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Task 2

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Healthcare Development in the 21st century

The discoveries of the last two centuries have resulted in an increase in life expectancy by several dozen years. Many of the diseases treated today as trivial, only a few hundred years ago were a serious threat to life and health. The aim of this report is to conduct and analyse secondary research on how healthcare has changed and what has been achieved in the 21st century.

Introduction

Technology makes a significant impact on how the NHS is managed, it allows healthcare providers to free up their time and focus on frontline care, which could also mean money saving for the NHS.

Research Objectives

Artificial Intelligence is precious to many of us. Better, easier, longer life is promised. Maybe even more... It all sounds impressive and suggests a better quality life. Technology is gradually transforming not only healthcare in the UK, but also becoming an integral part of our daily lives. The objective of this report is to share my secondary research on the use of technology in the modern healthcare workplace – hospitals.

Surgical Technology

3D Printing – Revolutionary in orthopaedics. If you are having orthopaedic surgery you might need an implant inserted for reconstruction, grafting or replacement. The recent introduction of three dimensional printing is offering patients a more comfortable and custom solution.

Doctors face three problems in their daily work that 3D printers can solve.

- Planning operations requires the use of pre-operative models, which take a long time to execute in traditional technology
- Patient-specific anatomical features can only be identified on digital model
- Some implants need to be shaped during surgery, which increases its time

3D printing may be the future of transplantology and in the coming years bring with it the possibility of creating functional organs with the structure, shape and composition created individually for a given patient.

The achievement of being able to print body parts using 3D printing can be a highly important step in transplantology. Taking cells from the transplant awaiting patient and using them to print an organ can help tackle complications such as, long waiting list for suitable donor or rejection of organ by immune system.

MRI – Magnetic Resonance Imaging

Magnetic resonance imaging – MRI is a modern and very accurate imaging examination of lesions in the patient's body. It allows you to examine all internal organs in a non-invasive way.

It should be added that in terms of design, two types of MRI braces are distinguished:

- Open - allowing access to the patient from three sides (it is useful if the examined patient is afraid of closed stops, has problems with obesity or is in a forced position)
- Closed – the patient is placed in a magnet tunnel

Magnetic resonance imaging allows you to determine the state of internal organs, tissues, and thanks to the use of contrast even their functions. It precisely determines pathological changes in the muscular and skeletal systems, and even in the bone marrow. Thanks to the examination, it is possible to visualize blood vessels, heart cavity and heart muscle.

Magnetic resonance is widely used in the diagnosis of diseases of the central nervous system (multiple sclerosis, brain tumours, Alzheimer's disease, neurological disorders, spinal canal tumours). It is used to detect tumours in soft tissues, tumours of the heart, lungs, tumours of the reproductive organs.

COVID-19

The NHS was dominated by the Covid-19 pandemic in the past period. The crisis has focused health care leaders on the role of technology and accelerating the digital transformation of the sector.

Technology plans have sped up recently to help the NHS recover from the pandemic, cut down waiting lists and increase staff efficiency through digital innovation.

In the future, the integration of health and social care will depend heavily on technology, and the new organisational structure that brought together NHS Digital and NHSX will take the lead in the next steps in implementing further IT projects.

The government wants to make use of technologies like artificial intelligence (AI) to deal with the backlog and is investing £160m in 12 different areas where new ways of working are being tested. (COVID-19, 2022)

Digital healthcare is used by nearly half of the adult UK population - Around 50% of the UK adult population has access to digital healthcare, according to new data published by NHS Digital. The increase in user numbers is due to the addition of the NHS Covid Pass (Covid-19 Vaccine Status) following the joint work of NHSX and NHS Digital, with 12 million users who have signed up since the feature was launched.

Electronic Health Records

An Electronic Health Record is an electronic version of a patient's paper medical history. Electronic health records improve patient care by, allowing clinicians to communicate in a more clear manner. EHRs as they are known gives instant and full access to up to date patient records, which can be shared between clinicians. This saves time, which benefits the patient, as treatment time isn't delayed. From a simple and practical view point, EHRs also solves lack of storage space.

Artificial Technology

TUG – this is the name of a hospital robot that is able to provide patients with food and medicine. He can independently move around the hospital, following the programmed checklist prepared by the hospital staff.

Have you seen the video showing the grape being operated on? No, it's not a joke at all. A few years ago, the film went viral, and viewers around the world could see how the innovative DA VINCI surgical system pushes the boundaries of human possibilities: it achieved a level of precision completely unattainable by human hands. (The NHS AI Lab, 2022)

The choice of fruit was also not accidental: the grape is an example of a delicate and slippery element of small size. Sewing the skin detached from it with human hands is impossible. Artificial intelligence, however, was able to perform this task without the slightest problem.

Exploring Technically advanced hospitals

NHS patients have more choice than ever before: they have the right to choose any hospital in England, whether on the NHS or private (as long as they provide NHS priced services), in order to get better quality treatment.

Royal National Orthopaedic Hospital

Offers the most comprehensive care in the whole country when it comes to joint and muscle diseases. It specializes in a variety of services, from surgery for the most serious back injuries to the best rehabilitation for people suffering from chronic back pain. It treats patients from all over the country, many referred here by specialists from other facilities for a second opinion.

Great Ormond Street Hospital NHS Trust

Paediatrics is one of the areas of medicine that gives doctors the greatest satisfaction. It has made spectacular progress in recent years, especially in the treatment of cancer, the survival rate has increased significantly.

Many of the children treated at GOSH suffer from life-threatening illnesses, but are given the best care thanks to the experience and knowledge of the staff and the extraordinary technology used.

A unit unit is being opened in Great Ormond Street Hospital, it is set out to transform the use of technology, including artificial intelligence. The state-of-the-art unit, called DRIVE – Digital Research, Informatics and Virtual Environments – is the first of its kind in the world. (Digital, research, informatics and virtual environments (DRIVE) partnership - NHS Digital, 2022)

Moorfields Eye Hospital

The largest specialist eye hospital in the country and one of the largest in the world - Moorfields, was founded in 1805. More patients are treated here than any other hospital or eye clinic in the UK, and more than half of practicing ophthalmologists in the UK have undergone specialist training at Moorfields.

Moorfields Eye Hospital is launching a department of digital medicine. The new department will be responsible for monitoring the clinical safety of digital systems, coordinate clinical input into the design of digital infrastructure, and support the implementation of new technologies like clinical artificial intelligence (AI) into practice. (Moorfields launches department of digital medicine | Moorfields Eye Hospital NHS Foundation Trust, 2022)

Now let's look at the top 10 technically advanced hospitals in the UK:

- The Royal Free Hospital
- Guy's and St Thomas' Hospitals
- Chelsea and Westminster Hospital
- St Mary's Hospital
- Moorfields Private Eye Hospital
- Great Ormond Street Hospital for Children
- St George's Hospital
- The Royal London Hospital
- Charing Cross Hospital
- Hammersmith Hospital

Healthcare in the UK is very technologically advanced and it is much appreciated and praised around the world.

Statistics

Medicine is rapidly moving forward, and medical progress goes hand in hand with technological progress. Just as research contributes to the discovery of new ways of treating and diagnosing a patient, modern equipment enables these medical procedures to be carried out with meticulous precision. Hospitals are increasingly investing in the latest generation equipment - all to give patients a chance to recover and provide them with the best care during treatment and after care.

Of course, not all hospitals around the world have such an option, but those that can afford it, do not spare their resources. Just take a look at the 5 hospitals listed below - literally packed with electronics.

1. Mayo Clinic

Established In: 1864

Location: Rochester, Minnesota, USA

2. Johns Hopkins Hospital

Established In: 1889

Location: Baltimore, Maryland

3. Cleveland Clinic

Established In: 1921

Location: Cleveland, Ohio, United States

4. Massachusetts General Hospital

Established In: 1811

Location: Boston, Massachusetts

5. Toronto General Hospital

Established In: 1812

Location: Toronto, Ontario, Canada

Research Analysis

Healthcare providers and institutions have been exploring technology for years to improve patient care, advance medical research, and reduce waste in healthcare resources. A survey found that 62% of participants "strongly agree" that the new pressures mean that digital transformation is more important than ever to improve their work. Another 38% "strongly agree" that they must accelerate their transformation plans this year. (COVID-19, 2022)

Healthcare is increasingly relying heavily on the use of digital technology to support care, in many areas, appropriate tests enable doctors to choose the most effective treatment for the patient, avoiding not only very costly attempts to adjust the therapy, but also the patient's frustration related to the treatment process. According to research conducted by British scientists, by 2025 more than 80% of health care workers will have to deal efficiently with new technologies. The use of various types of applications will be a daily routine for every doctor. (England, 2022)

Conclusion

Never in history have we had such great opportunities to use every intellectual value we have created. Technology in the health sector is a great opportunity for all of us, and at the same time it is a massive pressure on innovations and funds for new research. This extraordinary knowledge and unlimited availability of goods and services can change existence for the better.

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