



Design and Implementation of an Integrated EMR/RIS/PACS Platform in Africa

Maruf Adewole, PhD, Postdoctoral Research Fellow, University of Pennsylvania

Kelvin Njeru, MBChB, MD; Roselyne Okello, MD; Henry Rabah, MD; Udunna Anazodo, MD

Background/Problem Being Solved

Private and faith-based healthcare facilities account for the majority of health services in Africa. Access to affordable and Fast Healthcare Interoperability Resources (FHIR) compliant software hinders efficient patient care leading to poor health outcomes. This has precipitated manual record keeping and siloing of patient records within facilities. Current commercial platforms for record keeping: Electronic Medical Records (EMR), Radiology Information System (RIS), and Picture Archiving and Communication System (PACS) are expensive and not well integrated across the disparate clinical pathways/facilities. This challenge is a major contributor to delivery of timely and accurate diagnoses in Africa.

Intervention(s)

We have developed the Sonar Informatics Platform (SIP) to offer an open, web-based RIS and PACS platform with a custom EMR integrated for cost-effective acquisition, sharing, and archiving of medical data and images (Figure 1). SIP leverages the open-source OpenMRS and Orthanc PACS functionalities and is hosted on our own servers with multiple redundancies ensuring compliance with local data protection laws, scalability and reliability. Secure access was implemented using Firebase. Individual facilities self-host a lite version of the EMR, synchronized with the central EMR.

Barriers/Challenges

High server set up cost.

Outcome

SIP (Figure 2) was deployed in a pilot imaging center in Nairobi, Kenya and at two sister peripheral imaging centers in rural Kenya (400 km from Nairobi). It demonstrates improved efficiency in data management and accessibility. User feedback indicates enhanced workflow integration and significant cost savings compared to existing commercial RIS/PACS systems. Detailed performance metrics, including image archival and retrieval times and cost savings are under evaluation.

Conclusion/Statement of Impact/Lessons Learned

SIP enables timely access to life saving diagnostics and care with a secure single patient record across facilities in a resource limited setting. Future steps include embedding AI tools (e.g., Speech to text and large language models).

SIP enhances the secure sharing of patient data among facilities while ensuring affordability. This potentially improves patient outcomes and reduces the cost of care.

Figure(s)

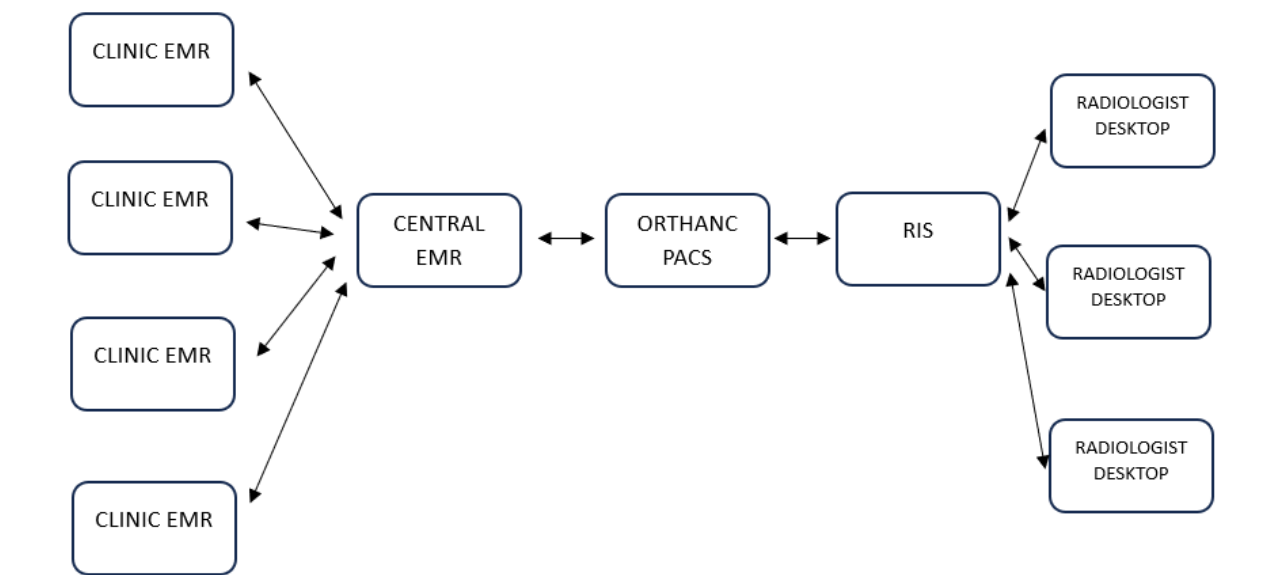


Figure 1. SIP conceptual framework

RADIOLOGY REPORTING SYSTEM										RADIOLOGIST		Logout
Search Table	Index	Patient ID	Patient Name	Study Date	Study Time	Study Description	Series	Referring Doctor	Actions			
<input type="text" value="Search"/>	1	MR 6376/2024							More			
<input type="text" value="Search Server"/>	2	MR 6378/2024							More			
<input type="text" value="3days"/>	3	MR 6375/2024							More			
<input type="text" value="Patient ID"/>	4	MR 6373/2024							More			
<input type="text" value="Study From dd/mm/yyyy"/>	5	CT 4657/2024							More			
<input type="text" value="Study To dd/mm/yyyy"/>	6	MR 6372/2024							More			
<input type="text" value="Study ID"/>	7	CT 4656/2024							More			
<input type="text" value="SEARCH"/>	8	MR 6371/2024							More			
	9	CT 0000/2024							More			
	10	CT-4655/2024							More			
	11	MR 6369/2024							More			
	12	CT-4654/2024							More			
	13	X-5551/2024							More			
	14	MR 6377/2024							More			

Figure 2. SIP Screenshot

Keywords

Clinical Workflow & Productivity; Enterprise Imaging; Storage