

Build versus Buy a Custom App

A TeleTriage Story

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610-402-CARE LVHN.org



Agenda

- **LVHN background**
- **Request for a New App**
- **Health Network Secure Text**
- **Requirements**
- **TeleTriage Development**
- **Conclusions**
- **Lessons Learned**
- **Questions**

Lehigh Valley Health Network



Organizational Summary

- 8 Campuses
- Children’s Hospital
- 250+ Physician Practice locations
- 17 Community Clinics
- 16 Health Centers
- 12 ExpressCARE Locations
- 81 Testing and Imaging Locations
- Regional burn center
- Level I trauma center
- Memorial Sloan Kettering Cancer Alliance member

Key Metrics

- 1,700 beds
- 57,272 Inpatient admissions
- 212,897 ED Visits
- 2.9 million ambulatory visits
- 18,000+ Employees
- 2,005 Physicians
- 95 Medical specialties
- 3,400 Registered Nurses
- 400 Specialty certified nurses
- 243 Medical residents
- \$2.8 B FY18 projected revenue

LVHN Informatics and Technology Status/Awards

LVHN achieved Stage 7 in the EMR Adoption Model for both inpatient and ambulatory use of the EMR

- Only 5% of US hospitals and 9.6% of US ambulatory clinics have achieved Stage 7



For the 12th consecutive year LVHN was awarded Most Wired designation

- 2017 - Most Wired Advanced, one of 27 hospitals in the US
- 2017 - Most Wired Innovator, one of 3 hospitals in the US
- 2017 - Most Wired Most Improved LVH-P



LVHN achieved the HIMSS Davies Award for Excellence in HIT and Informatics

- August 2017



LVHN is the only organization that has achieved all these HIT / Informatics awards



Clinical Request for Technology

Lehigh Valley Health Network Burn Surgeon Team requested an app for referring hospital sites to send images and basic demographics of burn patients for triage purposes.



Enterprise Secure Text Solution

- Offered to all Employees and Medical Staff
- Piloted extending Secure Messaging of Burn Images from Referring Hospitals



Enterprise Secure Text Solution

- **Too general for referring hospitals**
- **Difficult to provision customers at referring hospitals**
- **No Discrete Data Fields**
- **Burn Surgeons were not satisfied with secure text notifications**
- **Not an intuitive user interface for referring hospitals**



New App Planning Activities

- Spoke to burn surgeons about their specific requirements for Tele Burn mobile app.
- Researched vendors
- Vendor apps did not meet Burn Surgeons' needs
- CIO told us to build the app in 3 weeks



Custom App Requirements

- **Overarching theme – Ease of Use**
- **Logging in takes user right to the camera**
 - **Images taken within the app**
- **Enter:**
 - **Demographics**
 - **Date of Injury**
 - **Mechanism of Injury/Burn Type**
 - **Sending physician name (from drop down)**
 - **Contact Phone Number of sending site**
- **Submit Button**
 - **Once submitted – photos from sending phone are deleted.**
 - **Once assessed – photos from provider phones and the cloud are deleted**

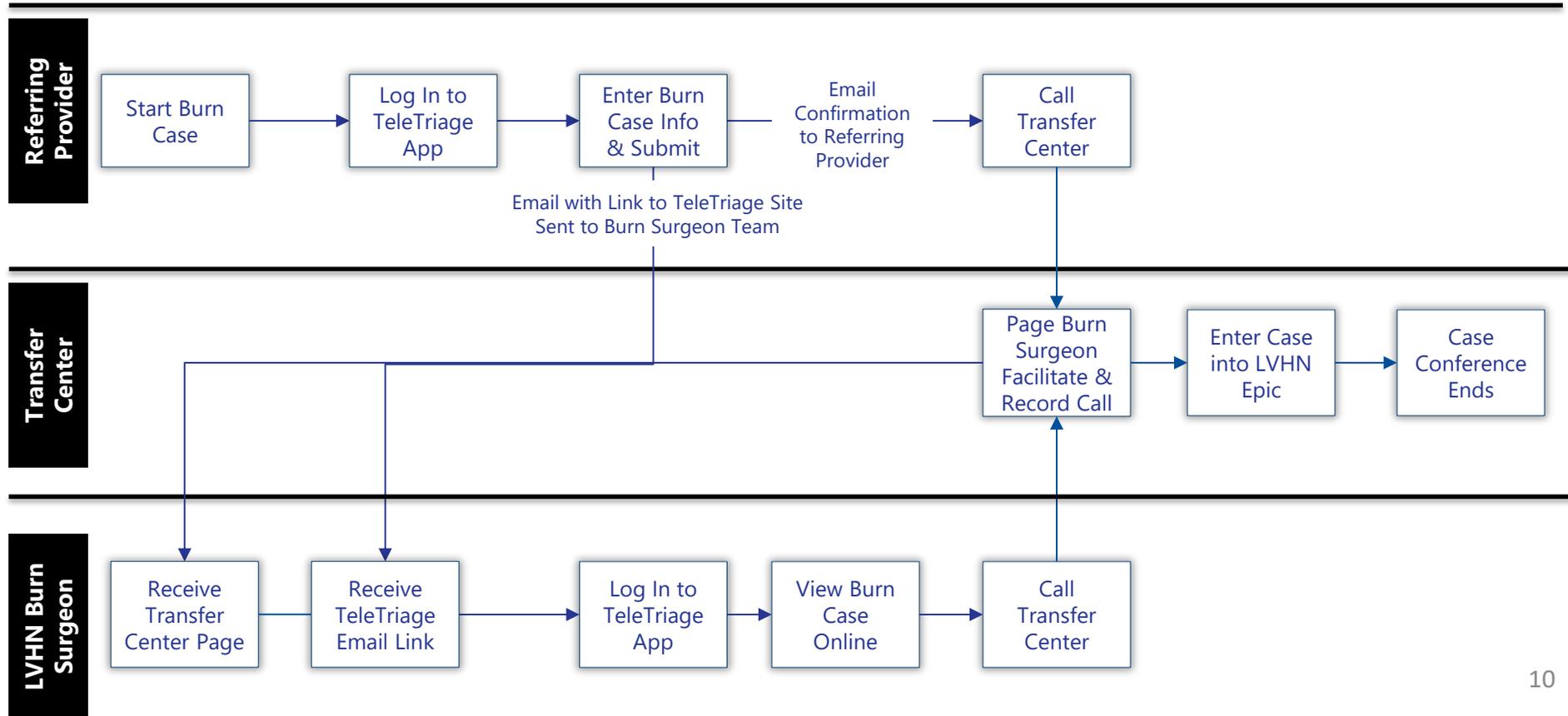


LVHN TeleTriage Application

Fast and Secure Web-Based Tool for Burn Patient Referrals



LVHN TeleTriage Application Process Overview



Burn Patient Arrives at Emergency Department or ExpressCARE



Provider asks for TeleTriage for a patient's burn with an LVHN burn surgeon



Log in



Create & Submit Case



Contact LVHN Transfer Center

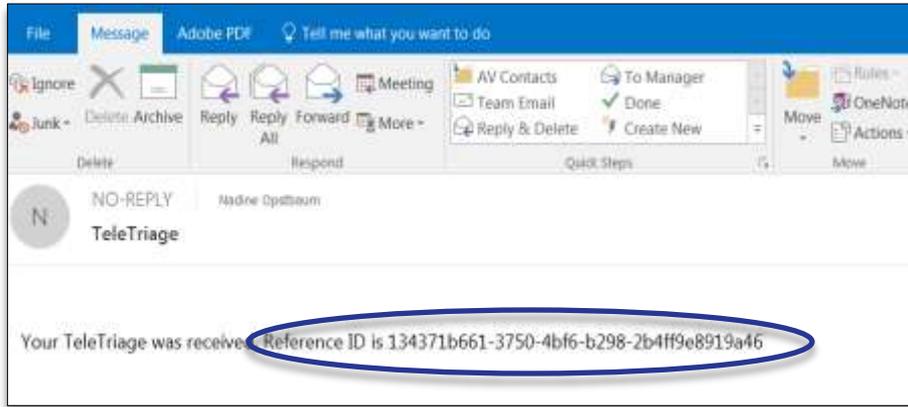


Confer with LVHN Burn Specialist

LVHN Burn Specialist TeleTriage Request

LVHN Burn Surgeon On Call:

1. Receives email message
2. Is paged by Transfer Center
3. Links to TeleTriage Application
4. Reviews case, makes clinical decision



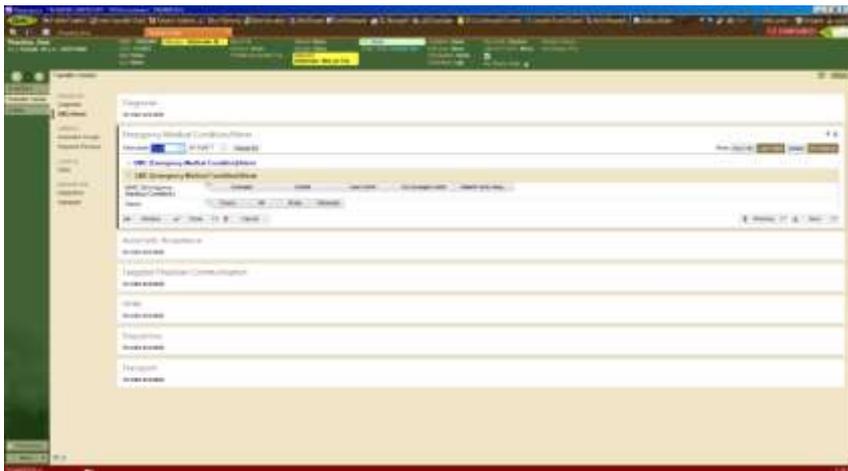
Confer with remote care provider

Log in to TeleTriage Application via Link in Email Notification

Review Case

LVHN Transfer Center Manages Referral or Transfer

- LVHN Transfer Center creates an patient record in Epic EHR for every patient triaged
 - Also coordinates patient coming to LVHN as an inpatient or outpatient



Example Epic screen used by LVHN Transfer Center

The image shows a screenshot of an Epic real-time report titled 'Disposition'. The report is grouped by 'T1 Disposition' and shows the following data:

Disposition	Total Count
Grand Total	188
Admitted/Accepted	71
Base Recovery Center	82
Consult Only	22
Outpatient	6
Declined	6
Admitted/Accepted, Toxicology	1

Reporting and Analytics

Example Epic real-time report to track TeleTriage and other transfers

Advantages of Custom Built Solutions

- **More control over the fields that collect the data**
- **Control over design and delivery**
- **Didn't need to wait for vendor functionality**
- **Meet a very aggressive timeline**



Standards

- **Specification document**
- **Programming Language**
- **High Availability architecture externally exposed**
- **Take advantage of best practices within the industry**
- **Flexible design for future growth**



How long do we have?

- 4 days to design and create a proof of concept
- 3 weeks to design/build architecture and release the first production build
- Transmit images back to referring hospitals that opt-in

Stakeholder Management

- **C-Suite**
- **CIO**
- **CMIO**
- **TeleHealth**
- **Burn Team**
- **Referring Hospitals**
- **Initial meeting to gather and review requirements**
- **Met with CMIO at key milestones to allow for approval and course correction**

How We Moved Fast

- Iteration
- Make decisions and stick to them
- Quick approvals
- Involve the right people from the start
- Collaboration vs compromise
- Focused on features



The Team



Design for Today – Consider the Future

- Designed for mobile – but there are so many options
 - Native
 - Hybrid
 - Responsive is the winner!
- Intuitive – little or no training should be required
- Fast – can't take a long time to complete tasks
- Expandable – needs to handle other tele needs
- Flexible – Allow for future integration



Project Management – Not Quite Agile

- **Daily standup**
 - **What was accomplished**
 - **What was planning**
 - **Blockers**
- **Product backlog**
- **Sprint backlog**
- **Communication**
 - **Daily reports to stakeholders**

Documentation is your friend

- Began documenting from day 1
- Progressive elaboration
 - Continued to evolve as we progresses
- Supported collaboration
- Supported speed to market

IT Security as a Partner – Not a Hurdle

- **IT Security was considered from the beginning**
- **IT Security team part of the scrum team**
- **All architecture and design was vetting by security**
- **Actively engaged in design process**
- **Vulnerability and penetration testing**
- **Ongoing partner**

TeleTriage Security



- **LVHN TeleTriage designed around security requirements**
- **Advanced authentication and record tracking numbers**
- **Data security**
 - **Data encryption while data in transit**
 - **Data storage encrypted while data at rest, online storage segmented**
 - **Patient digital images not stored on mobile devices**
- **Real-time event monitoring and alerting**
- **Advanced threat protection and anti-malware**
- **Ongoing patch management and updates**
- **Proactive security assessments**
 - **Monthly – LVHN IS review and scanning**
 - **Annually IS and outside security vendor penetration testing**
- **Logging of activities**

Conclusion

- **Successfully launched the application on-time**
- **Had the internal resources to build a custom application**
- **47 locations**
 - **Adding additional sites weekly**
 - **TeleHealth works with legal and referring locations to bring online**

Questions?

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