1 – Discussion

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1.1 Description of the Problem

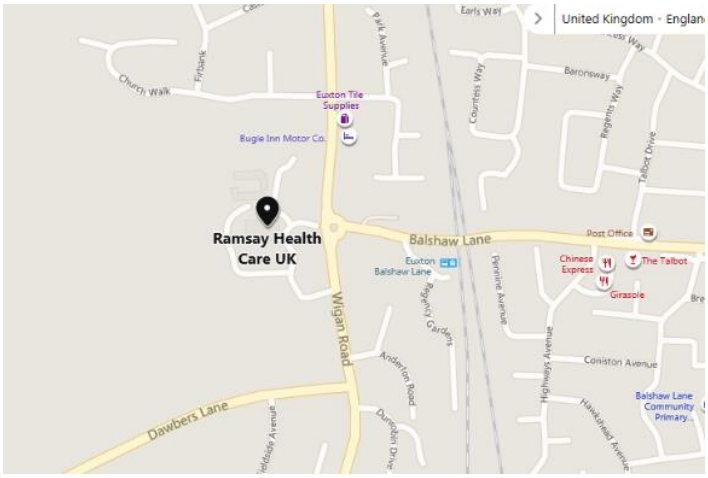
Background and service information:

Company Background:

The organisation Ramsay Health Care is a global medical group having over 220 hospitals and surgery facilities in countries like: Australia, the UK and Indonesia. The company as a whole **is well regarded in the medical and healthcare industry for its management of hospital resources and overall patient care.** Because of this, it is Australia's largest private healthcare provider and now fourth in the UK. The company has a total of 8000 beds and staffs around 25,000 employees' providing an arrangement of medical practises from complex surgery to rehabilitation. In 2007, the Australian company, acquired the UK based healthcare company Capio UK allowing for a foothold in the British medical industry.

Local Background:

The local medical centre Euxton Hall Private Hospital was opened in 1983 and is one of Lancashire's leading private hospitals, and inside the company being the **'Best in the North'**. Situated nearby Chorley the hospital also has nearby access to Wigan and Preston with easy passage to M65, M6 and M61 motorways. The facility itself has 32 available beds available all with en suite facilities to promise utter privacy and comfort including personal televisions, radios and telephones. The hospital itself is paired with 3 other hospitals: Renacres (Ormskirk), Oaklands (Salford) and Fulwood Hall (Preston). Which allows for a wide range of medical services throughout the North West.



Services:

The hospital also has on offer (all on site): **two fully equipped ultra clean air theatres, an endoscopy and small treatment room.** The hospital predominantly focuses on orthopaedic procedures (which are medical services orientated around joints) but also offers an array of other medical practices like:

- Breast surgery
- Cardiology support (Heart problems)
- Gastroenterology (Digestive system problems)
- Neurology
- General medicine
- General surgery
- With many more to offer

Problem Area

Within the Ramsay Healthcare environment, the system currently in place is an **essential backbone to the infrastructure** ensuring patient files are where they are needed to be and to prevent them from being lost. The current virtual system shows the whereabouts of a patients file with a date of its last known location through a simple process of **"tracking"**, where a **general description** is shown like, "Return to File" meaning it has been sent to medical records for storage. In addition, it **includes which member of staff reported this** and the **department they work for,** which is all updated to the patient's medical account.

However, the major problem is that the current system in place for filing away old or inactive files is **outdated and impractical** for the technological capabilities of today. This is a result from the only online system being used for stating the whereabouts of a files location, besides this **no virtual documentation of patient medical visits are kept** for long term use besides generic data regarding emergency information like phone numbers, allergies and contact data. Because of the lack of digital documents all physical paper-based notes have to be kept onsite, within the medical records department.

This creates an assortment of issues with the main ones being that **notes are lost**, where patients are left with no medical records. This is mainly due to employees failing to follow protocol in regard to not updating a files position or misfiling them under the wrong letter. Also, **the time taken to retrieve a file is not constant**, where one file may take a day while another may be a week. Other minor knock-on effects being the cost of hiring staff to file these files away, these notes and the cost of ink and paper to produce them.

The system as a whole is currently being used in major hospitals in the UK which is **prompting for a complete overhaul** of the current systems from Parliament.

The Current System

The system cycle in place roughly follows the routine of:

When a new patient is wanting to be seen they either come as a **new patient** (least likely) or come with a referral from an external hospital outside the system wishing to be treated here (most likely).

Here **the booking date is recorded**, and their **physical record file is created** by medical secretaries and sent to the consultant/doctor.

If an existing patient is waiting to be seen a request is made and their **current medical file is found** and brought to the consultant **before** the date they are to be seen.

During this, a notice is created for the medical records staff to **find and return the patients file to that consultant**. This normally is done around a week before the appointment to allow time to locate the file.

Once a visit has happened the consultant/doctor will verbally **dictate their findings**. This is then sent to medical secretaries who receive the document, print it off and then insert it to the front of the patients notes.

At the end of the morning shift all files with new notes are sent down to medical records where **during the evening they are filed away alphabetically** on shelving units in the medical records department.

From time to time when notes are full in medical records, they are **archived away** and sent to an external storage facility. During the process files that are deemed “not in use” are files that indicate that patient has no need to revisit and has said to be discharged. These files are then taken off the shelves, tracked and put into boxes and sorted alphabetically by only the first letter.

Problems within Medical records and Notes

As there are only a finite number of staff willing to work in the evening, the rate of files that can be stored and removed onsite is also a limiting factor. This causes other issues in medical records as when files need to be archived, **staff priorities shift** from filing away recently accessed files to removing inactive files to make space for new ones, resulting in a build-up of files waiting to be” returned to file” or “RTF”. Also, the task can be physically demanding with notes being transferred between departments weighing around 7 to 8 kilos per box and around 17 boxes being moved in an evening.

As of now the current virtual system in place is over complicated with many passwords and usernames required to access emails, learning sites and the current system which manages a files location. The whole process to login and access all of these programs could easily take 10 minutes, whilst the functionality of these programs are acceptable, they are clearly outdated as they use basic buttons and tabs making it feel like it was made at least two decades ago. To add to this, while the programs themselves are usable they aren't efficient in any way to be productive, where the process of tracking itself, takes a prolonged period of time to navigate the endless tabs within the system to find one file. The files themselves are also too complicated with them having multiple traits the main being:

FAT files, these are files that are too large to store on shelves with other files so have to be stored in a separate location to the others, as the name indicates these files are very big with some having to be held together with elastic bands. These files are created for patients who have to visit the hospital frequently so need to be easily found.

NHS/Ramsay patient, as the hospital provides both private and NHS funded healthcare the files are split up into two sections however, in the storing of the files this makes no difference, the two can be differentiated from each other by the secondary colour of the file.

Archived or not as the current system can't distinguish between files that have been to the external archival site (and then returned back there). Files have to distinguished physically by a sticker informing the member of staff that it has been to Restore (the external archiving location). This creates issues when archiving, as a non-archived file should be separated from archived files during this process and dealt with separately.

Restrictions

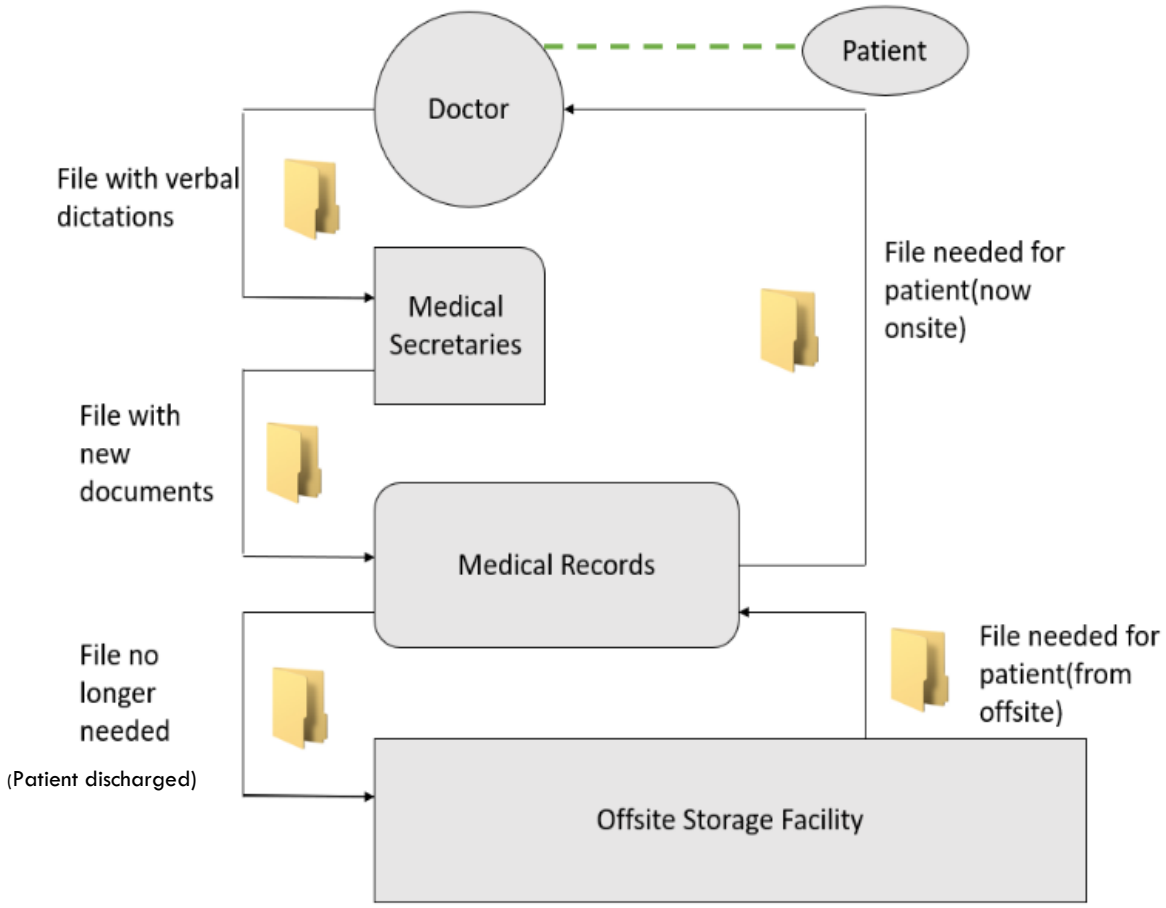
The process as a whole is very inefficient, with the task of retrieving the file taking **from a day to a week** depending on the location of said file, if it is onsite it will normally be found within a day or two, while files from external sites taking much longer. As many patients are needed in a day for a single doctor and there being many doctors, the process is entitled to a couple of members of staff to find them, if however, a file is needed whilst being in the process of being achieved to an external site it could take up to an hour for a single set of notes, due to them having to search through boxes of files that are ready to be moved offsite.

Another restriction is time, where a single process could take a prolonged period of time which may be problematic for patients who need treatment quickly. However, to prevent major issues from arising a temporary file is created when the old one can't be found and then can be merged with the previous file at a later date. This, however, wastes hospital resources and results in their previous documents like test results not being present for their visit. Real time transactions also play an important role in the booking system but acts as a restriction, as many patients request to see a particular doctor, real time transactions prevent the potential loss of integrity or accidental update of fields where a patient's appointment gets replaced with another. It also makes a large restriction also over the access to expensive medical equipment like the ultra-clean theatres the hospital provides so that two different operations can't occur in the same place at the same time.

Staff Structure

The structure of the staff is also important:

- Consultants/doctors are primarily the main entity who interacts with the patient, they will receive symptoms from the patient and conclude by diagnosing the patient when adequate information has been retrieved. This can be from tests or by finding out from the patient themselves. When recording medical findings, they to have a fast process so verbally dictate what they think/know.
- Medical secretaries are staff who receive patient notes and print them off and insert them into their file. They don't interact with the patient in any way besides organising follow up appointments or booking dates for the patient
- Medical records store and locate the patient's notes. They store files of two different kinds. They don't interact with the patient so should therefore have restricted access to patient details but currently have more access than they should, as the only way to determine if a file is eligible to be archived is to look through all of the patients notes to see if they have been discharged. Other tasks revolve around locating and finding files for consultants.



1.2 Broad Aims of the Proposed Solution

To resolve the main issue plaguing Ramsay Health Care I will attempt to virtualise the current physical method of dealing with files and centralise current digital process onto one coherent system. This will mainly include an efficient method of creating and editing notes through a form structure, a booking system that allows users to view upcoming events and a staffing structure which grant authorised users access to medical/general notes.

The main 3 user entities are:

- Doctors/consultants
- Patients
- Staff - medical secretaries (medical records would no longer be needed)

Other entities will probably be

- Booking
- Medical notes
- Management (staff)
- Adding/removing patients

Main Entities

Doctors

Most advanced end user, due to having to deal with a patient's medical information. They will consolidate medical findings with that patient and create a virtual copy of that finding. Over the course of the day they will interact with many patients all with differing needs and wishes and other staff, so the system for them needs to have the most important actions (like the ability to freely edit patient information). The user interface doesn't need to be friendly, just **efficient** and **quick** as they will have to use it the most in a day. The ability of this user is advanced so they should ideally have the ability to fill in a form for the notes quickly. They can:

- view **only their** patients advanced information like recent test results etc. This is a key feature as to ensure privacy of data
- Add to their patients' medical record through a form to ensure consistency
- Edit/amend patient records to remove errors, update inaccurate data
- View upcoming patients on their timetable so they can prepare by reading over notes etc
- Search through a medical file, by key fields like date etc
- Request follow up, notify medical secretaries to insert patient into said time, they would give a time slot currently free and then notify secretaries who would then add them to the system

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Patients

The customer of the hospital, they come to resolve a medical issue from the doctor and/or surgery. Normally they will have the least in user ability so their user interface will have to be the most intuitive and easy to access. Depending on the patient they could have a range of priorities, where one patient may have multiple reasons to visit and could have a range of issues they want to address. As the system is very large and there are many patients with similar or the same name, they should have a reference number that uniquely identifies them as that patient. Priority for this user is **ease of acces**s rather than features. The user interface should be a simple GUI with clearly labelled actions. It is assumed that they are the most important user, so can:

- View all related information regarding them. It is a legal right so really must be included
- Request to remove all information regarding them for any reason.
- View their follow ups, usually most patients have a bi-annually pre-arranged check-up so the patient may want to know when this is
- Cancel follow ups, this stems from the previous point. If a booking interferes with something in their personal life. They may wish to postpone it to a later date
- All their data is encrypted, this is another key part of information for the patients and is very personal and private so when dealing with the data it should be encrypted at all times except when they view it.
- Print off their notes, if for some reason the patient requires to access a physical copy of their details it should available for them

Staff

The backend user who will deal with tasks that the doctor has no time to do like organising follow up appointments and managing their medical notes. They should mainly use a mixture of GUIs (booking dates) and forms (updating notes/bookings). They are there to ensure the constant running of the system, therefore focus for these end users are similar to Doctors but will not have access to personal and private information. They will need to use the facilities quickly and faster than before in the previous system. They can:

- Add appointments for Doctors (if not automated), this should be set up in a way where they can just fill in a timeslot and it will be unable to be removed (cancelled) without confirmation from the patient.
- Remove patients from the system, as thousands of patients currently access the hospital for healthcare, not wasting resources for patients who no longer require medical help should be used. Also, under data protection as it is an organisation, any patient has the right to request that their data is removed from the system.
- Add new patients to the system, clearly this is needed otherwise new users could not access any notes as their file wouldn't be created. This should be a task for the staff rather than the doctor so that the doctors time is not wasted doing monotonous tasks that could be done by others. Batch processes would be inappropriate as it needs to be verified by a human to ensure that the data is accurate and adequate.
- View basic information regarding patients, this should be used as it means the doctor has some information regarding a patient before their first encounter with each other.
- Search through an entities calendar (staff or doctors), as they primarily intend to deal with bookings as staff should have access to both users who have a calendar available

Other entities

Booking

As the system to be introduced will be entirely virtual a booking system needs to be a key part of the whole thing so multiple systems are not needed (in the current system two different software are used one for staff, Edexcel where batch processes calculate staff wages and another that deals with patients' appointment). As it needs to be well-organized it should allow for bookings to be done in a matter of minutes where all incoming patients for a specific doctor can be seen. As certain people have emergency needs and could require emergency visits one doctor should be freely available at all times this is the "on call doctor". Also, as it is a real time transaction system data integrity is one of the most important features. We do not want a critical appointment being overwritten for an appointment by someone is there for a standard check-up. It should:

- Allow for the adding of new appointments, staff should only have this ability as doctors would have no time to do this and patients should not be able to view other information outside their own.
- Editing/moving of appointments, this is to allow freedom to the patient and can plan around other events in their life however there should be **a deadline for cancellations** as it would be inappropriate to cancel a couple of hours prior to the visit
- Sorting by key fields, date, doctor and/or time, if the table of dates is full, reducing the number of patients to those with selected attributes would be beneficial to the system.
- Searching by doctor or patient, this extends my last point: to search for someone individually would increase speed in which the user could see when they would arrive for an appointment
- Calculate number of patients that day, this could be used to create a maximum number of patients to allow the doctor a break as it would be legally required
- Allow patients to request an appointment by filling in a form

Medical Notes

The main reason the new system needs to be introduced, a virtual copy of notes allows for an efficient and fast access to patient details. It should be split into two sections; basic information and medical information. Basic information should available to all staff and should include generic data like names addresses phone numbers, emergency contacts, allergies and blood types so that anyone inside the system can contact the user in case of emergency. Other traits to include are if they are an organ donor and/or have a disability or notable problem i.e. diabetes. Advanced medical information would be personal data the patient wants to keep private like weight, previous medical test results and doctors' notes. Because of this a simple layout with clear buttons for features laid out plainly should be used, therefore, filling out notes should be done through forms so that it follows a basic standard layout, they should:

- Add notes through a form this would create a universal standard that if outside a doctor was to see notes they would know that they all follow the same format
- Edit notes (it should be simple), if an error has occurred or the patient has requested to update their notes it should be a swift and simple process
- Sort by date, key fields (Test Results etc) similar in respects to the booking entity when searching notes. Currently it takes far too long to find certain information like latest results so sorting will improve readability
- Search by key fields like date improves searching time for doctors to find a specific entry.
- Viewable only by the patient and consultant, this is a privacy issue as currently anyone in medical records has access to any file
- Verification to ensure that notes are acceptable, this is more to ensure that false or inaccurate data does not occur
- Notes should be encrypted, this should be true with all data, so it is protected against unwanted threats like packet sniffers during transmission of data packets across a network
- Ability to print notes i.e. request from patient so they could use it to prove medical issues i.e. doctors notes used as proof of illness for employers

Management (Staff)

Management will be the staff behind the system and will manage all internal requirements like introducing new staff onto the system. They will deal with the changeover of the current system and will organise how old documents get put onto the new system (if this feature is introduced). They will be one of the most advanced end users so functionality will be prioritized over simplicity. They should have access to staff process but will be unable to have doctor permissions. They can:

- Introduce new Doctors/staff to the system they will have to create new booking slots etc to accommodate for the removal/adding of the new staff
- Remove Staff/Doctors to the system similar to the prior point
- Maybe offload inactive patients who have not been present for x amount of time to save mainly on storage.

Other Considerations

Validation and Verification

As the system requires accurate data as it is dealing with important data, validation and verification should be used entirely throughout the system so no error/mistake can be made to ensure exactness in patient notes, this a big issue currently so it needs to be focused on. As large errors like the wrong data being given to the wrong person has caused great losses for medical companies in the form of financial compensation.

Dealing with the current paper-based system

As the current system is predominantly physical, an initial changeover task will need be considered to convert the current system onto the new one. The idea is to just treat old documents like new ones and fill them in as a new document but just have a pre-existing date. But this has ethical issues as it would take months to convert these files into new ones and would mean the hospital could come to a standstill in regard to dealing with notes. As well, no-one will want to type up tens of thousands of old notes for hours every day. Other issues arise also, as some notes are handwritten by the doctors themselves, their handwriting maybe partially unreadable and therefore the new document will be a 100% copy of the physical rendition.

Audience and Purpose

To distinguish non-employed users, patients and staff should have differently formatted layouts as it will allow for a clear distinction between users. For patients, accessibility and simplicity are the priority whilst for employed users the focus should be on functionality and efficiency, maybe a page that displays a favoured layout could be implemented to allow access to frequently accessed features. The house style for patients should be similar to current website/branding standards to make it feel like a genuine product from Ramsay themselves.

Encryption

As the patient's data will be highly confidential a feature that will definitely have to be included is data encryption whilst as of now, the method of encryption is yet to be determined, it should be implemented in a way that perfective maintenance could be done to improve the standard of encryption if it needs to be done later down the line. Currently at this moment of time a basic encryption is best as it would show the practicality of the feature while not wasting time on developing a highly advanced method and as stated could easily be improved on at a later date.

1.3 Limitations of the Proposed Solution

Despite the new system containing a lot of new features there will be numerous limitations that will be present which will result in other features not being present in the final system. As the main focus for the system is efficiency, novelty and overcomplicated features should also be avoided. For the time being there are few things that seem to be unreasonable, unnecessary and are not needed for my system the main ones being:

Major features that will not be included

Advanced Expert System dealing with medical questions

Due to the lack of medical knowledge an advanced expert system is absolutely a feature that will not be included at the current time. **It would be impossible to create a system that could accurately generate a correct diagnosis from the countless arrangement of symptoms patients could have**. Other reasons being the ability to create an expert system that could accurately diagnose medical problems being unreasonable for my system as it is clearly out of scope from my aims. Moral implications could be introduced also resulting in reliability being a key factor where if a mistake was made it could result in a misdiagnosis and mistreatment of the patient's illness. It could also result in patients no longer needing to use doctors, resulting in no need for actual doctors at all. **The impact of this will be small**, that the system will not have the feature to suggest possible ailments to the patient and will be ultimately left down to the consultant to determine a diagnosis, this isn't an issue as this already happens and no problems appear to occur.

Creating new users

When a nonuser enters in their symptoms into the system, the staff entity will then create an account from their information and set up the initial admission for them. However, there will be no communication system to give the nonuser the login details for them to gain access to the details. This is due to limitations between communicating with the user's mail client and the system. While it would be ideal for this to occur, it will take too long for it to be developed so ultimately this feature will be avoided. Despite this I still intend on allowing for new patient accounts to still be developed.

Admission analysis

This feature would have been an appealing feature to have been included as it would have allowed for the analysing of patient admissions which could track changes to the rate of admissions which could allow for adjusting of current resources. This could be reducing the demand for a medicine for an ailment that is in decline, but the suggestion for increasing the supply of another medicine that is increasing in demand. **The reason to not include the feature is down to inexperience with analysing of data in general and the ability to develop tools that could automate it for the system in future would inevitably take too long.** The impact on not including this would be rather substantial as a local outbreak for an illness or a sudden surge in demand could result in supply becoming scarce resulting in possible loss of life if not resolved. However, it may be a possibility during development to prototype the ability to view increases in a certain admission which could calculate how many of each admission have occurred this month etc.

Verbal dictations for data input

This would have been like a current part of the old system, to avoid unreadable handwriting consultants dictate what they want said and the recording are then typed up onto the document to be printed by the secretaries. **One thing that will not be included on the system is the ability for consultant's verbal comments to correctly inserted into the document**. This is due to a few reasons: One, the accuracy for speech recognition is not 100 percent accurate and would result in occasional mistakes which can't happen as every piece of data is vital. Two, speech recognition software would take too long to develop that can correctly determines speech. Three, accents in speech and the

language spoken will result in a limited accessibility so very little would have the ability to use it easily. However, the overall result of excluding this will not be devastating as it can be done by the current secretaries working there.

Working with hospitals outside the system

As it will take a long period of time for changeover from the old system to the proposed one, **the old system will still need to be managed for keeping track of patient files like they currently do now as other sites will still use physical copies of notes**. However, one limitation will be is **the integrity of documents as a file currently being imported onto the new system are affected by the patients visits to other hospitals**. An example would be if a patient visits a neighbour hospital under the Ramsay ecosystem that still use the physical notes and have their file updated, Euxton will be unaware that her medical information may have changed during her visit if the patient/Other hospital fail to inform the department responsible. This will result in multiple versions of her file existing which causes problems understanding which the most accurate representation of her medical information is. Because of all of **this I will not include other hospitals to access the system and will treat the system as an isolated one, with the physical file being discarded once being virtualised**. The impact of this would be that patients would be forced to only visit Euxton or to print of all virtual documents needed, this defeats the purpose of virtualising the system but is a limitation I can't avoid and have to accept it won't be included

Communication between system users

Another major feature that will be missing in my system will be a communication network. This would allow users like staff to talk to doctors for any reason, for example to comment on an upcoming appointment or inform a patient that their test results have come through. Anyway, this feature will not be implemented due to it not being within the scope of my idea enough. Also **another reason is the ability to establish a communication network would have been too hard to make work for a feature that will not be entirely needed**, it feels to me it is a feature that would have been implemented just for the sake of the system having another feature, although if a mobile application was to be introduced the validity to implement communications between users could be justified. I believe however, that a few fully worked on features would be quintessential to the system rather than a catalogue of gimmicks that would have no relevance whatsoever. **This will have a major impact on the system as it would have allowed critical information like results being securely and freely available to the patient to view whenever they want.** However, as it is currently not in place it has no negative affects on the system as a whole.

Payment from patients and wages of staff

Payment from patients is a feature I don't intend on implementing mainly due to the fact that most hospitals within the system have support for private and NHS patients, with NHS patients being the predominant patients present. **Therefore, it would be waste of resources and time to create a feature that not all patients would use.** As for wages a current system is already in place and sufficient enough to carry on being used, as the current situation with wages is fine with there being batch processing to calculate payments, I don't think it needs to be implemented into the system straight away. It may be a feature I add later on during development however, right now I feel it is a thing I will not include currently as I want to focus on the main problem then focus on extra features. **There will not be any major drawbacks as of now to not include the feature** but may seem a little inconvenient to be centralising processes onto one service but still keep payments separate.

Location of data storage

The system will have to hold a wide range of both staff and patient data, it is clear that the choice of data storage will be a clear limitation of the system. The problem will be of the location of data storage, as everything will be done from my laptop, I will have a limited access to storage for my data, whilst my college account does provide a cloud data storage service through One Note it will be more accessible to manage all my data from the same device. While if the system was to be directly implemented onto Ramsay's actual site, a server would clearly be the choice of hardware, where IT technicians could maintain and support the hardware as the size of data storage requirements would increase. I have also thought about other storage medias to use like external flash memory and optical discs, but I will choose to use my internal solid-state drive to test usability as its size currently is more than usable. The impact of this will not be noticeable as data access should be fine if the software is developed efficiently.

Other features to be excluded

These are smaller features that I have thought about, but feel are too small to fully mention in greater detail.

Information freely available to the public

As an organisation, Ramsay Health Care will have to follow the Freedom of Information Act of 2000, which dictates that any member of the public has the right to request information regarding themselves or any information regarding the company. At the current moment a dedicated feature regarding this law will not be included in the new system, as it is relevant however a nonaugmented feature may be included in a way where a request page could be set up to submit queries regarding any questions regarding data involving the company, which a response would resolve the question. As the feature to remove data regarding a patient is set to be included at the present moment anyway this feature may not be too far out of scope, as the main focus of the new system is ease of access to data anyhow.

Other members of staff currently present at Euxton

The hospital requires a wide range of staff to keep operations up and functioning, there are many departments intended to be excluded from the system due to the lack of usability they would receive from the new system the examples of them being:

- Cleaning/catering of patients, as they currently have no access to patient data anyway it is clear they should be excluded from the new system as it would waste resources allowing them access to basic patient/doctor information.
- Human resources, even though this department has to have a presence in every work environment, they have no part in the operation/management of patient records therefore there is no reason to include them.

Mobile/ home applications

The whole system is centred around medical records. The new system will continue to be used onsite only, so different versions of the user interface to support mobile and other displays will not be supported. This is mainly due to data security in regard to accessibility of patient information, where there would be no need for a doctor to have access to patient information outside working hours. Whilst it would be ideal to create a mobile application to allow patients to have access to medical information outside the hospital, it is too ambitious to pull off within the given time period, however, to prevent the patient having no external access to notes offsite, I am allowing the ability to print off documents. Despite physical copies of notes being the main contributing reason, the current system is flawed as it is the only way I see patients having access to notes whilst not at the hospital.

1.4 Feedback

Approach to Feedback

To consolidate my idea, I am to consider feedback from my peers. I have been told to present my ideas to them and hold a quick presentation about this system and the discussion phase of the system so far. Afterwards, their thoughts and opinions will be recorded. I will have to determine whether their comments should be accepted or rejected. It has also been suggested that I should find people (family/ friends) who are technologically capable of submitting feedback about the idea to me. With this in mind here is the list of people who have given me feedback regarding this project.

Name of Respondent	Relationship	Level of Competency
Karl Nurdin	Farther- contracted Programmer	Very High
Suzanne Tomkins	Mother- employee- medical records	Standard
Harshal Gosai	School colleague	High
Jay Taylor	School colleague	High
Jamie Russell	School colleague	High

Here is a photo from the presentation I gave around the idea from the previous page. On the next page there is the power point I used, even though the text is similar to the one on this document it was there mainly to show key ideas where I would then go into detail verbally. Once the PowerPoint was over I opened up to questions and their feedback was recorded below is their feedback and the considerations I took with it.

Modernising the filing system at Ramsay Health Care

James Nurdin

RAMSAY HEALTH CARE

Background

- The organisation Ramsay Health Care is a global medical group having over 220 hospitals and surgery facilities in countries like: Australia, The UK and Indonesia.
- The local medical centre Euxton Hall Private Hospital was opened in 1983 and is one of Lancashire's leading private hospitals
- The hospital predominantly focuses on orthopaedic procedures (which are medical services orientated around joints) but also offers an array of other medical practises like:
  - Breast surgery
  - Cardiology support (Heart problems)
  - Gastroenterology (Digestive system problems)
  - Neurology
  - General medicine
  - General surgery

Problems

The current system deals with paper based notes, which are the physical copies of all past and previous information regarding the patient: every test, surgery, doctors note etc are all kept in these files
Wherever the patient is at the hospital their file should be with the corresponding doctor

- The major problem is that the current system in place for filing away old or inactive files is **outdated and impractical** for the technological capabilities of today
- The current virtual system in use shows the whereabouts of a patients file with a date of its last known location.
  - **Because of this, no virtual documentation of patient medical visits are kept** for long term use besides generic data regarding emergency information
    - Because of the lack of digital documents all physical paper-based notes have to be kept onsite.
  - **When notes that are lost,** patients are left with no medical records, When they visit again doctors will have no previous information to go from.
  - **The time taken to retrieve a file from medical records is not constant either,** where one file may take a day while another may be a week.

(All these files are waiting to be filed)

- There is only a finite number of staff willing to work in the evening (files get put away in an evening) so the rate of files that can be stored and removed onsite is also limiting factor, depending on staff availability a few employees may have to put away up to 20 boxes with around 25 files per box.
- Medical records is a small area to store around 10,000 patient notes so notes have to sent to an external site which costs money.

Proposed Idea

- To resolve the main issue plaguing Ramsay Health care, I will attempt to virtualise the current physical paper based method of dealing with files and centralise current digital process (i.e. wages) onto one coherent system.
- This will mainly include:
  - An **efficient method of creating and editing notes** through a form structure. This will allow doctors/staff to efficiently view/amend notes at will, whilst viewing notes the user should be able to search through and sort notes in a variety of ways.
  - **A booking system that allows doctors/patients to view all past and upcoming appointments**, and search for key fields like name, date etc.
  - A **staffing structure which grant authorised users access to medical/general notes** where patients get to see only their information, whilst doctors can see all their patient information.

Why?

- The main reason the system needs updating in some areas and overhauling in others, is because there currently there is **no need to have a paper based filing system, created in the 80's,** in the 21'st century
- Also it is prone to human error resulting in **lost files** which can be dangerous fir patients who are seriously ill as it prevents them from having surgeries etc.
  - Also the task of archiving files is **wasteful of resources** in medical records as over the course of a few months the shelves will start to fill up but not enough staff are tasked to put away unused files

  In addition to having a paper based system, all the other virtual systems currently need to be centralised onto one system, as it would benefit productivity.
- Finally the new system will be **more efficient than the current one** as the demand of dealing with notes is constantly increasing and the result of this would be that it would cost less to maintain in the long run.

Limitations

These were features and other things I have thought about that I have now dismissed from the new system. These were either too ambitious, or out of scope from the main idea, and would have exacerbated the system.

- **Advanced Expert System dealing with medical questions**
  - Expert system that responds to user asked questions by giving an accurate diagnosis
- **Ordering and maintaining medical equipment**
  - Feature allows doctors/management to purchase or restock medicines and or equipment
- **Communication between system users**
  - The ability for specific users to communicate so that doctors could inform the user that they have had test results come in etc
- **Payment from patients and wages of staff**
  - Users could have been able to pay for private treatment/employees could input hours worked
- **Location of data storage**
  - The actual location where all patient/staff data would have been stored
- **Medical Education of staff/Training of nurses and doctors**
  - Undergraduate students getting experience would have had their own entity, mandatory training staff would have been on the system
- ***Information freely available to the public***
  - A page that would allow members of the public to ask questions regarding company data, etc
- ***Other members of staff currently present at Euxton***
  - Other members of the hospital outside the system now, i.e. human resources would have their own entity,
- ***Mobile/home applications***
  - Allow patients to read their notes from their phone offsite

Consideration of Feedback

Person	Feedback	Consideration	Accept/Reject
Karl	"The idea is good, there is definitely a problem with your old system, it seems that your solution will mostly solve it. However, as you have said the current system uses physical notes, how are you going to deal with them? You could deal with physical notes when bringing them over to the new system through pdf files and create new notes and save the as electronic. So that the patient has a virtual record with new notes being digital and obsolete notes from the old system being pdfs.	I have thought about this a lot and feel that **I will accept the feedback**. The idea to scan in pre-existing documents and labelling them with digital tags to suggest what the document is about for quick access is **a very efficient method of dealing with the current paper system**. This can result in me abolishing the prior idea to just treat old documents like new ones and fill them in as a new document. In hindsight even though it would have taken a while to bring files onto the system by doing this it **will save a lot of time for the staff who will have to deal with it** and therefore is the option to go with.	
Karl	The method of how you are going to approach this project is acceptable but research the v-shaped model if you need a way of creating your system if you want a different way of approach.	After reading up on the v-shaped model, what he recommended with it being an extension of the waterfall method of software engineering, I think **I will have to reject the proposed suggestion** and will follow the current structure to this project, whilst the method is interesting, **the lack of actual prototypes is clearly the most disadvantageous** for me as it is required I create one, whilst the model is beneficial to medium sized projects, the current method is satisfactory due to everyone else using the same structure. Whilst I can comprehend why with his experience in the software engineering industry would lead him to give this feedback, I know that I need to follow the guidance I have been given rather than doing it without the help pre-established.	

Karl	'You've said that doctors don't have time to waste with dealing with notes, and that the staff seem too impersonal you could maybe introduce a new form of staff like a personal assistant for the doctor that could receive the doctors verbal dictations and then type them up for them'.	I have given this some thought, but the number of doctors there are at Euxton and the number of patients that visit are too restrictive for this and have decided that **there isn't enough justification to implement them onto the system.** This is due to there being "staff" already designated to perform these tasks. If there where physical notes on the system, then the "PA" could have been implemented to manage them for the doctor but, as the intention to remove physical notes is too big to not remove, **I will have to reject this idea.**	
Suzanne	"I definitely know the flaws in the current system so coming from an actual end user I believe this is a very big issue here, if you were to digitalise the system it would be excellent. However one thing you could do to make it better, as you've said the hospital specialises in different medical practises and that the hospital needs to have an 'on call doctor' at all time, however as no one doctor would have standard training in every medical practice you should have a range of doctors present who have training in certain areas rather than one with a general licence to perform medicine.	While this feedback is given from someone with very basic technical knowledge, they have the actual experience with the current system besides me so is the best person to give feedback that is not orientated about the technical aspects of the project. With hindsight I should have thought about this, they are very correct by pointing out this criticism and **it would be very useful actually to have a range of medical abilities available as a single doctor with a basic understanding of everything** wouldn't be able to help someone in an extreme emergency. The benefits of this could be that a doctor would have a range of attributes indicating what field they specialise in i.e. Orthopaedic, cardiology, neurology etc. This feedback has also given me an idea to maybe can swap around doctors in case one can't make an appointment, where a doctor with similar expertise could take their place. **Because of this I will ultimately accept her feedback**	
Suzanne	Also how are you going to address the physical disposal of notes while putting them onto the system, how are you going to remove files from site if not all of them are going to be electronic instantly?	While considering this feedback and the initial one from Karl Nurdin, **it is clear one area to reconsider is definitely change over,** while putting files onto the system now with the new feedback should be improved, the method of change over in respects to actually continuing on with hospital processes clearly needs to be revaluated. With this in mind **I am going to accept this feedback** and think about how the system should be ran during the crossover period from a physical system to an electronic one.	

Jamie	A feature that you could implement onto your system would be to allow staff to ignore irrelevant fields when browsing through patient booking dates like highly technical information as they would have no need to actually see that data.	Yes, while this is true staff would have limited knowledge to medical findings, it has already been noted that staff have primitive access to sensitive information, if the feedback was to be taken from this point of view, **I would have to already accept it as it was already intended.** In addition, if Jamie is coming from the point of view where staff should have limited access to patient data in regard to patient bookings resulting in staff being unable to see certain things like the actual medical procedure that **would be another criticism to accept** as staff should know that a patient is coming but doesn't need to know little details, maybe a reference number could be used where only the doctor/patient knows while a staff member could use it to see what the appointment is about by entering it in, this could validate a patients authorisation confirming that they have to see a doctor on that day.	
Jamie	While you said you were not going to implement an advanced expert system, I would suggest a couple of things around this. I would implement a basic Q/A system for the patient that would allow for basic symptoms to be entered and a simple suggestion would be given informing the best course of action either to book an appointment or take x medicine for y days. Then if a booking date was to be created from this suggestion, it could automatically choose the best doctor as the basic diagnosis would already be generated.	With the new system being introduced to improve efficiency in an outdated system **I feel that Jamie's suggestion would help improve the overall flow of the booking situation, so I will accept the feedback.** This is as sometimes appointments are situated with unnecessary visits where patients visit for very basic problems like colds etc, while the visit is not bad itself the doctor's time could be used to treat people with more serious problems. While a major expert system is out of the question a simple dropdown box could be used to determine the best response for the patient and could suggest the most suited doctor a patient could see initially if a booking was going to be created. Because this feature isn't too demanding on medical experience, I will definitely be including it.	

Harshal	I Think your system could actually use the wages as it would allow for management to have a larger impact on the system rather just being there for no reason major besides managing staff.	While I do feel this is a very good reason to implement wages onto the system it needs to be done well, rather than just being there to add features onto the system, while Harshal was qualified to give this feedback **I think he doesn't seem to get the scope of my system being orientated around data management** rather than being finance, this is also the other reason why ordering medical equipment and medicine was decided to be excluded from the system, because of this **I will not be adding wages onto the system**, but I am thankful for his contribution	
Jay	The proposed solution to your problem is good and should solve it however the only feedback I would give is this. As you said that data security is important to the company and that validation and verification should both be used to ensure that data is correct, so I think you could include a file that records who adds/ edits patients notes similar to a transaction file to ensure falsely added information is tracked to the correct member of staff.	After considering this feedback I will definitely accept this feature and will include it. As I have said before that files currently are tracked the feature Jay has suggested would work similar to this and would be very useful for finding discrepancies within notes as it would inform management to find who has edited what file and could allow for issues to be resolved. This also gives management a greater role within the system a criticism that Harshal implied with his feedback.	
Jay	Also are you going to include backups for your patient's files as it would be important to make sure that minimal files are lost in case of corruption or other reasons a file would be damaged or missing. Would you use a generation system or just a single copy? What would be your backup method Full backup, incremental backup etc	This final feature by Jay is a feature I have thought about and have ultimately decided to exclude and therefore reject. While the idea of having a copy is relatively important in a real-life scenario, I personally feel that it would reduce my focus from the real task of the system, which is management of files and documents. If I were to re-evaluate the current main features of the system I might possibly include this but as of now I am rejecting the feature	

1.5 Refinements to the Proposed Solution

After receiving much criticism regarding my proposed new system, I have taken on-board the comments made. There have been quite a few changes from my original version of the new system. Here are those changes regarding it. No changes will occur to areas not mentioned

1. Dealing with the old system

Refinement	Explanation
Instead of treating pre-existing documents as new ones and filling in them in as a new document, **they will be scanned as PDF documents and will be given appropriate tags** so that when tried to be retrieved they will be able to be searched for efficiently.	The reason to follow through with the change Is as it will result in hours being saved from irrelevant information. It will save countless resources to convert an old document onto the system this way, however this is still not an efficient or completely ideal way to do this the following can occur: - The scan may distort a consultant's handwriting. - Staff will still be needed to initiate the scan and check the document is readable.
Old documents that are no longer have any use, old referrals or have been updated onto the online system, **should be shredded and recycled.**	As the whole focus is to virtualise the system when documents are to be no longer needed for archive, they should be securely disposed of completely. If this was to not occur it would be counter intuitive to have a physical and virtual copy onsite. The reason for it to be shredded is also quite important as it needs to be certain that no personal and private information can be retrieved shredding documents allow for reassurance that the document can't be recreated.

2. The doctor/consultant entity

Refinement	Explanation
Doctors will possess a range of medical attributes in areas they specialise their profession in	This is true in real life as no one doctor has a basic general knowledge of all practises. Also, as Euxton is a specialised hospital it's obvious that only certain practises are performed there. Because of this it is vital that this be carried onto the new system so it can be properly used as this system is meant for Euxton.
Only doctors with similar specialised areas can take over appointments if the normal one can't make it.	This suggestion should be followed on because it is common sense otherwise patients would be left with a consultant that has no idea how to generally help the patient with the admission.

3. The Staff entity

Refinement	Explanation
Staff will now **have even more limited access to patient information,** they will know that an appointment is going to happen, **but minor details like for what purpose will be unknown**	This is because data security is a major push in the newer system as it is important that no data breaches occur. One way to reduce them is by limiting who can see what. This was already going to happen, but the refinement extends onto what appointment or visit was for as in reality the staff don't need to know the minor details of a patient's visit.
To validate an appointment **the patient will give the system a reference number** to confirm the reason they are visiting. This will be done at the desk	This will now be needed to confirm that they are meant to be visiting Euxton at the reception to prevent anyone getting inside the hospital without authorisation. This is needed for security reasons and can be used to show if a patient actually has arrived at the hospital
The member of staff will also have an updating list of appointments where the reference number is listed and what time, this will be an extension of the booking system.	This will be needed as the secretaries will need to know of all the appointments approaching and can answer questions to patients if they have an appointment that day

4. The pre booking system

Refinement	Explanation
Before an appointment is made **the patient will have the option to insert symptoms onto the system through a basic dropdown box** with simple symptoms like headache etc, here **if a minor illness is diagnosed the only prompt will be is to take x medicine for y days.**	This is a very important feature I talked while I was writing the discussion. This feature will allow for a broad idea to be formed by the consultant before the appointment and could even determine if it would benefit from an appointment at Euxton in the first place. While an advanced one I wrote off due to lack of expertise in medicine, I basic one will really help give an early impression for the admission.
if a notable ailment has come up the following will happen: • **Urge the patient to book an appointment** • **Automatically choose the best doctor as the diagnosis has already occurred** • **Move them onto the booking page with the request form partially filled in.**	This is another aspect I intend on changing to the system as it will overall streamline the booking process if they go from asking a question, because of this it will also narrow down the best consultant for the system to decide on giving to the patient to see.

5. The management staff entity

Refinement	Explanation
Introduce a new version of the old tracking system now when a patient's notes are updated a new entry will be written onto the update log for that specific patient, it will include who added/edited the file, when this was done and what was amended. This file will only be accessible to management staff.	This is a feature I now intend on adding onto the system as I feel should be included because it will link the next refinement but will be another security aspect for the patient. It will allow for management to view all the changed to a patients file. This will make sure any discrepancies can be located and the individual that caused any issues can be resolved, it also makes restoring data result in less data loss as it can be used to restore recent updates to a file