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A practical guide to apply AI in childhood cancer: Data collection and AI model implementation

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Childhood cancer is a leading cause of death in children, and the increasing availability of digital healthcare data, coupled with rapid progress in artificial intelligence (AI), brings a transformative opportunity to revolutionise its diagnosis, treatment and ultimately improve patient outcomes by leveraging diverse data resources. However, the effective application of AI in childhood cancer requires strict adherence to regulatory and best practice guidelines for patient data preparation and AI model development. Currently, there is a lack of such regulatory and methodological guidance specifically tailored for the paediatric community. This review seeks to address this gap. Beginning with an overview of existing regulatory frameworks, it examines the types of data currently in use or with potential use in developing AI applications for childhood cancer. This encompasses data from traditional sources, such as patient data and electronic health records (EHRs), as well as emerging sources like social media data and social determinants of health. This review also outlines the rules and criteria for collecting, processing, and sharing these data. Informed consent and re-consent are required for data collection and re-use, and data quality, privacy, and security as well as data standardisation, harmonisation and interoperability are important for data processing. Additionally, this review clarifies the essential requirements and methodologies for developing AI models in childhood cancer and healthcare. It also emphasises the importance of AI being trustworthy, protecting privacy, and being accountable and validated in clinical settings. By systematically addressing these key components, this review aims to provide comprehensive knowledge and practical tools for the reliable application and implementation of AI in paediatric cancer to enhance AI acceptance and promote its widespread integration within the childhood cancer community. This, in turn, will lead to improved diagnosis, treatment and outcomes for children with cancer.

Biography

Shuping Wen is affiliated with the Department of Paediatric Oncology and Haematology at Saarland University in Homburg, Germany. Their work focuses on advancing clinical care and research in pediatric oncology and hematological disorders. Through ongoing academic involvement and contribution to the field, Shuping Wen is committed to supporting improved diagnostic approaches, therapeutic strategies, and outcomes for children with cancer and blood-related conditions.