Lecture Notes

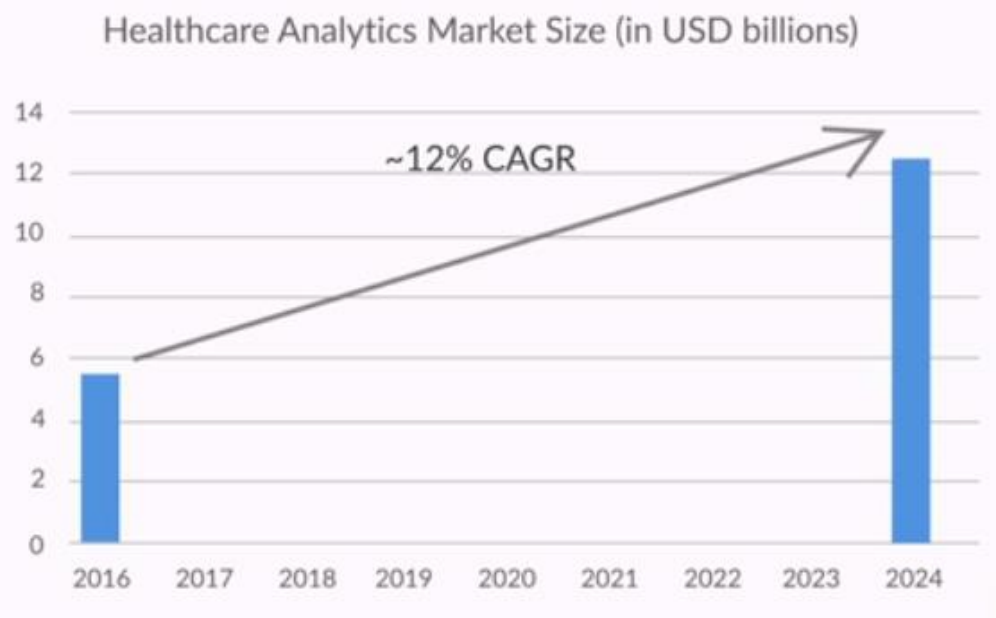
Introduction to the Healthcare Space

This module was focused on providing you an overview of how the healthcare industry works. Let's do a quick recap of the concepts you learnt.

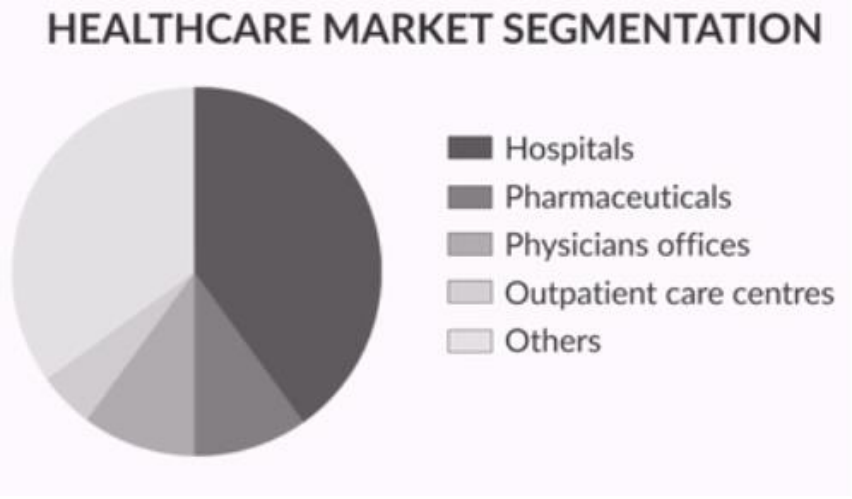
Understanding the Healthcare Market

Healthcare is a huge industry. Deloitte Research estimates that **across the globe**, a total of **$8.7 trillion** were spent on healthcare in 2015. Of this, the **US** is responsible for **$3.2 trillion**, which is around 37% of the global spend.

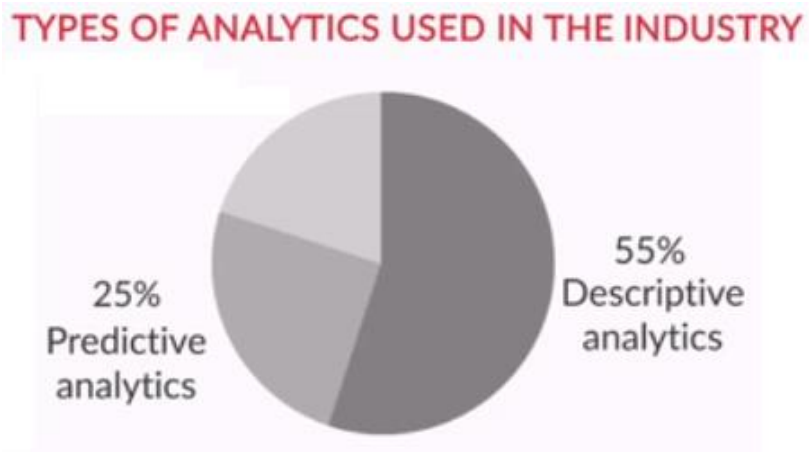
Healthcare analytics, however, is a very small market and stands at **$5.5 billion**. It is, however, expected to grow at 12% CAGR to be worth **$12.5 billion** by 2024.



Hospitals are the biggest component of the healthcare market. So a lot of projects come from them. **Insurance companies** provide a lot of opportunities too, since they work closely with hospitals. Also, 10% of the spend is on drugs, which come under **pharmaceutical companies**. Hence, pharma companies also provide substantial employment opportunities.



Because of the slow adoption of analytics, the industry has not matured enough in terms of complexity, and most of the projects in it are based on descriptive analytics.



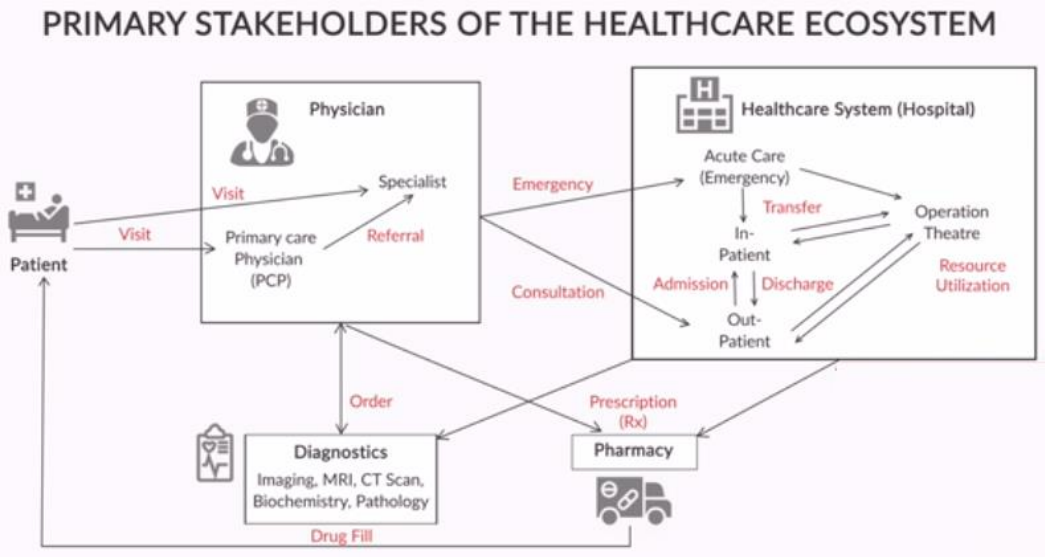
Descriptive analytics is basically another name for exploratory data analysis. Mostly, you just have to '**describe**' or '**summarise**' the data available. For example, given some data on a lot of diabetic people, find the average HbA1c level of all these people, and segment it according to territory.

In **predictive analytics**, you use machine learning to make **predictions**. For example, given some data on a lot of diabetic people, predict how many of these people will end up coming to the hospital next year for a diabetes-related problem. You could also predict the costs they will incur.

In **prescriptive analytics**, you '**prescribe**' courses of action to your clients, based on the data you have. For example, given some data on a lot of diabetic people, you suggest that the agency send an informative text message to every person with an HbA1c level above a specified limit, and you tell the agency how much of the patients' costs will be saved as a result. You could also predict alternative courses of action, such as calling the patients and informing them about what they should do. You could then compare the various courses of action and see which one gives the best result after the least effort.

Stakeholders of the Primary Healthcare Ecosystem

Next, you developed an overall understanding of how the healthcare industry actually works. First, you understood how the stakeholders of the **primary** healthcare **ecosystem** interact with each other. The primary healthcare ecosystem is the one directly and **visibly involved in providing healthcare**, i.e. the ecosystem formed by hospitals, doctors, pharmacies, etc.



Primary care physician – This is a doctor who has a holistic view of the patient's care, as opposed to the specialist who is an expert on an organ or organ system of the body.

Visit – The act of visiting a doctor, a general practitioner or a specialist, is called a visit. For example, if you go to a doctor three times a month, it is referred to as three visits per month.

Referral – This is when a patient visits a primary care physician and the physician thinks that the condition is severe enough to need a specialist's opinion. So, he/she refers the patient to a specialist.

Diagnosis – The act of treating a patient for a disease is referred to as diagnosing that disease of the patient. For example, if a doctor is treating a patient for diabetes, then you would say that he/she is performing a diagnosis of this patient's diabetic condition.

Diagnostics – If required, a doctor may prescribe a lab test, etc. to the patient. For example, a blood sugar level test may be prescribed to a diabetic person. This is referred to as diagnostics.

Inpatient/Outpatient – Any patient who visits a hospital but does not occupy a bed is called an outpatient. For example, if a diabetic patient visits a specialist in a hospital regularly, he/she is an outpatient. However, if tomorrow the situation worsens and the patient ends up getting admitted to the hospital and occupies a bed, he/she becomes an inpatient.

Acute care – As the name suggests, acute care, in any hospital, is the department that is responsible for providing care in emergency situations such as accidents, heart attacks, etc. It is the only case for which you can go to a hospital directly, without any referral, and no insurance company can deny covering you.

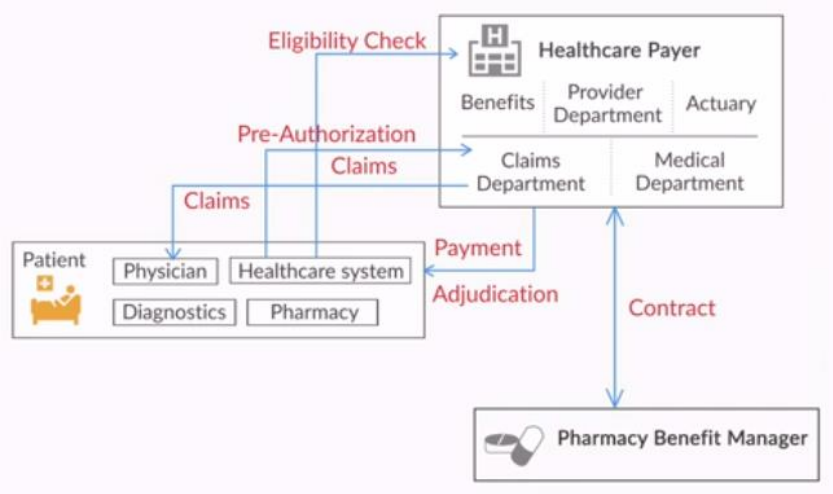
The **core drivers** (key objectives) of all these stakeholders are —

1. To achieve a high accuracy of diagnosis
2. To promote primary care usage
3. To shorten overall hospital stays
4. To reduce complications in hospitals
5. To avoid unnecessary investigations
6. To ensure proper drug dosage with minimal side effects
7. To achieve positive health outcomes

Each of these can be and are achieved using analytics.

Stakeholders of the Secondary Healthcare Ecosystem

Other than the primary stakeholders, the ones that are obvious and can be seen as we go about our everyday activities, there are a lot of stakeholders that are not directly involved in giving care. They help **finance the provision of care**.



There are two types of **secondary stakeholders**:

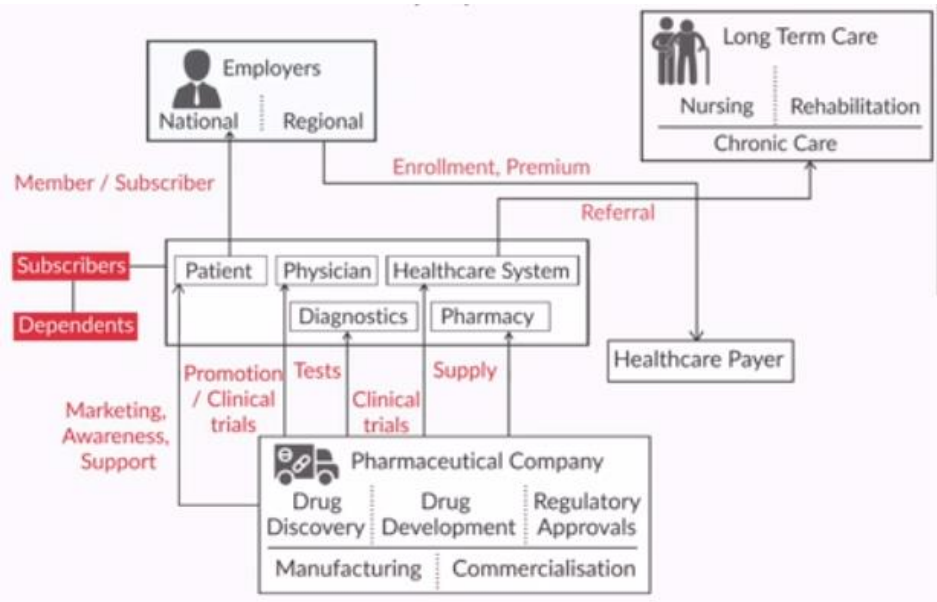
Payers – In the US, only 12% of the population is uninsured. All the other citizens either have public or private insurance. Hence, almost all the payments that are made to hospitals are made through **insurance companies**. Because of this, these companies are simply referred to as the 'payers' of healthcare in the US and other developed countries.

Pharmacy benefit managers (PBMs) – Traditionally, insurance companies used to cover their subscribers for both hospital costs and medicine costs. However, nowadays, insurance companies in the US are starting to **subcontract** out the function of **covering medicine costs** to companies that specialise in covering costs of drugs. So, these companies, also referred to as PBMs, are like insurance companies, except that they cover only the cost of medicines.

Broadly speaking, the objectives of these stakeholders are to lower the **cost of healthcare** and to **improve its quality**.

Other Stakeholders of the Healthcare Ecosystem

There are some more stakeholders in addition to the secondary and primary ones. They **don't finance** anything, but they provide a lot of **supporting services**.



Employers provide health insurance to their employees and hence, provide payers with the access to a **large customer base**. For example, Infosys has over 15,000 people in the United States. It partners with WellPoint for their health insurance. Now for WellPoint, this is an easy way to get a lot of lives under the umbrella of its plan.

Each employer is different; hence, analytics have to be performed for each one to decide what the correct plan for its employees will be. For instance, as you can understand, the premium for Facebook employees will be lower as they have predominantly younger employees, and the premium for General Motors employees will be higher as they have older employees who may also have higher healthcare costs. Another thing to note is that the company may also have to cover the family members of these subscribers. Hence, one **member** could translate into two or three **dependents**, and the payers should be ready to cover their costs too.

Also, you saw what a **long-term care centre** is. Basically, it is a **scaled-down** version of a **hospital**, where patients are sent if they need long-term, or in other words, **chronic care**. The costs there are low, and generally, this step is also motivated by the payers' motivation to lower the cost of care.

Finally, you learnt what a **pharmaceutical company** is. In simple terms, it is a company that makes **drugs** (medicines) and sells them. This organisation is actually pretty similar to any other conventional commercial organisation. Hence, most of the analytics that is performed for pharma companies is related to **sales** and **marketing**. Another important area where analytics is used by these companies is in **clinical trials** — these are the trials that are performed to test any medicine before it is launched for public use.

So, the high-level objectives of these stakeholders are —

1. Employers: Provide access to good healthcare coverage for members.
2. Long-term care centres: Reduce healthcare costs and provide quality care.
3. Pharma companies: Develop cutting edge drugs that improve the quality of life of patients.