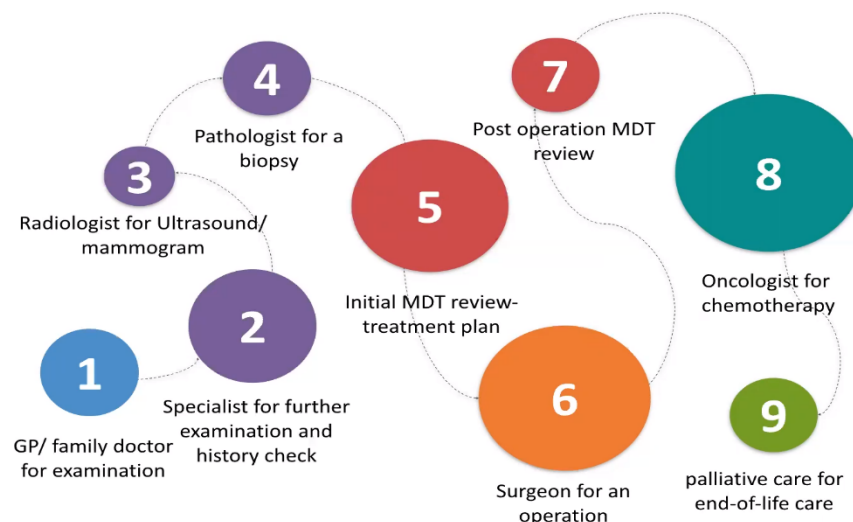


The need of health care models raises due to the increase in population where people with the need of medical treatment has been increasing day-by-day. As a result, it is creating a lot of medical records. This raise to the case of comorbidity which means more older people than younger patients. In older patients one disease is interlinked to another disease which means if a patient is suffering from one disease it leads the patient form suffering to other disease as well. Older people have a lot of disease in commo and sharing of data between doctors can be helpful in treating this disease.

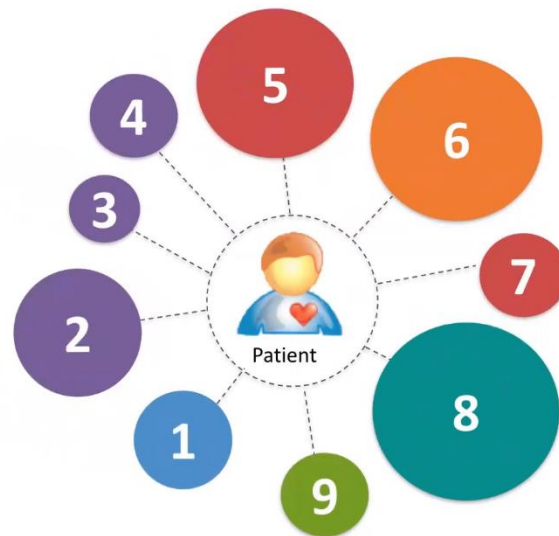
Breast Cancer Treatment Scenario



For example, consider the Health Service System of UK. We consider a patient having Breast Cancer- when the patient meets his\her family doctor or General Practitioner (GP), he collects all the information about the patient ask some general questions, do some x-rays and check those for any suspicious. If he found anything suspicious in it then the patient is suggested to the actual hospital. Hospital starts with the GP, like treatment patient undergone, medicines used by the patient via fax or by medical record file the patient is having. Now, the doctor takes some notes of the patient, perform some more tests and if he still feels suspicious, he recommends the patient to a specialist-in this case maybe a Radiologist to perform ultrasound/mammogram. During Radiology a pathologist is also considered is also considered for a biopsy. After compilation of tests, three test reports are discussed in Multi-Disciplinary (MDT) care review, where each patient case is discussed. Discussion is cried out by using medical records, card or x-rays where the patient name is called out loud on after another. After the discussion 90% of the patients undergoes surgery as first treatment. After completion of surgery another MDT review is carried by the doctor in the presence of surgeon in order to discuss any further need of treatment. If cancer comebacks years later or the patient in is in advanced stage, he is suggested for end-of-life care. In this every sate or evet test and treatment a patient undergoes is considered as a record.

Here, the bubbles indicate the system and colour indicates the hospital in which the system exists. These systems are more discrete and are not designed to talk to each other and share information.

Patient-Centered Care

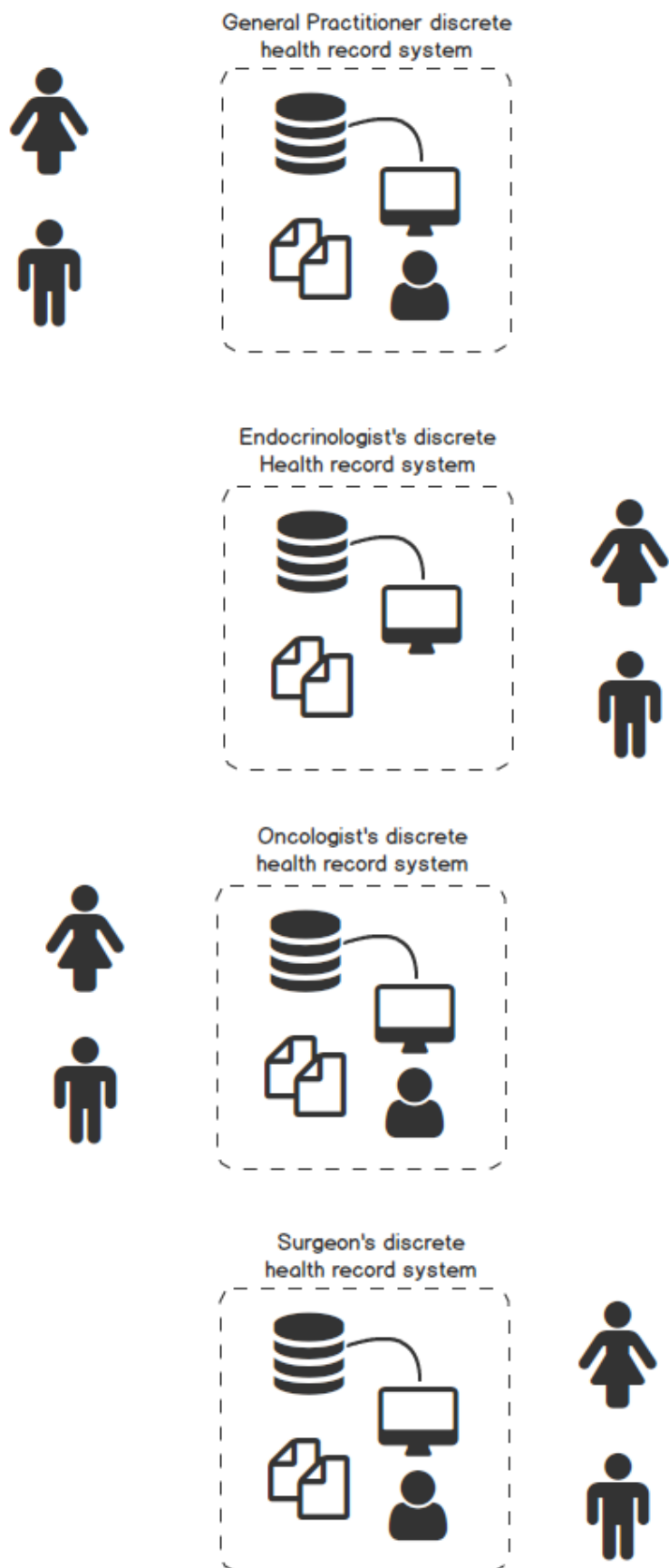


The modern approach is to create a Patient-Centred Care by bringing these systems together. As a result of it, they integrate the service around the patient and his needs, about the treatment undergone for optimum healing and recovery.

There are some traditional health care models like eHealth, mHealth, uHealth, virtual healthcare, Tele-medicine etc with the common aim is to provide sharing information irrespective of the platform. Though this new model is encouraging doctors and patients to sharing information but raise information sharing dilemma which are data protection and legal issues related to data protection and sharing. At the end of the day what ever methods we follow, more harm is done to the patient if his information is not available to the care team if it is fallen into the wrong hands.

The drawback of this system is readiness. Instead of making information sharing easy they are actually making it difficult by blocking the flow of information and really nit helping for the treatment. When the data is shared between doctors, there is no guarantee that the data is shared with in the law or with in the data protection law acts. Because of this, information sharing is not effectively taken place resulting in the blockage. There is also lack of Unified security policy to govern the Patient-Centred data across legacy systems.

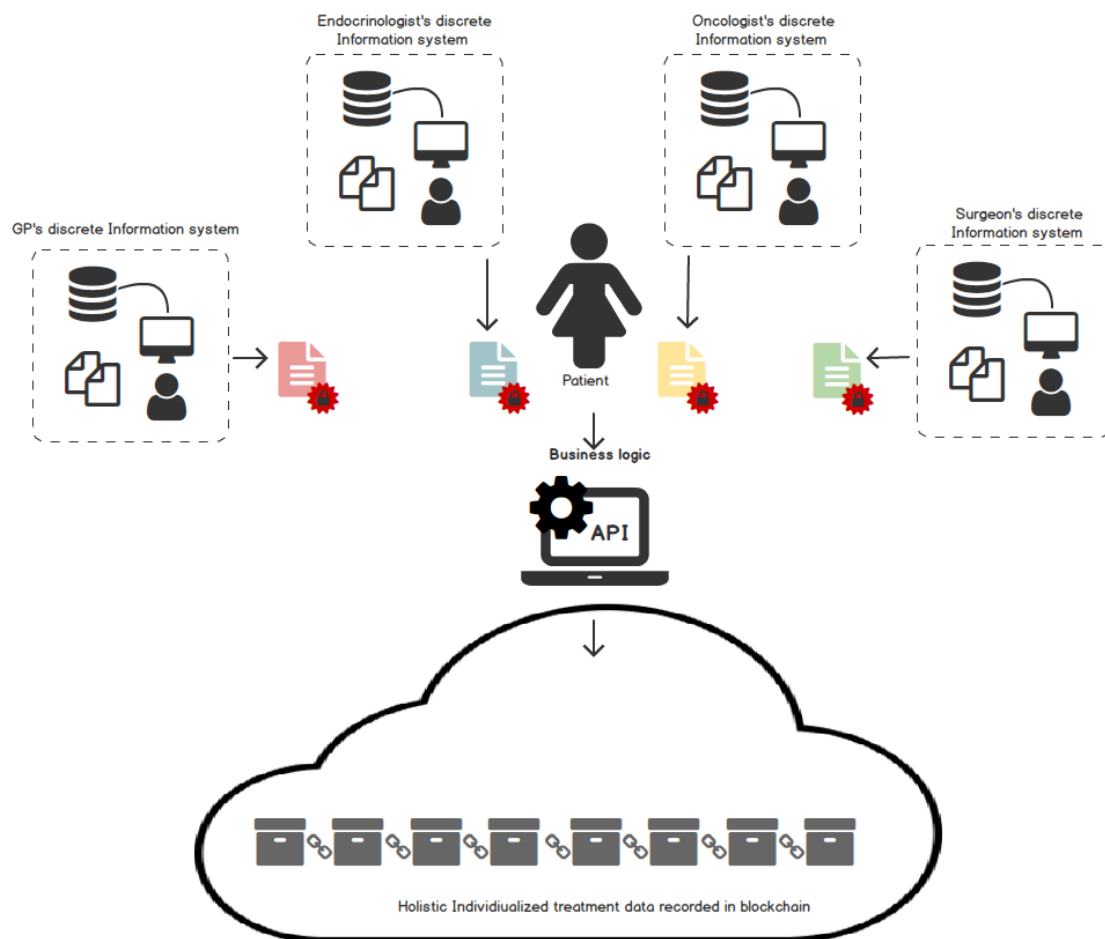
Blockchain Technology can be used to overcome the situation of data blockage due to the legal issues. Blockchain Technology results in peer-to-peer distribution ledger that allows a new generation of transactional application where we cab digitally track the record transactions between group of participants in this case a doctor-to-doctor or doctor-to-patient. This provide a temper-proof trail time-stamps of blockchain square to establish transparency and trust between two parties.



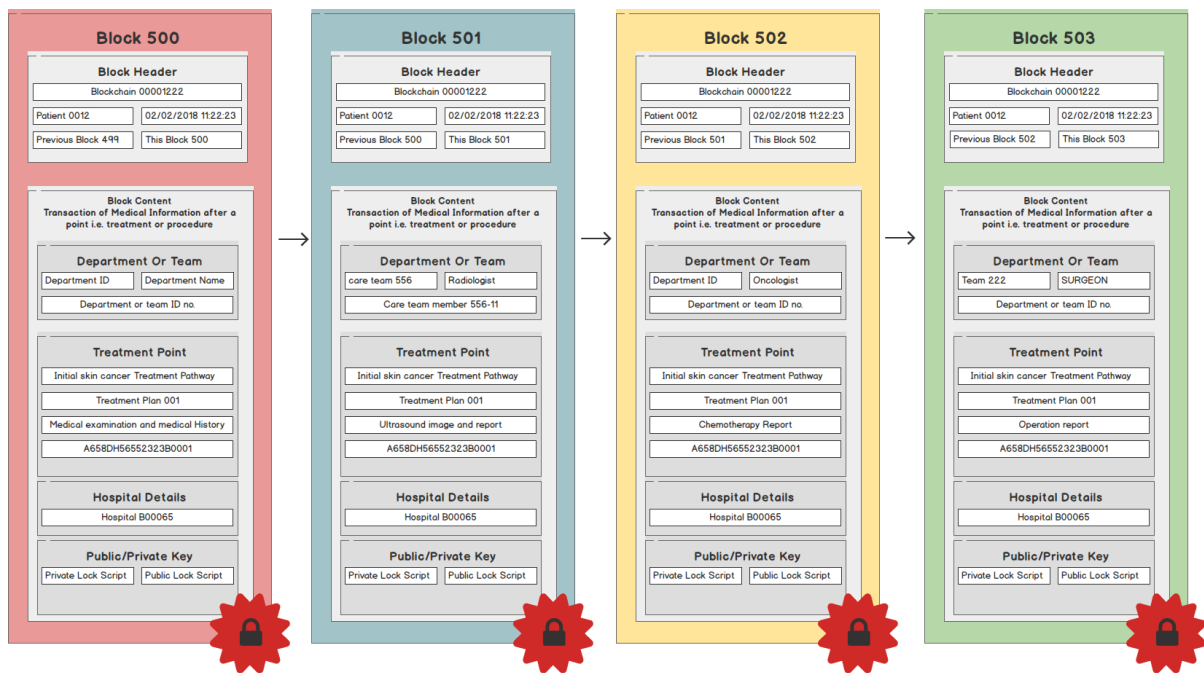
Whenever a patient visits a hospital, data related to the patient doesn't get stored in Blockchain database instead of which all the data is stored in the local data base of the respective hospitals and

blockchain consists the description of that database. Instead of local database if all the data is stored in the blockchain then it will be very difficult to maintain the blockchain with huge amount of data present in it.

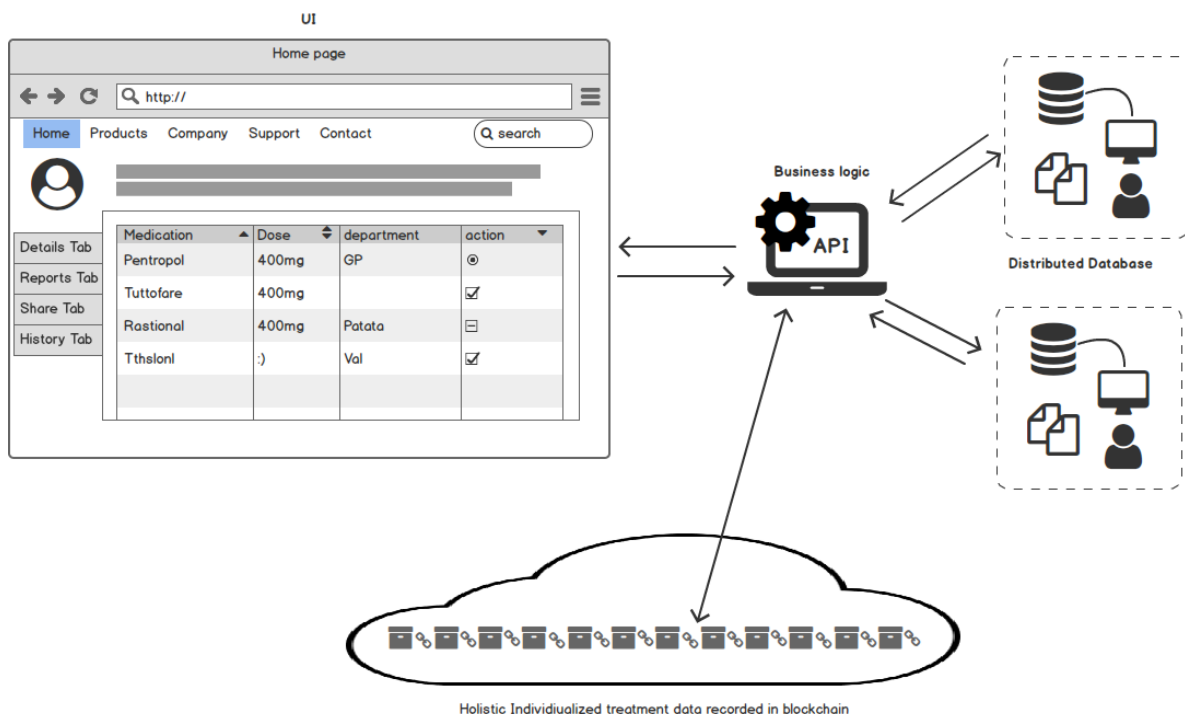
So, how can we access this local data base from blockchain. We use an Application Programming Interface (API) tool that act as an interface between the user and the records present in the local database. Whenever a client or the patient itself would like to access the records API tool search for the description of the particular patient in the blockchain in which the description of the patient consists of. From there is taken into the local data base and records are pulled up.



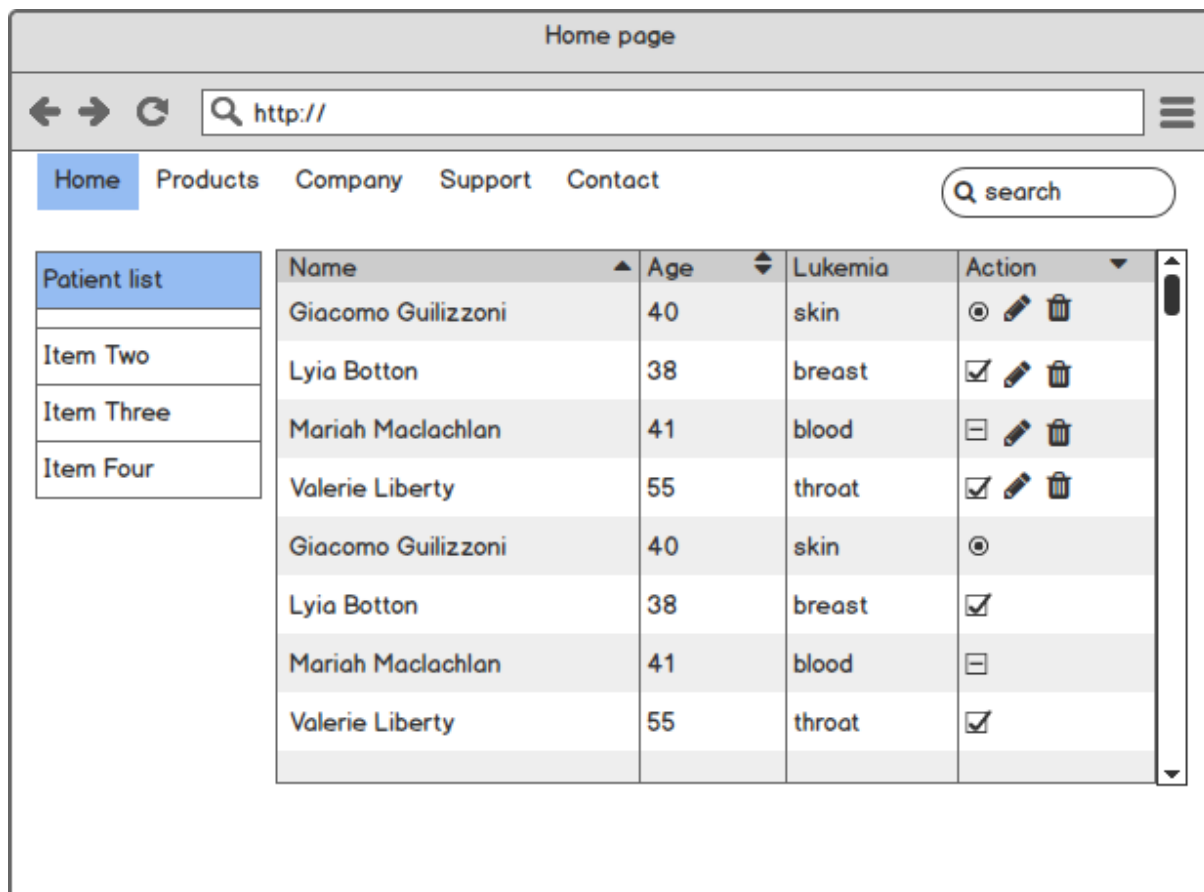
The aim of the blockchain technology is to connect patients, clinics, healthcare providers and systems to make sure right information is available to the right person at the right time. When the doctor uses their local systems in a blockchain, a block is generated automatically with the description of the data to give an idea of what information is collected at which treatment point by which doctor and at which hospital. This blockchain is digitally certified by the healthcare professional who treated the patient and adding that sequence. Putting all these together creates a fine-grained patient-centred, comorbid-friendly and decentralized ledger across health care legacy system, which is missing in pervious systems, this ledger contains the full description of the patient like name in this case patient ID, General Practitioner, Surgeon, Oncologist, Palliative care.



When a new record is created in the local data base then a new block is created in the blockchain. Adding on data related to the patient will create new blocks for the patient in the blockchain with authenticated signature and ID on it making it trustable.



API act as a bridge between the local database, blockchain and the User Interface. User interface helps us to create, update, retrieve and deletion of patient information. Its a web page that contains structure data tables for data collection and storage. After the creation of data all the data is stored in the local database.



A User Interface looks more or less like as shown above with rows and columns that have structured formation. It consists of rows for entries like Name, Age, type of cancer the patient is suffering and the action the authorized person would like to perform. We can add more rows and columns depending on the need.