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# Interview Questions

*Interviewing: Stuart Andrews (Primary Stakeholder of system)*

*Interview conducted on: 11/04/2023*

* *“Who works for the company and what are their requirements for the system?”*

Answer: “You’ve got different departments including reception and inquires that interact with patients. These people have to be able to look up patients and relevant data and information as well as adding and changing data where required. There are also administrators, these people create appointments and clinic lists theatre lists and need to be able to access names and addresses to be able to send out appointment letters. You also have the clinical department, they deal with the patients and they need to be able to document letters, operations and discharges. There is also a finance department, they need to billing and payroll for staff. There is an IT department that need to have access to data to make it cohesive across different software used and developed”

* *“What tasks does the system need to carry out?”*

Answer: “The system needs to be able to record, organise and recall patient information in an easy to use and intuitive space. The system needs to be able to automate and populate clinic and theatre list template for ease of use for all departments with automated and standardised templates.”

* *“What information should be stored for each patient?”*

Answer: “Name, DOB, address, telephone no, email, NHS number, GP name, GP address, GP email, next of kin details, hospital identifier number, diagnosis, related diagnoses, other medical conditions, medication history and medication allergies.”

* *“In what format does the processed patient data need to be output?”*

Answer: “Data outputs include, correspondent’s letter, treatment discharge summaries, operation lists, clinic lists, bills and invoices. These outputs need to standardised and compatible with existing data”

* *“Does this system need to be cloud based for can data be stored locally?”*

Answer: “For security and ease of development, the data should be stored locally with backups. As this system will be in use across devices, the system will need to be able to transfer data in a standardised format from device to device when needed.”

* *“How many different levels of access should be set up for different users?”*

Answer: “Staff fall under 2 levels of access. Level 1 access does not give access to clinical details (diagnosis, treatment etc.) and level 2 access will give the user access to all data in the system. This will be achieved through different user accounts for each member of staff accessing the system.”

* *“Roughly how many patients will be entered into the system?”*

Answer: “Currently there are roughly 1000 patients that need to be entered but the number will continue to grow and the system needs to be able to handle any amount of growth that may occur.”

* *“Are there any features you would like to see that haven’t yet been discussed?”*

Answer: “Being able to integrate with other information systems for transfer of information if appropriate and when required.”

# Other methods of investigation

**Group interview:** This method of investigation would not be appropriate for my system as only one user/ stakeholder would be available to interview, making a group interview impossible.

**Survey and questionnaire:** I think that surveys and questionnaires could be used very effectively in my project. Something in the form of a Microsoft form could be easily passed around staff and gather data and opinions strait from the users most likely the use the system, not just my primary stakeholder.

**Document inspection:** A document inspection could also be advantageous to this system. An integral part of the proposed system is the output of data in a standardised format. To ascertain how these outputs should be structured I could analyse pre-existing documents in the business to try and keep the new system as close as possible for a seamless transition period with the staff.

**Observation:** This would be unsuitable to my project as physically going to a hospital may be impractical or even impossible due to limited access and time constraints.

Other methods of investigation to be carried out: Survey and questionnaire and Document inspection

**Questionnaire used:**

* In the new system being developed, are there any specific features you would like to see that would be an improvement in the effectiveness and usability of the old system?
* Were there any specific features of the old system that you disliked due to them being hard to use, ineffective or inefficient?
* On a scale of 1 – 10 how would you rate your computer and IT skills?
* What do you think we could do with the system to make the transition period from the old system to this one as smooth and seamless as possible?

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* Is there anything else you would like to add or that you feel we should know?

**Documents inspected ->**

# Existing system 1: Pabau

<https://www.pabau.com/industry/gp-clinics/>

Pabau is advertised to be an all-in-one clinic software aimed to make tasks related to industries such as medicine, spas and cosmetic surgery paper free and coherent. The software aims at streamlining the admin processes in such industries in a very similar way to my planned system with automatic forms, digital data inputs for both patients and staff, cloud accessibility and staff management. These aims and problems encompass a large part of my system with similar themes and objectives.

Features that can also be used in my system and why:

1. Digital booking calendar: Pabau features a calendar in which you can add, manage and view appointments. This could be useful in my system as it’s dealing with many different events scheduled for different times that could be effectively organised in a system such as a calendar.
2. Statistical report generator: Pabau has a feature where using the data in its system it creates a statistical report for a given period showcasing relevant information and stats. This would be useful for my system as Surgicare (the company that my system is being designed for) would likely benefit from the statistics and analysis of its performance and progress showing the team where to improve and where they have succeeded.
3. Staff management menu: This system has a staff management menu where employees can be managed and administrated. This would be effective in our system as Surgicare deals with dozens of employees all with different access levels, data and needs and managing all this in one place would be very beneficial.

Features that wouldn’t be necessary in my system and won’t be included and why:

1. Many automated tasks such as appointment reminders and automatic after-care emails: This is unnecessary because Surgicare (the company that my system is being designed for) deals with a relatively small number of patients compared to most healthcare providers using Pabau so this level of automation and streamlining isn’t worth the limited time it would save.
2. Marketing manager: Pabau features a marketing manger that helps the user capture and retain customers. Due to the nature of Surgicare this feature is likely to not be necessary as most or if not, all patients are acquired at hospitals so online marketing is not a priority.

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Description automatically generatedLimitations of Pabau: The reviews present on the internet of this system seem to suggest it is rife with bugs and other issues and when dealing with problems of a medical nature this is up the upmost importance because when things go wrong, they have the potential to do a lot of damage.

# A picture containing graphics, font, graphic design, logo Description automatically generatedExisting system 2: Epic

<https://www.epic.com/software/digital-patient-experience>

Epic is a piece of software developed in the US for use as a EPR (Electronic patient record) system. It has recently been implemented into some NHS trusts here in the UK with mostly positive reception. The software aims to (similarly to the system I’m developing) digitalise patient records and information with emphasis on centralisation and interoperability. Epic also aims to allow patients access to their own health data online while still being secure. Epic also has a focus on streamlining admin tasks for more efficient and effective healthcare application. While Epic does have the features mentioned above it is still a different system to the one I’m trying to make, it has been developed for very large organisations and consequently is likely to have a lot of features that would be necessary for a smaller healthcare provider such as Surgicare.

Features that can also be used in my system and why:

1. One feature that Epic has that I see being useful in the system is the focus on interoperability. All the outputs and data are standardised with external providers and healthcare systems encouraging the sharing of data and coordination of care. I see this being particularly useful in my system as many of the patients seen by Surgicare are going to have follow up, related or even unrelated surgeries elsewhere and the sharing of data between healthcare providers, when done right, can be very beneficial to the patient.
2. Epic also has a ‘Patient portal and engagement’ system where patients can view their test results as soon as they are entered into the system, view their medical records, communicate with healthcare providers and request appointments. This type of system appears to be very beneficial for both the healthcare provider as they can easily share data with patients and communicate where necessary and the patient as they get seamless and up to date access to their medical records.

Features that are not necessary for my system and why:

1. Epic also has a feature where you can give patients electronic prescriptions. This would not be necessary for Surgicare’s system as the work they do rarely or even never involves giving patients prescriptions so this feature would be entirely unnecessary.
2. This system also allows for a great level of customisation. This, in theory, could be a good addition to the program however, in practice, it tends to make it too complicated and clunky to use and is ultimately not worth adding.

Limitations of epic and conclusion:

Epic is generally a well thought out, reliable and useful program however, it has been designed for larger organisations and for our purposes it’s too over engineered and has functionality that we don’t need. As far as we’re concerned would just make the system too complicated. There is also the issue of price as Epic itself has a reasonably high cost but then on top of that you must also factor in the cost of the technical infrastructure to run it and the ongoing support and problems it may have.

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<https://www.cerner.com/solutions/health-systems>

Cerner is another EPR system developed in the US very similar to Epic with similar prices and objectives, however, it has a few differences. Cerner is generally used by smaller organisations while Epic is engineered for and used by much larger healthcare providers. While Epic does place some emphasis on customisation for the organisation, Cerner is generally thought of to have a greater depth of customisation for each individual healthcare provider.

Features that can also be used in my system and why:

1. A comprehensive range of clinical documentation: Cerner’s clinical documentation system features an advanced space where documents such as medical records, billing, patient history and prescriptions can be kept, amended and maintained. This would be useful in my system as with this type of system keeping records and documentation is key and a feature such as this where documentation and records are manged in a cohesive and streamlined environment would be ideal.
2. Cerner has an in-depth reporting and analytics system to generate various reports, track performance metrics, and analyse health data. Data such as this can be vital in processes such as decision making, performance evaluation and improvement efforts and would therefore be a great addition to my system.

Features that are not necessary for my system and why:

1. Customisation and scalability: Cerner is built to be fully customisable and adaptable for each individual user and organisation. While this feature is useful and would be worth while on some systems, my EPR system is designed for use by a single organisation so the ability to customise the application for different workloads, requirements and situations would be useless.
2. Cerner also has a payment cycle manager for paying staff. While this could be a useful addition, Surgicare’s staff are paid through another system that has up until this point worked effectively. The addition of an unnecessary feature like this would take valuable development time and resources away from more important features in the system.

Limitations of epic and conclusion:

In general, Cerner is an effective and efficient, multi-role system however much of the development emphasis was placed on customisation and versatility which would be redundant on my single organisation system. Similarly to Epic, Cerner also comes at a relatively high cost with the software, technical infrastructure and training all racking up in price fairly quickly.

# Analysis of the investigation

The system’s stakeholders:

One of the stakeholders for my system would be the owner of Surgicare UK LTD. He owns the independent healthcare provider that my system will be used for and will likely be the most frequent user of the system. The performance of the business will be dependent on the effectiveness and ability of my system. For the new system he will require a centralised system where data relating to the patients can be stored accessed and output in a standardised format. He will also need the system to have different access levels to ensure data is secure when and where it should be as it is his responsibility to ensure sensitive data is safe.

Another stakeholder of the system would be the hospital staff (both private and NHS) who will be using the system as their ability to work will based on the usability and intuitiveness of the system. These people will need the system to be intuitive and easy to use as most of them likely possess limited technical ability, so a simple, graphical user interface is required – particularly in the data entry area of the system.

Currently Surgicare operates a paper-based system with some elements of excel.

Aspects of the current system:

* On The current system, all patient data is stored on paper-based system that stores: *Name, DOB, address, telephone no, email, NHS number, GP name, GP address, GP email, next of kin details, hospital identifier number, diagnosis, related diagnoses, other medical conditions, medication history and medication allergies.* This information is input by hand onto the paper-based storage system with a pen. This information is then kept in the system and accessed when needed. When this data must be accessed by multiple people, one of two things happens, either it is photocopied onto another piece of paper or if the data is needed in a standardised format, it is manually entered into a form/ document.
* The current Surgicare system is used to make operating lists however it is very crude. When a surgeon needs an operating list to be printed or created, they must go to the paper storage system and manual create an operating list from by entering the data required (Patients, time of operation, patient information, location of operation by hand into the generic form.
* Staff management is done separately from the paper-based storage system and in an excel document. When a new member of staff joins, they must be manually entered into the database and managed along with their *Name, Phone number, email, identification number, access level and role.* When a physical staff list (or any other document regarding staff) is need the user must manually create it and print it.
* The current system is unable to calculate statistics, processed data or analysis of performance.

Opportunities to improve system: Making it digital and not handwritten to avoid ambiguity, centralising it, automating labour intensive tasks and implementing a way to make the sharing of data less time consuming and more encouraged to ensure cohesive and continuous care

Overall, the current system is inadequate for the task it must do. Firstly, for the handwritten elements of the paper storage system there is always the effect of handwriting legibility as it is often a struggle to read the data entered by many of the doctors in the current system. Also, the data is all stored in one physical location and if another person needs to access it, the user with access to the data must photocopy or manually tell the other user the information. Additionally, the system is not centralised, it has elements of paper-based data storage however it also has data in a digitalised format. For this application, the data needs to be centralised in a single system where data can be entered without ambiguity and can be shared without great effort. For these reasons the current system isn’t suitable.

# Specification and system requirement

**Inputs**

Store relevant patient information (Such as Name, Age, Height, Weight, DOB, Relevant medical history, Current GP information, Ethnicity and any other information necessary) in a CSV file accessible by the system.

Run suitable validation checks on data entered such as type checks, range checks and presence checks. This ensures the data entered is feasible (i.e., the DOB is within a suitable range) and the user hasn’t entered unusable data (numbers for a name etc.).

Outputs

Display patient information (Such as Name, Age, Height, Weight, DOB, Relevant medical history, Current GP information, Ethnicity and any other information necessary) when requested by user. This data will be taken by the CSV file mentioned in the input objectives.

Create usable clinic templates and operating lists. These will be dependent on the relevant stored information (read from the CSV) and any required input after that will be given by the user. Once the template/ list is created it will be export as either a PDF or as a print job.

Send an automatic discharge summary email to the user-entered GP email. The email should be present in the CSV as it would’ve been entered with the other patient information. The format for this will be standardised and the information needed will be added.

# Justification of approach

Programming language: Visual basic

I am using the visual Basic programming language mainly because I am familiar and have experience with it and it works very well with the visual studio drag and drop windows form application designer allowing for easy GUI creation. I had considered using python however I found that creating a GUI with python requires slightly more work and therefor it would not be an ideal language choice.

Development platform: Visual studio

I am using the Visual studio IDE for multiple reasons. Firstly, it is an IDE that I have experience with and am familiar with. This means that I won’t have to spend time learning the basics of a new IDE and can spend more of my time programming. Visual studio also has an easy to use ‘drag and drop’ windows form application maker. This will make the development of a graphical user interface far less time-consuming allowing for more time spent developing the features of the system themselves. Visual Studio IDE also has a range of debugging tools that come with it such as breakpoints, watch windows and step-through debugging. These features allow for an easier time debugging and more time spent developing.

Email software:

For email software, I will be using Gmail. This is because Gmail is a system that I am familiar with and it also has an API compatible with by language of choice – visual basic.

# Objectives and success criteria

Objectives:

Users will be able to login and create accounts on the first page. Use validation and verification here.

* + When users create an account:
    1. Take inputs of *Name, Phone number, email, identification number and role.* (Access level will be assigned by an admin)
    2. Preform validation on all data including presence checks and length checks
    3. Verify the email address with a confirmation email to the user
    4. Store this data in a CSV file
  + When users login:
    1. Check email and password against CSV file
    2. If this is correct, grant access, if it isn’t, send the user back to the login page
    3. Get the user’s access level from the CSV file
    4. Load the program with the data they should have access to

Store relevant patient information (Such as Name, Age, Height, Weight, DOB, Relevant medical history, Current GP information, Ethnicity and any other information necessary) in a CSV file accessible by the system.

* + Allow user to enter *Name, Age, Height, Weight, DOB, Relevant medical history, Current GP information, Ethnicity and any other information necessary*
  + Store this information in locally stored CSV file
  + Apply error trapping and validation to entered data

Display patient information (Such as Name, Age, Height, Weight, DOB, Relevant medical history, Current GP information, Ethnicity and any other information necessary) when requested by user. This data will be taken by the CSV file mentioned in the input objectives.

* + Display each patient along with their relevant data
  + Display this in a data grid
  + Read the data for this off a CSV file

Create usable clinic templates and operating lists. These will be dependent on the relevant stored information (read from the CSV) and any required input after that will be given by the user. Once the template/ list is created it will be exported as a PDF.

* + Read the data from the CSV file
  + Take the required inputs from the user
  + Use the data to create a clinic template in the standardised format seen in the document inspection
  + Output this as a PDF

Send an automatic discharge summary email to the user-entered GP email. The email should be present in the CSV as it would’ve been entered with the other patient information. The format for this will be standardised and the information needed will be added.

* + Once the patient has been manually discharged by the user automatically:
    1. Read the CSV and find the GPs email address
    2. Create an email including the patients details and relevant information
    3. Send this email and communicate to the user that is has been sent