

# The Role of Artificial Intelligence in Contraceptive Care: Applying the United Kingdom Medical Eligibility Criteria Framework (UKMEC)

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## Brief Report

### Abstract

Artificial intelligence (AI) is an emerging modality increasingly influencing global healthcare systems [4,5]. Adopting complex guideline recommendations within limited time is always challenging. Navigating through the UK Medical Eligibility Criteria (UKMEC) is time consuming, and it's difficult to select the appropriate contraceptive method due to the complexity of the guide as well as the presence of multiple medical conditions. This article addresses how integrating AI with the UKMEC framework can simplify and support the selection of appropriate contraceptive options. [1]. We suggest a hybrid AI model that combines rule-based safety logic with probabilistic machine learning [6]. Deterministic rules encode UKMEC Categories 1–4 to preserve absolute contraindications, while probabilistic modeling enhances individualized risk awareness [1,2]. AI integrated decision making can reduce cognitive burden, enhance safety and individualized patient centered counselling and save time [7,11]. However, its effectiveness relies on data governance and algorithm transparency.[8]. Bias mollification, clinical validation and evaluation of patient centered outcomes are mandatory before widespread implementation [9,10].

**Key Words:** artificial intelligence, UKMEC (United Kingdom Eligibility Criteria), contraception counselling, Clinical Decision Support Systems (CDSS), patient safety

## Introduction

Contraceptive counselling is a collaborative process that incorporates reproductive autonomy, fertility expectations, cultural beliefs, medical safety and preventive medicine. The consultation requires clinicians to integrate the principles mentioned above within a short time period during busy clinics, postpartum reviews and cases where emergency contraception is necessary.

The United Kingdom medical eligibility criteria (UKMEC) is a globally recognized and well established guideline for contraceptive use, providing comprehensive guidance on the suitability of different contraceptive methods for individuals with various medical conditions. But in practice, manually cross referencing comorbidities can be challenging due to time constraints and the possibility of errors [1,2].

In medicine, clinical judgment is always crucial. AI offers an opportunity to augment clinical judgment but not to replace it. This article proposes a transition from guideline based consultation to Clinical Decision Support Systems (CDSS) that optimize UKMEC guided decision making [4, 7, 11].

## AI as a clinical companion

We propose a hybrid AI model where patient safety is considered the core principle. At the foundation lies a deterministic rule-based system. Here, UKMEC Categories 1 through 4 are encoded into structured decision trees [1]. These rules act as non-negotiable safety barriers. For example, combined hormonal contraception in a patient with deep vein thrombosis (DVT) classified as UKMEC Category 4, would be automatically excluded, and this recommendation could not be bypassed by statistical prediction or an AI algorithm [1,2].

Upon this safety layer, there is a machine learning layer, which learns patterns from clinical data to recognize signals that may influence the suitability of a contraceptive method including compliance, previous history of intolerance and risks that are not immediately apparent such as thrombosis and malignancy risk. Nevertheless, these probabilistic assumptions do not override UKMEC recommendations but generate structured and safety filtered suggestions for clinicians.

## Integrating UKMEC into Complex Clinical Scenarios

Consider women with hypertension, type 2 diabetes, obesity and who are 2 weeks postpartum. In usual practice, clinicians must check UKMEC tables for diabetes and hypertension, assess vascular complications and cross reference obesity and breastfeeding status to suggest a suitable contraceptive method, which is time consuming, error prone and cognitively demanding.

On the other hand, an AI enabled Clinical Decision support System (CDSS) could automatically extract data on BMI, diabetes and hypertension status, lactation details and map each condition according to the UKMEC to identify the worst case scenario (UKMEC 3/4) for each contraception modality and present it in a defined colour coded system. For example, UKMEC 1/2 (LARC) in green and UKMEC 3/4 (COCP) in red. This allows clinicians to focus on targeted counselling rather than wasting time on cross referencing, while keeping human interactions intact [1].

## Technical Ethical Challenges

Sexual and reproductive data are highly sensitive. Privacy of the data, with robust

encryption, transparent well informed consent processes and clinical governance is essential [8]. Algorithms should be auditable and explainable where clinicians must have an understanding of the reason for the recommendation rather than accepting it blindly.

From a technical point of view safeguarding against automation bias, handling incomplete or contradictory data and accepting the possibility of technical errors are paramount. [9,10]. One must keep in mind that clinical judgment, cultural sensitivity, beliefs and situational awareness are irreplaceable.

Most importantly contraception counseling is not merely about considering or adhering to guideline recommendation or eligibility; it's about shared decision making, autonomy, life goals and values, where it should never be totally replaced by an AI modality [11].

## Conclusion

Artificial intelligence provides an opportunity to support clinical decision making by integrating the UKMEC framework by combining deterministic safety rules with probabilistic insights [4,5]. It reduces cognitive burden, enhances safety and precision while promoting technological advancement in modern health care practice. It should be designed so that it does not replace the clinician but rather helps to simplify complex scenarios, allowing conversations to remain grounded in trust, clarity and choice.

## Ethical Approval

This is a narrative and conceptual commentary based exclusively on published literature and established clinical

guidelines. It did not involve human participants, animal subjects, identifiable patient information, or the collection of primary data. Therefore, institutional ethical approval was not required.

## Author Contribution

D.G.M. Chamikara conceived the manuscript, conducted the literature review, developed the concept, and drafted the manuscript as the principal author. T. Padeniya and B. Perera supervised the work, provided critical intellectual input, and reviewed the manuscript. C.D. Weerawardhane and C.N. Dissanayaka contributed to the literature review. S.C. Desmen assisted with manuscript preparation and document formatting. All authors reviewed and approved the final version of the manuscript.

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## Conflict of interests

The authors declare no conflict of interests.

## Data Availability Statement

No primary datasets were generated or analyzed during the preparation of this article. The manuscript is a narrative and conceptual review based on publicly available sources, previously published literature and the author's own analysis and perspectives. Relevant references are appropriately cited throughout the manuscript.

## Statement on Artificial Intelligence Use

Artificial intelligence (AI) tools were used solely to assist with grammar and spelling correction, improve the clarity and

readability of the manuscript and to identify relevant references for consideration by the authors. All scientific content, interpretation of evidence, clinical opinions, manuscript structure, and final editorial decisions

were independently conceived, developed, reviewed, and approved by the authors. The authors accept full responsibility for the accuracy, integrity, and originality of the manuscript.

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