

---

**Name:** Alberto Garcia Matachana  
**Degree:** MEng Electrical and Electronic Engineering  
**University:** Imperial College London  
**Word Count:** 613

**Title:** Tackling/reducing hospital waiting times

The NHS urges an organization change. Nowadays, the number of patients who are waiting more than the 18-week maximum timeline has passed a tipping point. Waiting longer creates prolonged pain and uncertainty on the patient and can ultimately cause a clinical worsening on the patient's health. In 2017, profit-driven hospital firms experienced a 10% increase in the number of uninsured "self-payers" due to long waiting times to undergo non-urgent surgery in NHS hospitals.

An "easy" solution would involve the government investing more money into the public's healthcare strategy. Unfortunately, that is not in my hands for the moment. However, what it is in my hands is proposing a new organization system, which, if executed correctly, will enable more patients to recover faster.

My solution makes use of blockchain technology.

To tackle the problem what we first need is to create the patient's "persistent ID and persona" on a blockchain. This "virtual you" may include information such as the patient's passport, social security number, medical information, job, income, and various other credentials and information. The blockchain works as a ledger which records and stores all this information in an immutable record. This ledger of personal information wouldn't be stored in a massive government database, but in many computing servers, also known as nodes. As it is distributed, it is not vulnerable to catastrophic crashes and security breaches. Most importantly, this "virtual you" is owned and controlled by you; making this ledger secure and private.

On the other hand, the NHS department could record the type of interventions (e.g. general, trauma, eyesight surgery) and the number of possible interventions within a specific period. For instance, Hospital A is capable of hosting 150 eyesight interventions within a month whereas Hospital B is capable of hosting just 80 in the same period. This interventions' record would be saved in a single ledger, visible for all, for any given surgery.

Interestingly, we can connect different blockchain networks to build a new one. The patients' database *persona* could connect with NHS's interventions blockchain. This connection would create a virtual block of data containing the desired information by the patient and the availability of that specific intervention in a defined time interval. Note the word *desired*, since the patient may potentially want to include details such as their job, if they consider their disability interferes with it, while others might give more importance to their low income.

The ultimate ledger contains the surgery order (i.e. waiting list). For a new block of data to be included into the blockchain, the peer-to-peer (P2P) network participants (i.e. substantial number of doctors, not just one) must decide the patient's order in the waiting list regarding the *persona* information provided. Different doctors will give different rating to the same patient. This rating will be normalized and compared to

already included blocks of data. At that moment, this patient will be included into the chain and they will receive a live position in the surgery order. If this order is modified due to other patients appearing or disappearing in front of them they will be notified immediately.

Apart from offering security and privacy to society, the system will also present impartiality. So, while the surgery blockchain is public – anyone can view it at any time because it resides in the network not within a centralised institution such as the government – patient's identities are pseudonyms. Anyone trying to corrupt / alter the data (e.g. move up the waiting list) would need to do a considerable amount of triangulating of data to figure out who or what owns a particular virtual block of data. All in all, this organizing method will result into more patients getting cured.