New EHR Deployment Project Review

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Term Project

CS 581

Virginia Women's Center

Project goals

Enhance patient care

- Patient information **access and transfer**
- Easy registration, scheduling, flexible location options, more time with providers
- Improve engagement

Enhance Revenue Cycle Management

- Improve coding, charge entry, billing
- Improve **claim** management
- Long-term cost savings

Improve operational efficiency

- Staff – Easier/quicker access to **charts**, streamlined workflows, **automate** tasks (like referrals)
- Reduced paperwork, handle more patient volume

Improve Security and Privacy

- Improve the security of patient data, its storage, and communication
- HIPAA compliance

Facilitate interoperability

- With other EHRs, VirginiaConnect **HIE**, and public health agencies
- Successfully participate in **MIPS** PI

Greater staff satisfaction

- Physician–**decision support, real-time remote chart access**
- Administrative – streamlined workflows, real-time admin information update

Team members

Clinicians

Physician Champion

Physician assistant lead

Nursing Lead

Lab staff lead

Chief Medical Information Officer

Chief Medical and Nursing officers

Finance and Legal

Chief Finance Officer

Purchase

Billing Lead

EHR lead

EHR implementation manager

Administration

Hospital administration lead

Registration staff lead

Operations lead

Compliance lead

Information Technology

Chief Information Officer

Security lead

IT lead

Developing clinical workflow to reflect the new EHR

Process	The AS-IS	The TO-BE (aligned with EHR goals)	Information needed	Benefits
Registration and patient data capture	Done by the admin staff from a **'bubble-sheet' form filled by the patient**	Data captured **by EHR's 'Registrations' tab**, old data pulled automatically	Patient health data, demographic data	Accurate, faster, reduced wastage of resources in 'correcting' patient entered data
Insurance verification	Done **manually over the phone** after the visit	• Done by the **EHR** automatically • Point of service **copay** collection	Patient plan details to send to providers and confirm eligibility	Efficiency, **upfront eligibility, and payment information,** and reduced payment problems
Diagnosis	Done by physician, entered into existing EHR	Done using **CDSS**, better compliance with protocols	Patient health assessment and tests Physician ID	Compliance with treatment protocols leads to better claim approvals
Tests and procedures	Ordered by physicians, entered into EHR separately for billing and record	Order captured and sent directly to the lab/ radio **(CPOE),** nurses, and billing as per customization.	Test/ procedure ordered. Authorized staff (Physician's and Nurses IDs)	Faster, more accurate, and better for privacy as no middle-people.

Developing clinical workflow to reflect the new EHR

Process	The AS-IS	The TO-BE (aligned with EHR goals)	Information needed	Benefits
Coding, Billing	Charges are entered later into the system	Captured and sent to coding/billing **automatically**.	Standard codes, diagnosis, orders	Automatic so faster, more accurate, more claim approvals
Interoperability	HL7 V3, works with HIEs, public agencies, RxNORM, SNOMED	**HL7 FHIR**, LOINC, PACS, DICOM, RxNORM, SNOMED, ICD-CM	Patient health data and authorized person approval	Better patient care and data communication
Security	Authorization, encryption within system.	**Access controls**, levels of authorization, and encryption of patient data for **external communication** also.	Accessing individuals, their level (security)	Compliance with patient data safety and privacy rules. Allows patient data access remotely to physicians also
Referral	Manually via phone	**Automated** via EHR, VWC is a limited-scope setup.	'Referring' and 'referred to'	Fast, real-time scheduling, better treatment planning
Patient Engagement	Only phone calls, health data only in clinic	Encrypted safe Health Data **communication** – mobile and web	Preferred contact method/s of patient	Improved access to data, reduced visits, increased engagement
Documentation	Manual by retrieving EHR data	Automatic for most parts, will need proof reading at the end	Patient Health data	Fast, accurate

VWC Business requirements and EHR's functional requirements

Business requirement	Function	Importance	Notes
• Enhance patient care • Physician support • Chart access improvement	Patient Health Data capture and manage	4 Essential	• This is a critical EHR functionality. Supported methods include **electronic forms and checklists** in EHR. Some data can be processed from typed notes. • Optional– speech-to-text, handwritten notes processing. VWC faced this issue slightly with bubble sheets and voice inputs.
• Participate in **MIPS** • Improve Documentation	eCQM - Electronic Clinical Quality Measures Reporting	4 Essential	• Electronic reporting of Quality Measures is needed to get MIPS incentives. • The EHR should be able **to create and export reports** as per the guidelines.
• **Certified EHR req** • Compliance with treatment protocols • **Better RCM - claims**	CDSS - Clinical Decision Support System	4 Essential	• CDSS assists physicians by recommending **evidence-based tests and treatment plans.** • In **VWC**, CDSS can also provide specific information like **drug** dosage and **safety for pregnant women, children, and their alternatives** if needed.

VWC Business requirements and EHR's functional requirements

Business requirement	Function	Importance	Notes
Improve the security of patient data during storage, external communication, and transfer	**Security** - Protect Patient Health Information	4 Essential	This is required by MIPS PI and also for HIPAA compliance. Three points are important • **Security Risk Analysis** - needed for MIPS PI • **SAFER guides** - needed for MIPS PI, including 9 guides for EHR safety like contingency plans, patient identification, and system interfaces. etc. • Practices like **authorization, encryption, access control**, training, etc.
• Facilitate Health information exchange with EHRs. HIEs, public health agencies • **Interoperability**	HIE - Health Information Exchange - 30 MIPS points	3 Important	• VWC participates in the **'ConnectVirginia' HIE** and MIPS has this as an optional category. • **Bidirectional exchange of information with HIE**
	Public Health and Clinical Data Exchange (25 MIPS points)	3 Important	• VWC exchanges data for population health management, including immunization data. • MIPS requires reporting to two different clinical registries and/or public health agencies (optional for MIPS)

VWC Business requirements and EHR's functional requirements

Business requirement	Function	Importance	Notes
• Patient care • Interoperability	**ePrescribe** - 20 MIPS points	3 Important	Reduces medication errors, and prescriptions available to pharmacies accurately and quickly, and makes keeping **electronic records** of patient **medications** accurate. • ePrescribe - 10 points • PDMP - Prescription Drug Monitoring program, required in MIPS PI in 2023, 10 points- allows for tracking of prescription drugs and controlled substances **to identify overdose risk.**
• Patient care • Interoperability • Workflow automation	**CPOE** - Computerized Physician Order Entry	4 Essential	• Functionality for ordering labs, images, etc. • CPOE here can be customized to include **order sets only used by VWC** like those related to obs/ gynae, pediatrics, immunization for mothers and babies, etc.
	Laboratory and Radiology Information Systems integration	4 Essential	• The whole process should be made electronic using CPOE with LIS and RIS. Supports **analysis, inventory, and order set customizations for VWC.** • Results are sent electronically to the provider and the patient while **automatically storing relevant fields in EHR**.

VWC Business requirements and EHR's functional requirements

Business requirement	Function	Importance	Notes
Revenue cycle management	**Eligibility verification** automatically by EHR	4 Essential	• **Eligibility verification** • Upfront copay or deductible information and **point-of-service collection** • **Referrals** will be confirmed, approved, and linked to the current service/ appointment.
	Charge Capture Coding Billing	4 Essential	• **Chargemaste**r – Database of standard codes • Codes from EHR sent to billing automatically
	Claim management	3 Important	• The EHR will have **a tool for claim scrubbing**, that checks if the claim is accurate, coding is correct, and it follows the conditions in the patient's health plan. • EHR should be able to **electronically submit the claim, track its status, and provide alerts** in case of delays in payments or denials.
• Scheduling • Registration • Documentation	Administrative functionalities	4 Essential	• VWC aims to improve these processes significantly, making them faster, more accurate, and mostly electronic. • Scheduling with EHR will provide real-time resource availability to different departments.

EHR interoperability requirements and plan

Interoperability Requirements	How they will be met
Standard that works seamlessly for data exchange with most devices, apps **(myVWC),** web, and other software/applications.	**HL7 FHIR** is the latest HL7 standard that we will use, it works by using **APIs** making it easy to create interfaces with different products, like apps, devices, web, etc.
Health Information Exchange participation	Interoperability with **VirginiaConnectHIE** via HL7
Public Health Agencies participation	Like Immunization registries via HL7
Laboratory and radiology integration	Using LOINC and DICOM, along with LIS and RIS
Pharmacy integration	Using **NCPDP e-prescribe standard – SCRIPT**
Insurance and administrative tasks	Using ANSI **Accredited Standard Committee (ASC) x12** standards for Electronic Data Interchange (EDI).
Coding and diagnosis standards	SNOMED CT, ICD 10 CM, CPT codes for coding and billing are essential for interoperability

EHR technical infrastructure

Network Components

Hybrid model

- Major locations, large practices, the laboratory, the imaging center, and the administrative and accounts center have LAN/WLAN, **on-prem servers, and databases**.
- Small practices (50) have **cloud-based ambulatory EHR**, with a central server and database, that is shared using virtualization. The downside is the unavailability of EHR if the internet provider is down, use another provider for backup.

Backup

To the central database (Cloud provider)

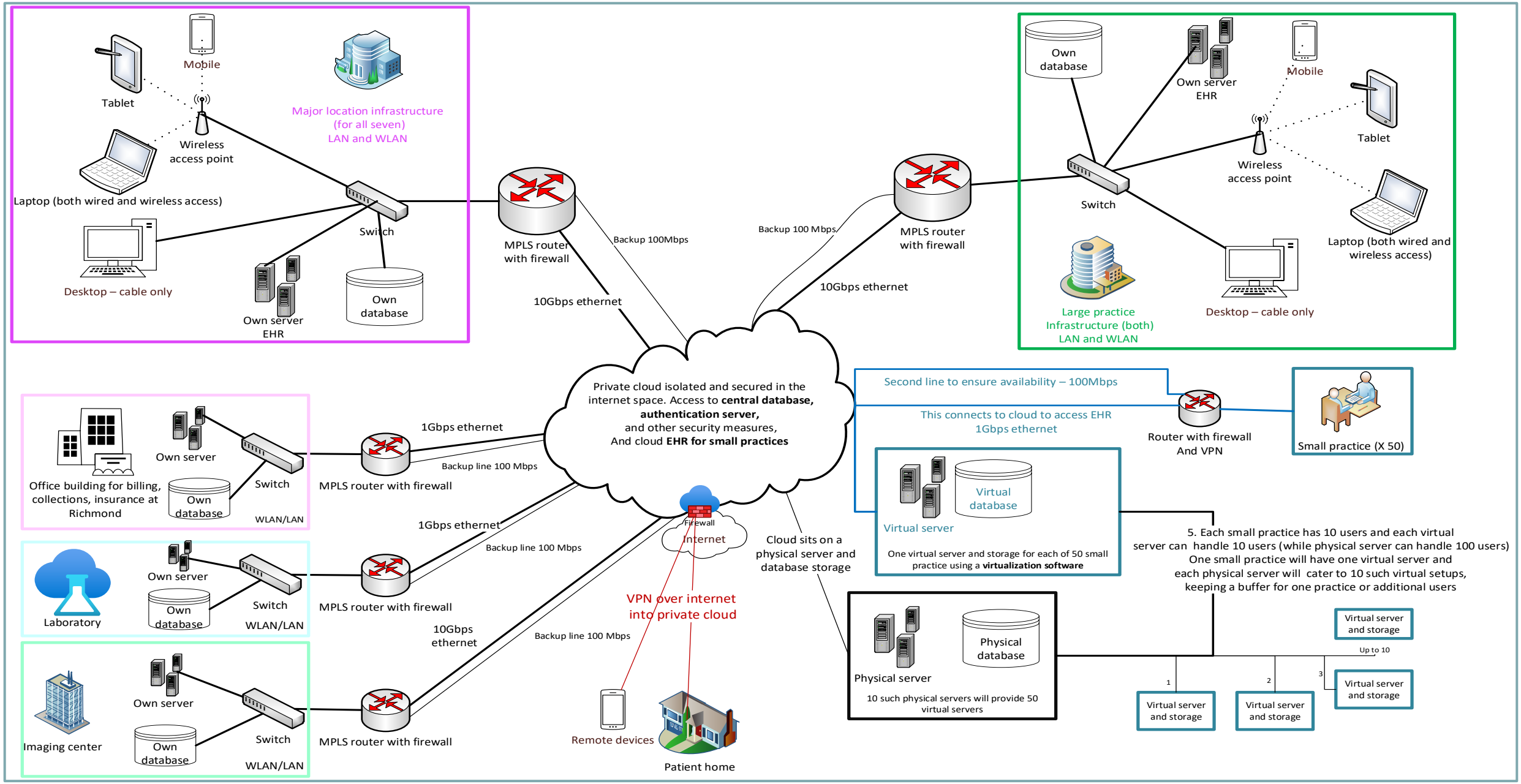
- On-prem data is backed up to the central database daily from 11 pm to 3 am. **Patient charts are backed up hourly.**
- Only central database data is available remotely.
- Ambulatory cloud EHR is online so real-time data backup, is available instantly

Reliability, Scalability, Security

Ability to manage increased volumes, unavailability of components

- Reliability – redundant lines, regular backups, central storage in a safe site.
- Scalability – The central database and server are cloud-based, so scalability is readily **available on demand**.
- Scalability - On-prem data will be stored for 6 months, and rest in cloud storage, removing the need to increase local storage.
- Security – Central authentication server, updates, and security patches centrally. On-prem maintenance is also remote.

EHR technical infrastructure



The overall project plan

Task #	Task name	Start Date	End Date	Duration
1	Project Initiation and Planning	11-Jan-24	10-Feb-24	30d
2	Workflow review and redesign	12-Feb-24	03-Mar-24	20d
3	Develop HIS/EHR functional requirements	20-02-2024	31-03-2024	40d
4	Vendor selection	15-03-2024	19-04-2024	35d
5	Architect Infrastructure	20-04-2024	30-05-2024	40d
6	Interfaces design & implementation	01-07-2024	31-07-2024	30d
7	Data migration	01-08-2024	20-08-2024	19d
8	Implementation	01-09-2024	16-10-2024	45d
9	Go Live	16-10-2024	31-10-2024	15d
10	Support (immediate post-implementation)	31-10-2024	20-12-2024	50d

High-level project budget

Item	Cost	Quantity	Total
Implementation Cost	$ 70000	1	$ 70,000
Content customization (form conversions)	$ 16500	1	$ 16,500
Interfaces	$ 40000	1	$ 40,000
Services and Training	$ 21000	1	$ 21,000
Hardware and network upgrades • Tablets • PCs • Routers • Wireless network upgrade	 $ 1500 $ 800 $ 5000 $ 40000	 50 20 6 1	 $ 75,000 $ 16,000 $ 30,000 $ 40,000
Total one time cost			**$ 308,500**
Monthly costs			
Post Implementation training and support monthly	$300	50 (on-prem)	$ 15,000
Cloud EHR monthly subscription charges	$ 700	50	$ 35,000
Total monthly cost Total yearly cost			**$ 50,000** **$ 600,000**

Project risks

Budget / Cost issues

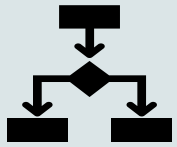
- Limited resources, **easy to exceed**
- Good planning**, monitoring** closely, planning **trade-offs and priorities**

Security and Privacy risk

- Data breaches, from inside or outside, threats to the cloud provider's infrastructure (data/server)
- **Training, security assessment, and best practices, backups.**

User resistance

- Resistance to learning and using new technology, especially by HCWs
- Include in decisions, communication, training, **roll out initial phases with on-board HCWs**



Workflow disruptions

- Workflow redesigning should be **flexible** to include any unforeseen issues

Integration and Interoperability risks

- EHR may not be compatible with some existing systems
- Plan and research well, the IT team must **ensure compatibility and perform required changes before implementing EHR**

Data migration risk

- Data migration from legacy systems (bubble sheet data) to EHR will take time, and planning, and **may require data processing/ changes to 'fit' in the new format**

Vendor issues

- Lack of support, updates, or delivery issues
- Research vendors well, SLAs, good relations

Post-implementation user support issues

- Provide ongoing support after implementation to users

Critical success criteria

Critical Success Factors

1. Strong **commitment** to the project, support, and involvement of all **stakeholders**
2. Right **team**, members should be 100% in.
3. Proper **planning**, with inputs from all stakeholders
4. Clearly defined goals- **SMART goals** are Specific, Measurable, Achievable, Relevant, and Time-bound.
5. Workflow Analysis and Redesign – this should be flexible and **changes must be made as required**.
6. Selecting the **right system** – compatible with existing systems, vendor support, cost, and right functionalities.
7. Monitoring for **timelines and budget, ROI targets**
8. Training and education of **users**
9. Post-implementation **support**

Important reasons for EHR Failure

1. Management and stakeholders are unsure, and not fully committed.
2. Cost – Budget and resources are not sufficient.
3. **Infrastructure and system** are not sufficient
4. Workflows are not designed optimally to suit the EHR
5. **EHR functionalities are not right for us**
6. Lack of training and support

Failure after implementation

1. Poor usability, clinician burnout
2. Reduced effectiveness - clinical or admin systems
3. Patient dissatisfaction with the system
4. Financial loss, instead of savings

Thank you

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