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Review

Understanding E-Consent in Anaesthesia: A Review of Clinical, Legal, and Ethical Dimensions

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Abstract

The integration of electronic consent (e-consent) into anaesthetic practice has accelerated since the Coronavirus Disease 2019 (COVID-19) pandemic, offering new opportunities to enhance patient autonomy, documentation fidelity, and clinical efficiency. This review examines the clinical, legal, and ethical dimensions of e-consent, situating it within the statutory and common law frameworks, such as the Mental Capacity Act 2005 and the principles established in Montgomery v Lanarkshire Health Board. It further interrogates the challenges posed by digital exclusion, cybersecurity vulnerabilities, and the environmental implications of transitioning to digital platforms. The emerging role of artificial intelligence in tailoring and strengthening consent processes is explored, while highlighting the imperative to preserve ethical integrity and legal validity.

Keywords: electronic consent; anaesthesia; informed consent; medicolegal frameworks; digital health innovation; cybersecurity

1. Introduction

Electronic consent (e-consent) refers to the process of securing informed consent through digital means instead of traditional paper documentation. Although its use expanded rapidly during the Coronavirus Disease 2019 (COVID-19) pandemic, particularly in academic medicine [1], and has since gained traction in clinical settings, its implementation must be carefully framed within established legal parameters. Under English law, valid consent must satisfy the criteria of being voluntary, informed, and given by an individual possessing capacity [2], regardless of the medium. E-consent platforms must comply with the requirements of the Mental Capacity Act 2005, the Data Protection Act 2018, and adhere to common law principles articulated in Montgomery v Lanarkshire Health Board (2015) [3], which obliges clinicians to disclose material risks that a reasonable person in the patient's position would find significant. Furthermore, the digital nature of e-consent demands strict adherence to confidentiality obligations and robust cybersecurity measures to preserve the integrity of the consent record. It is therefore imperative that e-consent systems are designed not merely for convenience, but to ensure compliance with legal duties, protect patient autonomy, and withstand legal scrutiny.

Consent in anaesthesia can be obtained as implied, verbal or written. In the UK, a separate consent form is not required when anaesthesia is needed to facilitate a surgical procedure [4]. However, written signed consent is obtained where the anaesthetic procedure is the primary intervention, such as performing an epidural blood patch in an obstetric theatre as a treatment modality after post-dural puncture headache (PDPH). Elective procedures provide an opportunity for patients to be assessed in an outpatient setting, such as a pre-assessment clinic. This environment is ideal for offering patients the necessary information to make informed decisions. Traditionally, this information has been provided through face-to-face consultations, information leaflets, and educational videos.

This article will explore the advantages and pitfalls of implementing e-consent in the healthcare setting, showing how e-consent will have to adapt to the challenges of modernisation of healthcare and patient expectations, whilst adhering to the UK law and ethics.

2. Legal and Ethical Requirements in the UK

In the UK, consent is governed by both common law and statutory law. Common law refers to a person's autonomy in that it must be given voluntarily, the person must be informed and have capacity [2]. Consent must be documented, it can be implied, verbal or written. Implied consent refers, for example, to a patient holding out their arm for a blood test. Consent must also follow the laws of confidentiality and only be broken in exceptional circumstances such as public safety [5]. The statutory laws that enable patient autonomy and protect vulnerable patients are as follows [6]:

(1) The Mental Capacity Act 2005;

(2) Mental Health Act 1983;

(3) Human Tissue Act 2004;
(4) Children Act 1989;
(5) Data Protection Act 2018;
(6) Health and Social Act 2008.

The Association of Anaesthetists Great Britain and Ireland (AAGBI) consent for anaesthesia [4] was updated to include the test of materiality from Montgomery v Lanarkshire Health Board [3]; to obtain informed consent, a patient should be made aware of all risks that a reasonable person in the patient's position would attach significance. However, provisions for e-consent were not made in this guidance. Twelve recommendations were made in this guideline, eight of which could be successfully implemented with the use of e-consent. E-consent allows patients to access and review consent materials beforehand, enabling more informed decision making and aligning with legal requirements for thorough and informed consent. E-consent makes the consent process more efficient and focused, allowing anaesthetists to review patient concerns in advance and ensuring that final discussions address key issues. McCulloch vs the National Health Service (NHS) explores the issue of discussing reasonable alternative treatments. This can be enhanced with e-consent, as patients have more time to review and think about their possible treatment options, enabling the clinician to have a more focused and personalised discussion. This not only improves the quality of consent but also enhances compliance with legal standards, contributing to both the sustainability and accuracy of documentation in anaesthesia practice [7].

Documenting consent is crucial and legally mandated. A regional medical centre in California reported a reduction in documentation errors from 32% with paper-based consent to just 1% using e-consent [8]. With e-consent systems, it becomes possible to track what information patients reviewed, how much time they spent on it, and which risks they chose to skip. E-consent not only enhances accuracy but also offers clear audit trails, supporting data collection and quality improvement efforts.

E-consent must comply with stringent data-protection and security requirements, as these are integral and legally mandated components of the consent process. The Data Protection Act (DPA) 2018 modernises the UK's data-protection framework for the digital era and operates alongside the EU's General Data Protection Regulation (GDPR)—now incorporated as the UK GDPR—to safeguard patient information held within electronic health records (EHRs). Consequently, effective e-consent systems are dependent on robust and resilient EHR infrastructure. This is because cyber threats are very real and potentially damaging. The Synnovis Ransomware Attack that happened in June 2024 affected a pathology provider leading to thousands of outpatient appointments and operations being postponed in some London trusts [9].

Ethically consent must uphold the principles of patient autonomy whilst giving patients access to clear, up-to-date information to enable them to make a decision. E-consent can both help and hinder this process. It is helpful, as information can be presented in various formats, the patient may have more time to think about their decision and ask clinicians more relevant questions that are personal to them. On the other hand, clinicians can automatically prepopulate e-consent forms for common procedures, risking depersonalising the process of consent. E-consent and paper consent must abide by the same ethical principles [10].

The difference between e-consent and an EHR, is that an EHR may not necessarily have e-consent enabled as a feature. This means that paper consent, by its nature, is more versatile in its use, as it can be used by hospitals that use either electronic health records or paper records.

Fig. 1 is a Venn diagram showing that e-consent is a part of an EHR, which is a much larger aspect of patient records, and beyond the scope of this article. The Venn diagram overlaps, because many EHRs will allow for paper forms to be scanned into patient records, to provide clinicians with a comprehensive detail of the patient's medical history. The comparison between e-consent versus paper consent is therefore not the same as EHR versus paper records.

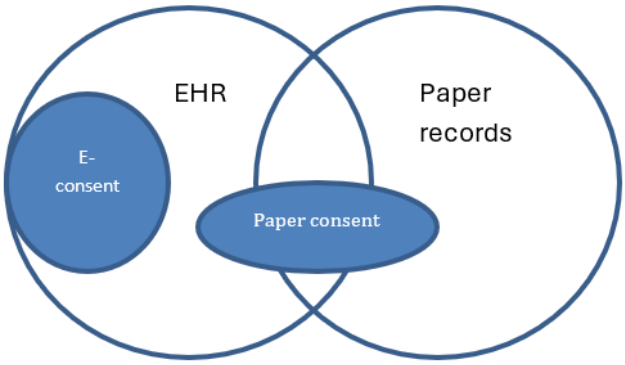

Fig. 1. From paper to digital: consent within hybrid health record environments. EHR, electronic health record; E-consent, electronic consent.

3. Benefits of E-Consent

E-consent offers advantages over paper-based consent by incorporating multimedia tools like videos and other educational resources. These tools can help patients better understand the information presented and allow them to ask questions for further clarification. Additionally, e-consent enables patients to receive information about the risks and benefits of anaesthetic procedures in a timely manner, giving them the flexibility to review the material at their own pace. This allows patients to delve deeper into details they find significant, including potential risks. Another advan-

tage of e-consent, is being able to do this via telemedicine, and so patients do not have to travel long distances to see their specialists, and also have their e-consent available on their mobile phones or tablets when accessing their electronic health record. The additional access and time mean that patients may feel more empowered when they are either consenting to or refusing a particular treatment.

Houten *et al*. (2025) [10] conducted a micro-costing analysis across multiple NHS Trusts to evaluate the financial implications of adopting electronic consent over traditional paper-based methods. Their methodology involved collecting detailed cost data related to staff time, administrative processes, litigation risk, and information technology (IT) infrastructure. They modelled both the short- and long-term costs and savings associated with transitioning to e-consent. The results showed that digital consent significantly reduced administrative errors, improved documentation quality, and provided better traceability, contributing to enhanced legal defensibility. One of the key findings was the potential to save approximately £202,000 (273,720 USD) per avoided litigation case, largely due to clearer audit trails and reduced ambiguity in consent records. Efficiency gains were also reported, particularly in busy clinical settings, where e-consent streamlined patient flow and reduced paperwork burdens. However, these outcomes depend on key factors such as dependable IT infrastructure, staff proficiency with digital systems, and successful implementation—all of which may vary across different healthcare settings.

4. Challenges and Limitations

E-consent may disadvantage those who are not well-equipped, trained, or familiar with the technology, such as individuals at the extremes of age or those from lower socioeconomic backgrounds. Clinicians that use e-consent in their daily practice must be mindful of this and not disadvantage those with digital illiteracy, and still provide the same breadth of information, time and respect when consenting that cohort [11]. E-consent can become challenging, or even burdensome, in situations where a patient requires emergency, life or limb-saving procedures, where time is critical. In such cases, traditional paper consent might be a more practical solution, for example, a category 1 caesarean section. In these urgent settings, the application of e-consent is more difficult and may not be feasible. The critical nature of these cases often necessitates a face-to-face discussion to obtain paper-based consent [1]. In situations where a patient lacks the capacity to provide consent, e-consent may not be feasible, and the procedure may need to be performed in the patient's best interest, guided by clinical judgement and ethical considerations. Efforts should also be made to identify if a relevant Advance Decision or a nominated Lasting Power of Attorney (LPA) is available to ensure the patient's wishes are respected. While a paper-based consent form could be signed by the clinician in these cases, digitising all consent forms and capacity assessments could allow the LPA to provide an electronic signature [12].

E-consent relies on seamless technological functionality; any disruptions, such as internet downtime or cybercrime threats, can compromise the consent process. Therefore, a backup paper-based consent form remains essential to ensure continuity and reliability. A hybrid system, where e-consent is the primary method but supported by traditional paper consent forms as a fallback, could effectively address these challenges. This approach balances the efficiency and modern capabilities of digital tools with the reliability and accessibility of established practices, ensuring preparedness for a variety of clinical scenarios.

5. Sustainability

Sustainability is becoming a key focus in anaesthetic practice, particularly in the UK, where the Royal College of Anaesthetists (RCoA) emphasises the importance of reducing the environmental impact of anaesthetic procedures [13]. As NHS Trusts across the UK increasingly adopt EHRs to reduce paper waste and move towards digitalisation, e-consent can be seamlessly integrated into these systems.

Kwon *et al*. (2024) [14] conducted a life cycle assessment at a large Indian eye hospital, using International Organization for Standardization (ISO) standards to compare the environmental impact of electronic and paper medical records. They found electronic medical records (EMRs) produced slightly higher carbon emissions, mainly due to electricity use and device manufacturing, even with 100% solar energy. The study concluded that while EMRs offer clinical benefits, their environmental sustainability depends on energy sourcing and IT infrastructure. This suggests that when implementing e-consent, digital gains must be balanced against ecological impacts, especially in settings without sustainable energy systems.

Even if this were hypothetically negligible, the cost of ongoing IT support is not, for example, Guy's and St Thomas are spending £450 million (620 million USD) over a 15-year period for ongoing support with their EHR [15].

6. Implementation

Implementing e-consent systems in anaesthesia involves upfront costs for technology and training, but these can be offset by savings from improved efficiency. The question remains how long it takes for efficiency savings to offset that upfront cost. Additionally, thorough documentation can help mitigate legal risks, though ongoing maintenance and cybersecurity also add to the overall expense.

Some NHS hospitals in the UK that have implemented e-consent into their EHR have described the process as not happening overnight; instead, it was iterative, requiring many months of planning, training, and obtaining equipment like tablets to enable clinicians to use e-consent in their practice. Other NHS hospitals have found one of the

difficulties of implementing e-consent was the reliability of their internet connection; a poor connection made the whole process much slower than paper consent [16].

7. Patient Satisfaction

Certain Trusts have done patient and staff surveys on their thoughts on e-consent [16]. They found, on the whole, patients were quite satisfied, with the following quotes:

"I was well satisfied the process was efficient, well explained, and clearly saved valuable time."

"Nothing to improve so much better signing a consent and receiving your paperwork straight to your email, and no waiting around for letters."

However, there were also patients who were more disgruntled with the new e-consent process:

"Doctor reading from the screen does not instil confidence in the knowledge of procedure."

Fraser-Govil *et al*. [16] had a high response rate from patients, and so their conclusion that, on the whole, patients were satisfied with the new e-consent is a positive sign for the future. However, the authors acknowledge that because the staff response rate was low, only 36 completed feedback, versus 853 from patients, the results obtained from staff may show negative response bias, meaning that those who were disgruntled were more likely to complete the form. On the other hand, the authors also noted that the patients who completed the questionnaire did so from an email link, this will invariably exclude those with digital illiteracy.

8. Future Directions—Era of Artificial Intelligence (AI)

8.1 Personalising E-Consent Delivery Through Artificial Intelligence

Artificial intelligence (AI) holds significant promise in refining the delivery of e-consent by personalising the experience based on individual patient characteristics. AI-driven platforms can dynamically tailor the complexity and format of consent information, adjusting to variables such as language preference, comprehension level, and previous interaction history. This adaptability ensures that all patients—regardless of their background or digital literacy—receive accessible and meaningful information, thereby reinforcing the legal standards of informed and individualised consent established in Montgomery v Lanarkshire [3].

8.2 Optimising Consent Pathways to Strengthen Clinical Efficiency and Procedural Assurance

AI can also play a vital role in optimising clinical workflows during the consent process. Intelligent systems may identify incomplete entries, highlight frequently misunderstood content, or flag patients requiring further clarification. Predictive analytics could anticipate potential hesitancy or refusal, prompting timely clinician involvement. These functionalities not only improve the accuracy and completeness of the consent process but also support more efficient service delivery in high-demand clinical environments.

8.3 Upholding Ethical Principles and Legal Accountability in AI-Driven Consent

The deployment of AI within e-consent systems must be governed by rigorous adherence to ethical principles and legal standards. Algorithms must be designed to ensure transparency, fairness, and accountability, particularly where they influence patient comprehension and decision-making. Full compliance with data protection frameworks, notably the UK GDPR, is imperative, alongside the maintenance of robust audit trails to safeguard medico-legal validity. While AI offers the potential to enhance the consent process, it must serve as a supportive tool that strengthens—rather than supplants—the clinician's fundamental duty to secure consent that is informed, voluntary, and ethically robust. Therefore, it is recommended that AI should not be used to replace the clinicians' involvement in the consent process.

9. Conclusion

The adoption of e-consent marks a significant progression in contemporary anaesthetic practice, enhancing patient engagement, improving the precision of documentation, and streamlining clinical workflows. Nevertheless, its integration demands careful navigation of complex clinical, legal, ethical, and technological considerations. Although evidence supports the role of e-consent in improving patient comprehension and satisfaction within elective pathways, limitations persist, particularly regarding digital access disparities, emergency scenarios, and the protection of patient capacity and data integrity. Emerging technologies such as artificial intelligence offer exciting opportunities to further personalise and strengthen consent delivery, yet they also heighten the responsibility to preserve professional standards and ethical rigour. A blended approach, combining digital innovation with traditional consent mechanisms, is likely to offer the most resilient and patient-focused model. As healthcare systems increasingly embrace digital transformation, it remains essential that anaesthetic consent processes uphold the core principles of autonomy, transparency, and clinical responsibility.

Key Points

• E-consent supports patient autonomy by providing accessible, multimedia information that patients can review at their own pace, improving understanding of material risks.

• Digital consent systems improve documentation accuracy, with clear audit trails that strengthen medicolegal defensibility compared with paper consent.

• Key challenges include digital exclusion, IT system reliability, and cybersecurity vulnerabilities, which may limit equitable access and compromise continuity of care.

• E-consent is less suitable in emergencies and situations involving impaired capacity, where traditional processes may remain necessary.

• Integration of AI may enhance personalisation and workflow optimisation, but must comply with legal and ethical standards, particularly in relation to transparency and data protection.

• A hybrid approach—combining digital platforms with traditional consent methods—may offer the most robust and patient-centred pathway during the transition to widespread digital adoption.

Availability of Data and Materials

All the data of this study are included in this article.

Author Contributions

MOW, ZMWM, SC and YM designed the work. MOW drafted the manuscript. All authors contributed to the important editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Not applicable.

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Conflict of Interest

The authors declare no conflict of interest.

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