Simplified System Requirements

Specification

FOR

Emergency airway management care

algorithm for laryngectomy patients

Version 1.0

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# INTRODUCTION

## Purpose/Problem Statement

The objective of this streamlined Software Requirements Specification (SRS) is to delineate the requisites for crafting a web-based emergency management system tailored for individuals caring for laryngectomy patients. The distinctive challenge in caring for these patients lies in the recognition that nasal or oral intubation is not feasible due to the absence of an intact upper airway. Emergency Medical Services (EMS) personnel may encounter unfamiliarity with this anatomy as total laryngectomy cases are infrequent. Notably, these patients, who breathe through their neck stoma, necessitate oxygenation/ventilation through this unique pathway.

To address this critical need, a website is envisioned, accessible via QR code, to present an interactive laryngectomy emergency management guided workflow. This innovative platform will guide healthcare professionals through a step-by-step management process, incorporating informative text, illustrative images, and instructional audio. The QR code, strategically worn on a patient's bracelet, will be conspicuous to medical staff. A swift scan using a smartphone will initiate an interactive website, commencing with identifying the laryngectomy stoma (accompanied by an illustrative image). Subsequent steps in airway management will unfold with user-friendly "yes vs. no" options, facilitating a seamless progression through the process. Additionally, optional corresponding audio will be available for each step, providing an inclusive and accessible experience.

Crucially, the medical steps and accompanying audio guidance will be supplied by physicians collaborating with the design team, ensuring accuracy and alignment with established medical protocols. This pioneering project is instrumental in empowering healthcare providers to deliver prompt and precise emergency airway care for laryngectomy patients, thereby enhancing overall patient safety and well-being

## Scope

The scope of the laryngectomy emergency management system involves the creation of a comprehensive web-based solution designed to guide individuals caring for laryngectomy patients through an efficient emergency airway care process. The system's primary objectives include providing a user-friendly platform for healthcare professionals to follow a step-by-step laryngectomy emergency management workflow, incorporating informative text, illustrative images, and instructional audio.

Key features within the scope of this system encompass the integration of a QR code-based access system. The QR code, worn on a patient's bracelet, will serve as a gateway to the interactive website. Upon scanning the QR code with a smartphone, healthcare staff will be directed to a guided workflow, starting with identifying the laryngectomy stoma (accompanied by an illustrative image). The system will then facilitate a seamless progression through airway management steps, incorporating interactive "yes vs. no" options and optional corresponding audio for each step.

Healthcare professionals will have access to the patient's emergency airway management history, allowing them to track the steps taken and decisions made during previous emergencies. Furthermore, the system will enable medical staff to access the emergency airway management histories of all patients, fostering a comprehensive understanding of each patient's unique needs. Administrative features will empower designated personnel to make necessary modifications to patient profiles, ensuring accurate and up-to-date information in emergency situations.

## Users

**Patients:** Patients are the individuals for whom the laryngectomy emergency management system is designed. They utilize the system to access an interactive emergency management workflow via a QR code on their bracelet. This enables them to guide healthcare professionals through their unique emergency airway care needs. Each patient has a personalized emergency airway management history, allowing them to review the steps taken during previous emergencies.

**Healthcare Professionals:** Healthcare professionals, including emergency medical staff, play a crucial role in utilizing the system to address laryngectomy emergency situations. By scanning the QR code on the patient's bracelet, they gain access to an interactive workflow that guides them through identifying the laryngectomy stoma, assessing airway management steps, and making decisions based on "yes vs. no" options. The system also provides optional corresponding audio guidance for each step.

**Administrators:** Administrators serve as central overseers of the laryngectomy emergency management system. This user role holds elevated privileges, allowing them to modify patient profiles, update information based on changes in medical status, and ensure accurate and up-to-date emergency airway care records. Administrators play a pivotal role in managing the overall functionality of the system and ensuring its seamless operation in emergency situations.

## References/Sponsors/Advisor

The following are the individuals from Penn State Health who will be working with us as the clients and given us the task to complete and are our sponsors.

Dr. Goyal (PI),

Dr. Goldenberg,

Bao Sciscent BS,

Hanel W. Eberly BS,

Nguyen Truong BS,

Penn State Hershey

Our advisor is Dr. Hien who will be supervising us in this project assisting us with keeping us on track throughout the next semester.

## System Functionalities

## The laryngectomy emergency management system, seamlessly integrated with a sophisticated reporting module, boasts a robust set of functionalities meticulously crafted to elevate emergency airway care operations and ensure optimal patient outcomes. Within this comprehensive framework, the system enables a fluid process for patient account management, empowering individuals to intuitively access and update their profiles. Simultaneously, administrators wield granular control to enact necessary modifications, ensuring a dynamic and responsive system.

For healthcare professionals, central to the system's effectiveness, a streamlined task management interface provides real-time updates on emergency airway care requests, fostering agile communication within the platform. Patients, in turn, benefit from a straightforward mechanism to initiate emergency airway care requests, with an automatic prioritization system driven by urgency. Critical to informed decision-making, the reporting module generates insightful weekly and monthly reports, delving into key emergency airway care performance metrics. This includes the frequency and nature of emergencies, the efficacy of interventions, and emerging trends in care protocols. Controlled access to these reports upholds the highest standards of data security. In addition to fostering transparency through comprehensive patient histories, the system incorporates notification functionalities to keep healthcare professionals in the loop. Advanced search capabilities ensure swift retrieval of pertinent patient information, while robust auditing mechanisms guarantee the accuracy and integrity of emergency airway care records.

All the envisioned features are slated to be implemented using JavaScript, a versatile programming language renowned for its flexibility and compatibility with various web development frameworks. While the specific framework has not been finalized, the current inclination leans towards leveraging either Vanilla JavaScript for its simplicity and direct integration, React for its component-based architecture and efficient rendering, or Angular for its comprehensive framework offering robust tools and seamless data binding. The choice of the framework will be guided by the specific needs and nuances of the laryngectomy emergency management system, ensuring an optimal balance between functionality, maintainability, and user experience. No database is needed for our project, so we will not be including one.

Collectively, these sophisticated functionalities not only optimize emergency airway care operations but also empower data-driven decision-making, setting the stage for operational excellence in laryngectomy patient care. As a collaborative effort between business analysts and developers, this system represents a pinnacle in responsive, efficient, and secure emergency management solution. All these functionalities will work as a productive flowchart in a interactive UI form.