

Elevating Oncological Care through Robust Electronic Medical Record Systems

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Cancer care today is defined by complexity, precision, and multidisciplinary collaboration. From genetic and molecular diagnostics to surgery, radiotherapy, systemic therapy, and survivorship, oncological practice generates vast quantities of heterogeneous data over extended time spans. As health systems pursue greater efficiency, quality, and patient safety, Electronic Medical Records (EMRs) emerge as a cornerstone for modernizing oncology. But realising their potential demands not only technology, but thoughtful design, governance, and evidence-based integration.

The case for EMRS in oncology

Comprehensive and Coordinated Care:

Oncology involves multiple disciplines: medical oncology, radiation oncology, surgery, pathology, radiology, palliative care, nursing, rehabilitation, etc. EMRs provide a unified platform for tracking diagnostic tests, treatment regimens, imaging, toxicities, symptom burden, and long-term follow-up. A mixed-methods study of an ambulatory cancer care centre found that an EMR designed as a care-pathway information system improved users' perceptions of access, quality of clinical data management, and coordination of shared care processes.¹

Enabling Research and Real-World Evidence:

EMRs enable large-scale outcomes research and quality improvement. A study comparing EMR data from community oncology clinics with registry data found good concordance for many tumour types, supporting their use in research, though standardization remains a challenge.² Natural language processing (NLP) tools have been validated for extracting staging and treatment information from free text, offering powerful solutions to harness unstructured data.³

Patient Engagement and Communication:

EMR systems that support secure messaging, portals, and remote monitoring improve screening

adherence, medication compliance, and patient–clinician communication. A systematic review in breast cancer care showed significant improvements in screening rates and adherence through EMR-based interventions.⁴

Decision Support and Safety:

Standardizing data capture allows EMRs to deliver alerts on chemotherapy dosing, drug interactions, and guideline recommendations. Studies show that structured EMR implementation reduces care variability and improves safety outcomes.⁵

Alignment with Guidelines:

Recent ASCO guidelines emphasize early integration of supportive and palliative care, survivorship planning, and use of patient-reported outcomes — all of which require robust EMR support.⁶ Digital health frameworks likewise identify EMRs as foundational infrastructure for telehealth, remote monitoring, and precision oncology.⁷

Challenges in implementation

Despite strong justification, EMR use in oncology faces challenges:

- **Interoperability:** Lack of common standards across institutions leads to fragmented records and incomplete data.⁵
- **Unstructured Data:** Significant clinical detail resides in free text; NLP and manual abstraction require resources and validation.³
- **Clinician Burden:** Poorly designed systems can increase documentation time and reduce time for patient interaction.¹
- **Data Privacy:** Oncology records often include genetic and prognostic data, necessitating strict security measures.
- **Resource Constraints:** In low- and middle-income countries (LMICs), infrastructure and workforce limitations are key barriers. Basic EMR requirements such as security and governance rank higher in importance than advanced features like decision support.⁸

The way forward

To realize the promise of EMRs in oncology:

1. Design for Workflow: Engage clinicians in system design to align EMR functions with diagnostic and treatment pathways.¹
2. Standardize and Interoperate: Adopt standards like SNOMED CT, LOINC, and HL7 FHIR; leverage oncology-specific models like mCODE.
3. Leverage Structured and Unstructured Data: Combine structured fields with validated NLP pipelines for comprehensive data capture.³
4. Empower Patients: Expand portals and remote monitoring features to support engagement, survivorship, and symptom reporting.⁴
5. Train and Support Users: Offer comprehensive training, phased rollouts, and responsive IT support to reduce clinician burnout.
6. Strengthen Governance: Establish robust frameworks for data privacy, consent, and ethical secondary use, especially in LMIC settings.⁸

Conclusion

Electronic Medical Records have the potential to transform oncological care: improving coordination among multiple specialties, enhancing patient safety, facilitating research, and enabling a patient-centric approach through better communication and monitoring. The empirical literature and guideline updates underpin these benefits. But adopting EMRs is not a plug-and-play proposition. To realize their promise, health systems must attend carefully to implementation: ensuring standardization, usability, interoperability, and robust governance. As cancer treatment becomes more personalized and data-driven, EMRs will increasingly be not just tools of record keeping, but active drivers of quality, safety, and innovation in oncology.

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