear the SOS warning light | Major issue | Audi A3 S3 2020 2021 2022 | Volkswagen VW Skoda*. YouTube. Retrieved April 2025 from https://www.youtube.com/watch?v=FVJEnMesSY0.

Department for Science, Innovation and Technology (2024). *Public Emergency Call Service disruption, Sunday 25 June 2023: post-incident review*. Retrieved May 2025 from https://www.gov.uk/government/publications/public-emergency-call-service-disruption-sunday-25-june-2023-post-incident-review/public-emergency-call-service-disruption-sunday-25-june-2023-post-incident-review.

DfT (Department for Transport) (2022). *The Highway Code*. UK Government. Retrieved April 2025 from https://www.gov.uk/guidance/the-highway-code.

DVSA (2024). *MOT inspection manual: cars and passenger vehicles*. Retrieved April 2025 from https://www.gov.uk/guidance/mot-inspection-manual-for-private-passenger-and-light-commercial-vehicles.

Economic Commission for Europe of the United Nations (UNECE) (2014). *Regulation No. 144: Uniform provisions concerning the approval of vehicles with regard to their light emitting signalling devices (LEDs) for use in power-driven vehicles and their trailers.* Official Journal of the European Union, L 123: 77–89.

EENA (2015). *Advanced Mobile Location (AML) in the UK*. Retrieved April 2025 from https://eena.org/knowledge-hub/documents/aml-in-the-united-kingdom/.

EENA (2023). *Next Generation eCal*l. Retrieved April 2025 from https://eena.org/knowledge-hub/documents/next-generation-ecall-integration-with-an-emergency-services-ip-network/.

European Commission (2005a). *Cars that can dial 112: Commission and industry target 2009*. IP/05/134. Retrieved April 2025 from https://ec.europa.eu/commission/presscorner/detail/en/ip_05_134.

European Commission (2005b). *Cars will dial 112 – but will anyone answer? Commission urges Member States to act on eCall*. IP/05/1137. Retrieved April 2025 from https://ec.europa.eu/commission/presscorner/detail/en/ip_05_1137.

European Commission (2005c). *112, the single European emergency number: Frequently Asked Questions*. MEMO/05/363. Retrieved April 2025 from https://ec.europa.eu/commission/presscorner/detail/en/memo_05_363.

European Commission (2006). *Cars that dial 112: An action plan for getting emergency calls back on track*. IP/06/1720. Retrieved April 2025 from https://ec.europa.eu/commission/presscorner/detail/en/ip_06_1720.

European Commission (2009). *Last call to implement car safety system voluntarily*. IP/09/1245. Retrieved April 2025 from https://ec.europa.eu/commission/presscorner/detail/en/ip_09_1245.

European Commission (2021). *Commission Delegated Directive (EU) 2021/1717 of 9 July 2021 amending Directive 2014/45/EU with regard to the addition of eCall to the list of test items (OJ L 342, 27.9.2021)*. Official Journal of the European Union. Retrieved June 2025 from https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021L1717.

European Commission (2024). *Commission Delegated Regulation (EU) 2024/1180 of 14 March 2024 amending Regulation (EU) 2015/758 of the European Parliament and of the Council with regard to the European standards supporting the eCall in-vehicle system*. Official Journal of the European Union, L 2024/1180. Retrieved June 2025 from https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202401180.

European Committee for Standardization (2012). *EN 16102: Intelligent transport systems – eSafety – Pan-European eCall operating requirements*.

European Committee for Standardization (2020). *EN 15722: Intelligent transport systems – eSafety – eCall minimum set of data*.

European Parliament and Council of the European Union (2010). *Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport Text with EEA relevance*. Official Journal of the European Union, L 207: 1–9.

European Parliament and Council of the European Union (2013). *Regulation (EU) No. 305/2013 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC*. Official Journal of the European Union, L 17: 1–130.

European Parliament and Council of the European Union (2014). *Decision No. 585/2014/EU of the European Parliament and of the Council of 15 May 2014 on the deployment of the interoperable EU-wide eCall service (Text with EEA relevance)*. Official Journal of the European Union, L 164: 6–9.

European Parliament and Council of the European Union (2015). *Regulation (EU) 2015/758 of the European Parliament and of the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC*. Official Journal of the European Union, 2 L 123: 77–89.

Gill, M. & Goldacre, M. (2009). *Seasonal variation in hospital admission for road traffic injuries in England: Analysis of hospital statistics*. Injury Prevention, 15(6): 374–378.

Hampshire & isle of Wight Constabulary (2024). *Response to Coroner Concerning the Death of George Dillon*. Retrieved April 2025 from https://www.judiciary.uk/wp-content/uploads/2024/09/2024-0488-Response-from-Hampshire-Constabulary.pdf

Hesketh, O. & Powis, J. (2019). *Great Britain MOT Mileage Report*. Field Dynamics. Retrieved April 2025 from https://www.field-dynamics.co.uk/wp-content/uploads/2017/04/GBMOTMileageReport-FieldDynamics-HighQuality.pdf.

Hayward, D. (2025). Mosh pits trigger 700 false 999 calls at Download Festival 2025. LeicestershireLive. Retrieved June 2025 from https://www.leicestermercury.co.uk/news/local-news/mosh-pits-trigger-700-false-10264678

Hutton, P. (2025). *New research finds eCall in over 99.5% of new cars*. Highways News. Retrieved April 2025 from https://highways-news.com/new-research-finds-ecall-in-over-99-5-of-new-cars/.

International Organization for Standardization (1983). I*SO 4030:1983 – Road vehicles – Vehicle identification number (VIN) – Location and attachment*. Retrieved April 2025 from https://www.iso.org/standard/9721.html.

International Organization for Standardization (2009). ISO 3779:2009 – *Road vehicles – Vehicle identification number (VIN) – Content and structure*. Retrieved April 2025 from https://www.iso.org/standard/52200.html.

International Organization for Standardization (2018). *Occupational health and safety management systems – Requirements with guidance for use (ISO Standard No. 45001:2018)*. Retrieved April 2025 from https://www.iso.org/standard/63787.html.

McClure, D. & Graham, A. (2006). *eCall – The Case for Deployment in the UK, Final report*. SBD. Ref. SBD/TEL/1100a.

National Highways (2022a). eCall SOS. *The safety feature that gets you help quicker and faster*. Retrieved April 2025 from https://nationalhighways.co.uk/road-safety/ecall/.

National Highways (2022b). *What if you break down in a 'live' lane?* Retrieved April 2025 from https://www.youtube.com/watch?v=Seng1Ul08wo.

National Highways (2022c). *How your vehicle's eCall could save your life*. Retrieved May 2025 from https://youtu.be/0dFLrftH-8k?si=QyyR8cJQtlY5sRgg.

National Highways (2025). *Smart motorways stocktake: Fourth year progress report*. Retrieved April 2025 from https://nationalhighways.co.uk/our-work/smart-motorways-evidence-stocktake/.

NPCC (2024). *Response from NPCC*. Retrieved April 2025 from https://www.judiciary.uk/wp-content/uploads/2024/09/2024-0488-Response-from-NPCC.pdf.

Riley, P. & Holubová, A. (2006). *Ex-ante evaluation of an emergency call system (e-Call)*. TEMPO evaluation report.

Robertson, K. (2024). *Prevention of Future Deaths Report: Wilfred Fitchett, Jevon Hirst, Hugo Morris, and Harvey Owen (Ref: 2024-0560)*. Judiciary of England and Wales. Retrieved April 2025 from https://www.judiciary.uk/prevention-of-future-death-reports/wilfred-fitchett-jevon-hirst-hugo-morris-and-harvey-owen-prevention-of-future-deaths-report/.

Sihvola, N. Luoma, J. Schirokoff, A. Salo, J. & Karkola, K. (2009). *In-depth evaluation of the effects of an automatic emergency call system on road fatalities*. European Transport Research Review, 1(3): 99–105. Retrieved April 2025 from https://doi.org/10.1007/s12544-009-0016-3.

SMMT (2025). *UK Car Registrations*. Retrieved April 2025 from https://www.smmt.co.uk/vehicle-data/car-registrations/.

UKROEd (2025). *Trends & Statistics*. Retrieved April 2025 from https://www.ukroed.org.uk/scheme/trends-statistics/.

United Kingdom (2004). *Civil Contingencies Act 2004*. Retrieved April 2025 from https://www.legislation.gov.uk/ukpga/2004/36/contents.

United Kingdom (2019). *The Electronic Communications and Wireless Telegraphy (Amendment etc.) (EU Exit) Regulations 2019: SI 2019 No. 246* (Schedule 3). Retrieved April 2025 from https://www.legislation.gov.uk/uksi/2019/246/schedule/3.

United Nations Economic Commission for Europe. (2023). *UN Regulation No. 144 – Uniform provisions concerning Accident Emergency Call Systems (AECS) (Revision 1)*. UNECE. Retrieved April 2025 from https://unece.org/transport/documents/2023/02/standards/un-regulation-no-144-rev1.

Vauxhall Motors Ltd. (2023). *Vauxhall Corsa Owner's Manual*. Retrieved April 2025 from https://www.vauxhall.co.uk/content/dam/vauxhall/Home/PDFs/owners/owners-manuals/new-corsa/VCORSFO2309en_23_online.pdf.

VESOS (2025). eCall facts and figures. Retrieved April 2025 from https://vesos.co.uk/front_page/ecall-facts-and-figures/

Virtanen, N. Schirokoff, A. Luoma, J. & Kulmala, R. (2006). *Impacts of an automatic emergency call system on accident consequences*. Ministry of Transport and Communications, Helsinki, Finland.

Wilmink, I. Janssen, W. Jonkers, E. Malone, K. van Noort, M. Klunder, G. Rämä, P. Sihvola, N. Kulmala, R. Schirokoff, A. Lind, G. Benz, T. Peters, H. & Schönebeck, S. (2008). ***Socio-economic*** *Impact Assessment of Stand-alone and Co-operative Intelligent Vehicle Safety Systems (IVSS) in Europe, Impact assessment of Intelligent Vehicle Safety Systems*. eIMPACT Deliverable D4. R&D Programme on Real-time Transport Information AINO, January 6, 2006.

Zirra, D., Bratu, C., & Cucoreanu, I. (2022). A cost-benefit approach for analysing the impact of eCall technology on the EU passenger vehicles. Engineering Economics, 33(2), 143-160. https://doi.org/10.5755/j01.ee.33.2.29321

Appendix A. Interview summaries

SMMT

The Society of Motor Manufacturers and Traders (SMMT) is a prominent UK trade association that represents the interests of the British automotive industry. It acts as a unified voice for vehicle and component manufacturers, as well as those involved in the broader motor trade, advocating for their needs to the government, stakeholders and the media. The SMMT plays a crucial role in providing industry data, promoting the sector's interests both domestically and internationally, and working to ensure the UK automotive industry remains competitive.

A call was held with SMMT representatives to understand how the automotive industry views the uptake and use of the eCall system. Interviewees were:

- Senior Technology and Innovation Manager
- Technical Manager – CAVs and ADAS[7]

Background

- As a mandatory system, eCall has achieved good market penetration, with vehicles fitted with the system as per the regulatory requirement.
- Some anecdotal evidence of success, especially in rural areas.
- Estimate essentially 100% penetration of the system in ten years.

Manufacturers

- SMMT is supporting its members on compliance in relation to the 2G/3G shutdown.
- Manufacturers are taking this very seriously, since eCall is seen as a safety-critical system.
- The UK has agreed to adopt EU regulation for continuity of the system in the transition to 4G/5G.

TPSPs/PSAP

- Regulation allows for TPSPs – ultimately an emergency call has to go to PSAP.
- Offering calls via TPSP has a cost. Manufacturer has to prove calls still connect to PSAP as a fall back.
- Tends to be premium manufacturers who offer TPSP but in general, the industry leans on the regulatory approach; TPSP approach is considered going 'above and beyond'.

7 CAVs and ADAS: Connected and Automated Vehicles and Advanced Driver Assistance Systems.

User awareness and education

- National Highways ran an effective campaign on eCall awareness (eCall vs. bCall[8] etc.).
- Education of consumers is not necessarily seen as a priority – eCall is an automatic system that works in the background when needed.

Scheduled maintenance

- eCall is not part of the MOT inspection in the UK but the EU is planning to include it in future.

Achieving benefits

- Yes, from the automotive perspective, the eCall system is seen as a success.
- Issues around false alarms are being addressed. (e.g. need for a back-up power supply unit).

Other countries

- Other countries seem to take a more proactive approach to the benefits that eCall can achieve.
- The government's planned road safety strategy may provide opportunities to review the role of eCall in reducing death and serious injury.

Future of eCall

- Key topics: role of eCall in automated vehicle safety; extending scope of eCall to include HGVs; what happens to 2G/3G legacy fleet.
- eCall alerts being triggered when vehicles are being scrapped is still an open item for concern – updating protocols for scrapping vehicles would help.

BT

The UK's 999 emergency service is handled by BT, connecting individuals in urgent need with emergency services – police, ambulance, fire and coastguard. Interviewees were:

- Relationship Manager, Emergency Authority and Government
- 999 Product Manager Mobile

General comments

- Key benefits of eCall:
  - Automatic activation and collection of data sent directly to the PSAP at the time of the incident. No need for manual activation, although this is available.
  - This information is then placed onto BT's location server, Enhanced Information Service for Emergency Calls (EISEC), which emergency authorities can retrieve at the time of the call, allowing dispatch to the incident even if the occupants are unable to respond.

8 bCall: A system similar to eCall but used to connect vehicle occupants to an operator to provide support for non-emergency vehicle breakdown situations (bCall = breakdown call).

- BT is developing a VIN lookup service so the VIN is translated into make/model/VRM, etc.; development work is ongoing.
- There are lots of false activations and more in poor (cold) weather, perhaps likely due to battery issues in the cold. Lots of repeated activations from individual vehicles.
- False alarms rise in proportion to the total number of eCalls/vehicles equipped.
- Some false alarms are filtered out by TPSP triage.
- Emergency services have some difficulties with the VIN that comes with the eCall, and BT is aiming to enhance the data with vehicle make, model, VRM, etc. Only police can access vehicle details from a VIN; other agencies do not have access to Law Enforcement Data Service (LEDS).
- eCall voice quality can be affected by background noise; BT aims to quickly connect to the appropriate emergency service who will triage the call. If BT999 are unable to identify which service is required or that an EA is not required, the call will be passed to the police.
- Poor call quality can increase the time to triage but BT connects calls to the police if unable to identify which emergency service is required, following agreed procedures (e.g. silent calls).

TPSPs

- BT is working on a data interface to allow transfer of eCall data.
- Any digital interface requires the TPSP call centre to be in the UK due to connection security restrictions.
- Current data handover from TPSP to BT999 is verbal (read out over the phone).
- Calls made from TPSP call centres will have the Caller Line Identification (CLI) data from the registered number of the call centre. BT update with the caller number, if it has it, from the TPSP before connection. If the TPSP is unable to provide a valid number, its number is passed through as BT must pass a valid number when connecting to an emergency service.
- TPSP onboarding:
    - A TPSP contacts the BT999 service and goes through the onboarding process with BT. There is a Memorandum of Understanding and Service Level Agreement that is put in place to support this.
    - Contact is generally made via BAPCO, EENA and OFCOM, or through the 999 EAGR (Emergency Authority and Government Relationship) team. Contact is also made through BT Account Managers.
    - There is nothing stopping a TPSP dialling 999 if in the UK and manually delivering a call to the BT PSAP without registration. However, this would likely be picked up on calls and reported by BT or the emergency services.
- EN 1645:2023 end-to-end testing with TPSP is mainly telephone call testing only, with no data transfer.

Data transfer

- The Enhanced Information Service for Emergency Calls (EISEC) format currently holds eCall data but this does not include all MSD elements. The service is operated with the agreement of 999LC.
- EISEC for eCall was designed for an earlier telematics standard. The 999LC agreed with BT which data would be shared with the emergency services.
- EISEC2 can support all eCall MSD data but 999LC will decide what fields it wants included (they still may not want the last three locations or number of passengers).
- Raw MSD data is held for three months.
- MSDs are held in EISEC for emergency service access for 30 minutes only.

False alarms

- BT reviews false alarms and may investigate if numerous activations from one unit are causing a service-affecting issue to BT or the emergency services, e.g. BT had to contact Tesla via the mobile network operator to deactivate an individual Tesla that was triggering multiple false alarms.
- Automatic activations represent a much smaller proportion (around 11%) of total eCall activations. It is very difficult to say which of these are false activations unless the person in the vehicle speaks to the BT advisor, or if BT receives lots of activations and can see that it is a faulty unit. Therefore, it is generally around 73% of automatic activations that are connected and treated as true activations, whereas it is around 70% of manual activations that are false.
- False alarms from automatic activations are around 28% compared to 70% for manual activations.
- BT does not have categorical data on false alarms.
- False alarms could potentially delay 999 response to genuine emergency calls – several call handlers might receive calls for a false alarm and be working to resolve them, reducing bandwidth for response to genuine calls.
- BT has to work with the emergency services if repeat calls are detected to identify a suitable approach that may be different to agreed procedures. This may be complex.

Future

- The EISEC2 format has more flexibility for more information (e.g. sends in XML format rather than 140 characters).
- EISEC2 includes encryption, thereby improving security and potentially enabling the inclusion of sensitive data (such as medical information) within eCall messages.
- BT provided the emergency services with the EISEC2 specification two years ago. No switch-over time has been specified, although the emergency services are being encouraged to move over as quickly as possible. No switch-off date for EISEC has been agreed at this point.
- BT is considering the effects on calls from wearable and other new technologies, and has concerns over the quality of data that could be provided. There is a 999LC working group looking at this.

- Future approaches may include data from smartphones and watches.
- The younger generation may have a preference for non-verbal communication – 999LC is looking into how the public might want to contact the emergency services and how it can provide more ways to enable access to emergency services.

Police emergency control centre operatives

An interview was held with the emergency control centre operatives from a police force, which shall not be identified. This was to understand how eCall fits into the everyday operational challenges and complexities of emergency response.

- The operation of eCall is not well understood, stemming from the rarity of such calls, quoted as being fewer than a handful per week.
- The majority of eCalls are transferred verbally in handover from BT999 service, which may also have filtered out some false alarms.
- The location of the incident is transferred verbally.
- Data in the EISEC format should automatically populate the control centre system.
- Work is in progress to migrate to the EISEC2 format.
- Not aware of any issues of receiving incorrect incident location information for calls routed via TPSP.

Appendix B. BAPCO members survey

Survey of vehicle Emergency Detection Alerts in Emergency Service Control Centres

The RAC Foundation, supported by the Department for Transport, is looking at how emergency detection alerts from vehicles, such as eCall, are used by the emergency services and agencies. As part of this, we want to know how well eCall is understood, used and viewed by the people involved in emergency responses. We are also interested in how other vehicle emergency detection alerts, such as Google's "Car Crash Detection" and Apple's "Crash Detection", are used.

eCall is an emergency alerting system fitted to all cars and vans type approved since 2018. It can be activated by a person pushing the SOS button, or by the vehicle if it detects a collision. The eCall system makes a call using a built-in mobile sim, microphone, and speaker, and will contact either the vehicle manufacturer's call centre or 999. eCall also sends a small set of data about the location, time and vehicle with the call.

Google's "Car Crash Detection" and Apple's "Crash Detection" are activated on a mobile phone when a collision is detected and can be configured to call 999 from the phone.

We would be grateful if you could complete this questionnaire about your work experiences with these technologies. Your responses are anonymous. You do not need to answer all questions or give your name.

Do not disclose sensitive or personal information in your responses.

This questionnaire will be available until 28th Feb 2025. If you wish to discuss the questionnaire further please contact Xx Xxxx Xxxx xx xxxx@xxxx-xxxxxxxx.xx.xx.

Please only submit one response per person. If you have any issues with this questionnaire, please email xxxx.xxxxxx@xxxxxv.xx.xx.

We would like to thank you in advance. Your responses will help us understand the challenges and use of eCall today, to help us improve its use in road safety in the future.

A: About your role and organisation

This section helps us understand your role and the organisation you work for.

1. A1: What is your job title?

2. A2: Which agency or emergency service do you work for?

Mark only one oval.

- Police Service
- Fire Service
- Ambulance Service
- Marine and Coastguard
- National Highways
- Other:

3. A3: What is your department?

4. A4: Which best describes your role?

Mark only one oval.

- Operational
- Managerial
- Other:

5. A5: Which regions do you cover?

Tick all that apply.

- England
- Scotland
- Wales
- Northern Ireland
- Republic of Ireland
- Other:

6. A6: How many years of experience do you have in Emergency Services?

Mark only one oval.

- 0 to 5 years
- 6 to 10 years
- 11 to 15 years
- 16 or more years

7. A7: WWhich roles do you perform?

Tick all that apply.

- Call Taker
- Dispatcher
- Team Leader / Supervisor
- Operational Manager
- Analyst
- Technical Manager
- Technical Support
- Other:

B: How you use eCall

This section helps us understand how you use eCall alerts today

8. B1: How familiar are you with eCall alerts?

Mark only one oval.

- Very familiar
- Somewhat familiar
- Not familiar

9. B2: How frequently do you encounter eCall alerts during your duty?

Mark only one oval.

- Daily
- Weekly
- Monthly

Rarely

Never

10. What types of incidents are most reported through eCall alerts during your duty?

Tick all that apply.

- Collisions
- Vehicle breakdowns
- Medical emergencies
- Hazards
- Congestion
- False alarms
- Other:

11. B4: Do you have any procedures or work instructions for handling eCall alerts (please give brief details)?

C: Quality and performance of eCall data

This section helps us understand how useful eCall alerts are to you today.

12. C1: How would you rate the location accuracy of eCall alerts?

Mark only one oval.

Excellent

Good

Fair

Poor

Other:

13. C2: How accurate is the information provided by eCall alerts regarding the nature of incidents?

Mark only one oval.

- Very accurate
- Somewhat accurate
- Not accurate
- Other: ______________________________

14. C3: How often do you get false alarms or accidental activations with eCall alerts?

Mark only one oval.

- Daily
- Weekly
- Monthly
- Rarely
- Never

15. As a percentage, how many eCalls are false alarms?

Mark only one oval.

- Less than 25%
- Between 25% and 50%
- Between 50% and 75%
- More than 75%

16. C5: How common are these reasons for not progressing eCall alerts?

Mark only one oval per row.

	Never	Rarely	Occasionally	Frequently
Vehicle fault that activated the eCall	⬭	⬭	⬭	⬭
Silent or dropped call	⬭	⬭	⬭	⬭
Unable to communicate with caller (e.g. language, noise)	⬭	⬭	⬭	⬭
Caller declines any further assistance	⬭	⬭	⬭	⬭
Situation is not an emergency	⬭	⬭	⬭	⬭

17. C6: How long does it typically take for an eCall alert to reach your service or agency?

Mark only one oval.

- ⬭ Less than a minute
- ⬭ 1 to 5 minutes
- ⬭ Up to 30 minutes
- ⬭ Up to an hour
- ⬭ More than an hour

18. C7: eCall units send data with the call; how does eCall data appear in your operational systems?

Mark only one oval.

- ⬭ The eCall data is clearly laid out and accessible
- ⬭ Some eCall data is clearly laid out and can be easily found
- ⬭ eCall data is hard to understand and/or hard to find
- ⬭ We do not see the eCall data in our operational systems
- ⬭ Other: ____________________

19. C8: How do you pass this eCall data on to other parties (e.g. National Highways or other responders)?

Tock all the apply.

- [ ] Via phone
- [ ] Via digital transfer (e.g. your system to their system)
- [ ] Other: ____________________

D: How you use other emergency detection alerts

This section helps us understand how you use emergency detection alerts like Google's "Car Crash Detection" and Apple's "Crash Detection" today.

20. D1: How familiar are you with emergency detection alerts like Google's "Car Crash Detection" and Apple's "Crash Detection"?

Mark only one oval.

- ( ) Very familiar
- ( ) Somewhat familiar
- ( ) Not familiar

21. D2: How frequently do you encounter these alerts during your duty?

Mark only one oval.

- ( ) Daily
- ( ) Weekly
- ( ) Monthly
- ( ) Rarely
- ( ) Never

22. D3: What types of incidents are most reported through these alerts during your duty?

Tock all the apply.

- [ ] Collisions
- [ ] Vehicle breakdowns
- [ ] Medical emergencies
- [ ] Hazards

☐ Congestion

☐ False alarms

☐ Other: ____________________

23. D4: Do you have any procedures or work instructions for handling these alerts (please give brief details)?

____

____

____

____

____

E: Quality and performance of other emergency detection alerts

This section helps us understand how useful emergency detection alerts like Google's "Car Crash Detection" and Apple's "Crash Detection" alerts are to you today.

24. E1: How would you rate the location accuracy of emergency detection alerts like Google's "Car Crash Detection" and Apple's "Crash Detection"?

Mark only one oval.

◯ Excellent

◯ Good

◯ Fair

◯ Poor

◯ Other: ____________________

25. E2: How accurate is the information provided by these alerts regarding the nature of incidents?

Mark only one oval.

◯ Very accurate

◯ Somewhat accurate

◯ Not accurate

◯ Other: ____________________

26. E3: How often do you get false alarms or accidental activations with these alerts?

Mark only one oval.

- Daily
- Weekly
- Monthly
- Rarely
- Never

27. E4: As a percentage, how many of these alerts are false alarms?

Mark only one oval.

- Less than 25%
- Between 25% and 50%
- Between 50% and 75%
- More than 75%

28. E5: How common are these reasons for not progressing these alerts?

Mark only one oval per row.

	Never	Rarely	Occasionally	Frequently
Phone fault that activated the alert				
Silent or dropped call				
Unable to communicate with caller (e.g. language, noise)				
Caller declines any further assistance				
Situation is not an emergency				

29. E6: How long does it typically take for these alerts to reach your service or agency?

Mark only one oval.

- Less than a minute
- 1 to 5 minutes
- Up to 30 minutes
- Up to an hour
- More than an hour

30. E7: Phones can send data with the call; how does this data appear in your operational systems?

Mark only one oval.

- The alert data is clearly laid out and accessible
- Some alert data is clearly laid out and can be easily found
- Alert data is hard to understand and/or hard to find
- We do not see the alert data in our operational systems
- Other: ____________________

31. E8: How do you pass this information on to other parties (e.g. National Highways or other responders)?

Tick all that apply.

- Via phone
- Via digital transfer (e.g. your system to their system)
- Other: ____________________

F: Training and awareness

This section helps us understand the level of training provided for handling emergency detection alerts

32. F1: Have you received any formal training on handling eCall or other emergency detection alerts?

Mark only one oval.

- Yes
- No

33. F2: If yes, how would you rate the effectiveness of the training?

Mark only one oval.

	1	2	3	4	5	
Poor						Excellent

34. F3: What additional training or resources would improve your handling of eCall or other emergency detection alerts?

G: Suggestions for improvements

This section helps us understand what you think needs to be done to make the most of these technologies.

35. G1: What improvements would you suggest to improve use of eCall or other emergency alerting systems?

36. G2: What additional features would be beneficial to your organisation?

Tick all that apply.

- [ ] At-scene video
- [ ] More vehicle details
- [ ] More collision details
- [ ] More recovery details

☐ More driver/passenger details

☐ Other: ______

37. G3: Based on your current experience, how do you rate the benefit of eCall to your emergency service role?

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
No benefit	⬭	⬭	⬭	⬭	⬭	⬭	⬭	⬭	⬭	⬭	Essential

38. G4: Do you have any more comments or suggestions?

______

End of questionnaire

Thanks for taking the time to complete this survey. Please now click Submit.

Your responses are invaluable to make the most of emergency detection alerts, so we can get faster, better and more reliable emergency responses for UK road users.

If you would like to provide more feedback, we would be happy to hear from you. Please contact Dr Nick Reed at xxxx@xxxx-xxxxxxxx.xx.xx with your comments.

RAC Foundation

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The Royal Automobile Club Foundation for Motoring Ltd is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

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