

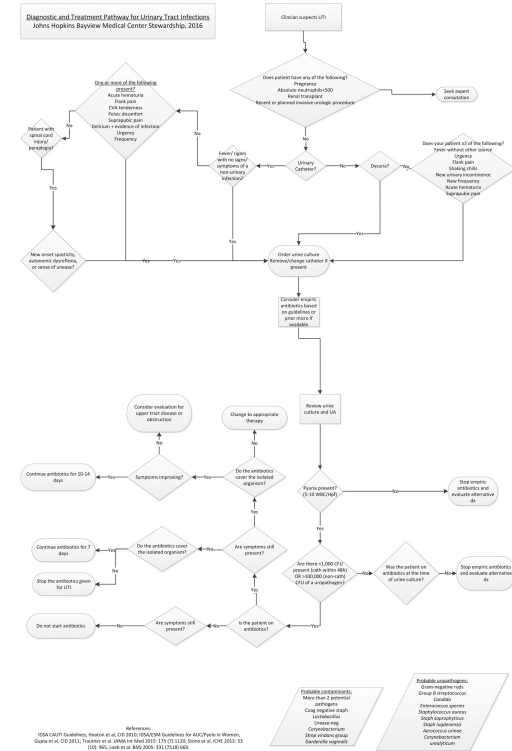
Antibiotic Ninja

Team: Allie Sanzi and Katie Hochberg

Mentors: Dr. Jennifer Townsend, Gorkem Sevinc,
and Michael Cohen

Background and Significance

- 50% of prescribed antibiotics are unnecessary
- Antibiotic overuse leads to resistance
- Problems with alternative treatments
- Solution: Antibiotic Ninja
 - Tool for healthcare providers
 - Steps through patient exam and diagnosis
 - Generate antibiotic recommendation
- Decision Trees inform solution



Technical Approach: Application Overview

- Workflow

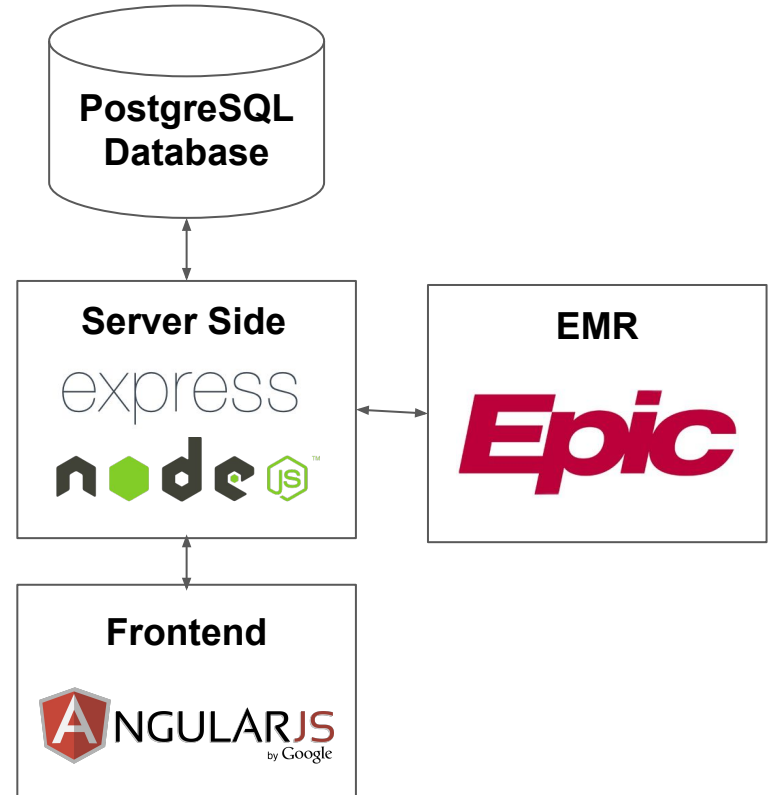
Step	Task
1	Administrators customize decision trees
2	User selects the type of infections (SSTI, UTI, Respiratory)
3	Application fetches patient information from EMR
4	User inputs remaining information (i.e. other symptoms)
5	Application makes antibiotic recommendation

- Follow up

- Pulls outcome data from EMR to determine past efficacy

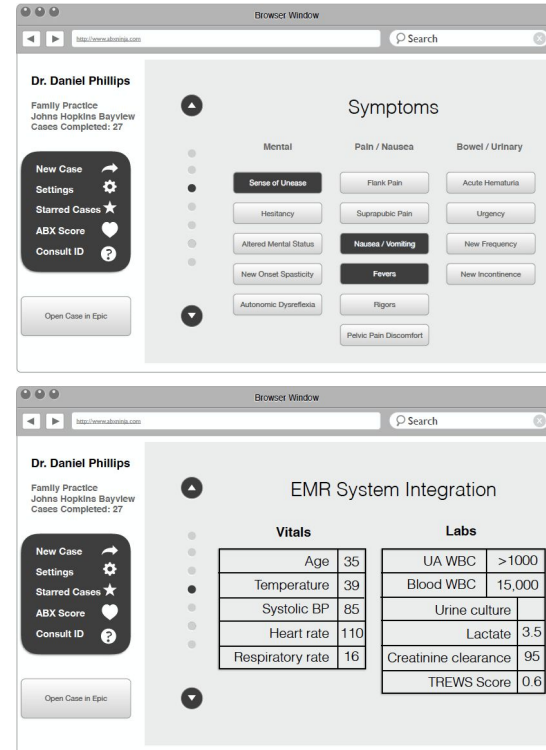
Technical Approach: Backend Design

- Technical Components:
 - PostgreSQL database
 - Node.js, Express.js, Angular.js
- Database
- API to query/manipulate database
- Interaction with EPIC for EMR data
- Administrator portal
- User portal

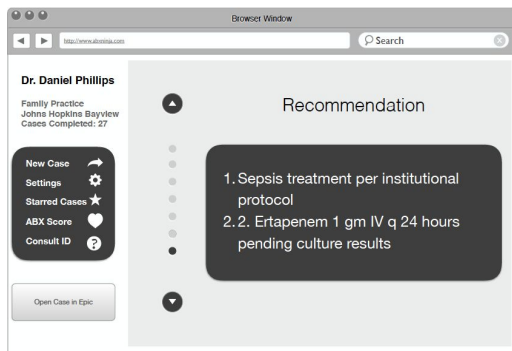
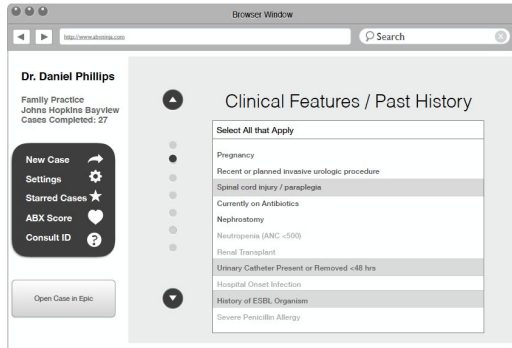


Technical Approach: Backend Implementation

- Create and test database
 - Populate with test data, ensure proper querying
- Administrator portal
 - Administrators can customize decision trees
- User portal
 - Use decision trees to get relevant information from users
 - Implement interactions with EMR
 - Test pulling relevant information
- Iterative testing



Technical Approach: Frontend Implementation



- Use designs and work with mentors
- Administrator portal
 - Interface to create decision trees
- User portal
 - Interface to input data and receive antibiotic recommendation
- Enhancing UI
 - Get feedback from end users and make improvements to frontend

Deliverables

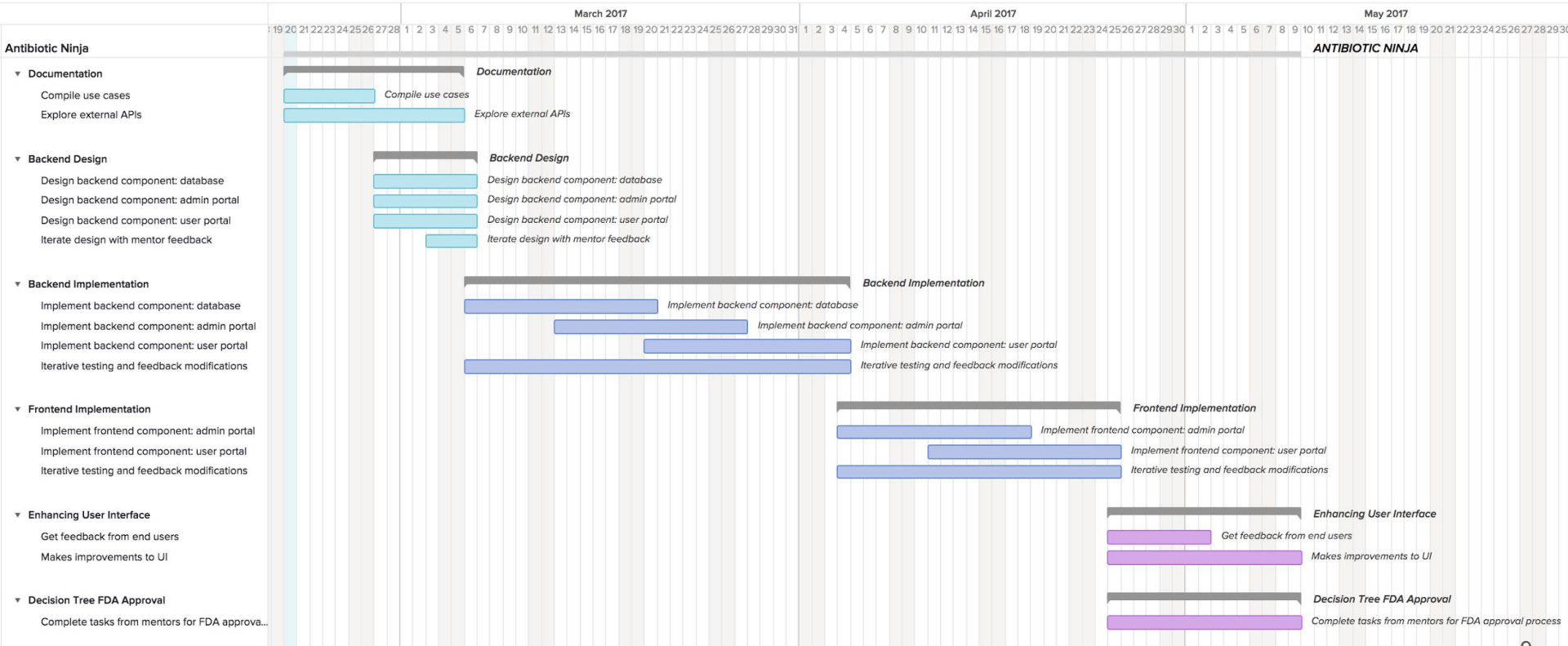
Deliverables		Deadline
Minimum	Documentation including use cases and exploration of external API's	March 5
	Backend design for database, admin portal, and user portal	March 6
Expected	Backend implementation for database, admin portal, and user portal	April 4
	Frontend implementation for admin portal, and user portal	April 25
	Minimum viable product for testing at Bayview Medical Center	April 25
Maximum	User Interface enhancements	May 9
	Decision Tree FDA approval	May 9

Dependencies and Management Plan

Dependency	Resolution Plan	Status
Obtain decision trees	Request from mentors	Resolved
Obtain initial user interface wireframes	Request from mentors	Resolved
Documentation for epic API	Explore online resources	In-progress
Software needed for backend	Download and/or install	Not started
External libraries for implementation	Get documentation and/or install	Not started

- Weekly meeting with project team
- Bi-weekly demo and discussion of progress
- Work at Technology Innovation Center
- Pair programming

Schedule



Reading List

1. CDC. Antibiotic Resistance Threats in the United States, 2013. Vol CS239559-B. Atlanta, GA2013:114.
2. Pollack LA, Srinivasan A. Core elements of hospital antibiotic stewardship programs from the Centers for Disease Control and Prevention. *Clin Infect Dis*. 2014;59 Suppl 3:S97-100.
3. Magill SS, Edwards JR, Beldavs ZG, et al. Prevalence of antimicrobial use in US acute care hospitals, May-September 2011. *JAMA*. 2014;312(14):1438-1446.
4. Magill SS, Edwards JR, Bamberg W, et al. Multistate point-prevalence survey of health care-associated infections. *N. Engl J Med*. 2014;370(13):1198-1208.
5. Hecker MT, Aron DC, Patel NP, Lehmann MK, Donskey CJ. Unnecessary use of antimicrobials in hospitalized patients: current patterns of misuse with an emphasis on the antianaerobic spectrum of activity. *Arch Intern Med*. 2003;163(8):972-978.
6. Braykov NP, Morgan DJ, Schweizer ML, et al. Assessment of empirical antibiotic therapy optimisation in six hospitals: an observational cohort study. *Lancet Infect Dis*. 2014;14(12):1220-1227.
7. MacDougall C, Polk RE. Variability in rates of use of antibacterials among 130 US hospitals and risk- adjustment models for interhospital comparison. *Infect Control Hosp Epidemiol*. 2008;29(3):203-211.
8. <http://hl7.org/fhir/index.html>

Questions?