ROBOTICS IN NURSING

Registered nurses (RNs) and nurse practitioners (NPs) are accustomed to emerging technology making an impact on their work environments and day-to-day duties. While these advances in equipment and technology bring many positive changes, some trends, such as robotics, are feared because of the possibility that they will take jobs away from nurses. However, the opportunities for nurses and robots to work together and the innate skills and characteristics of humans make RNs and NPs irreplaceable.

Overview of Robotics in the Healthcare Industry

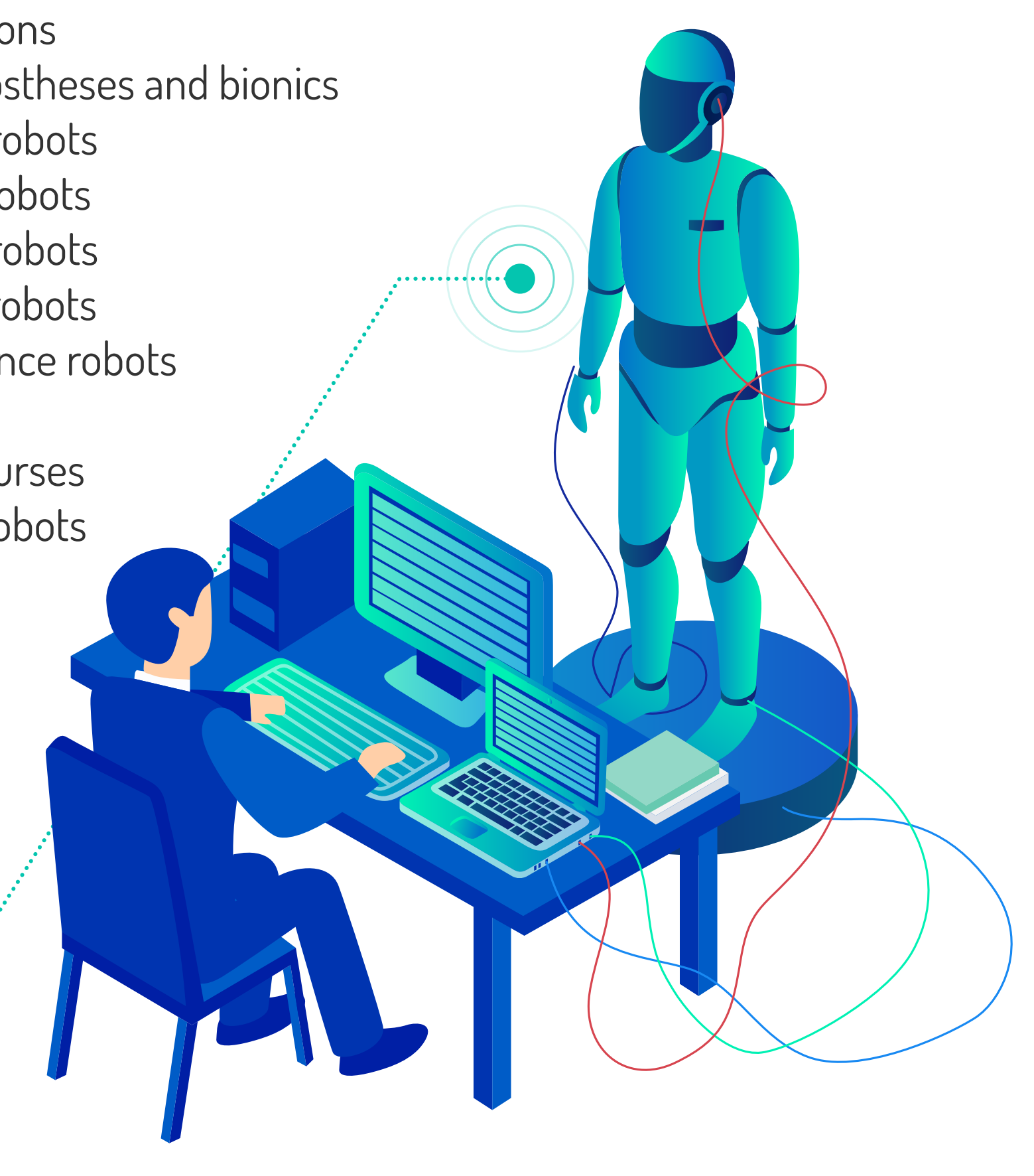
The healthcare robotics market is estimated to grow to **$2.8 BILLION** in revenue by 2021. The applications in healthcare seem endless.

THE HEALTHCARE ROBOTICS MARKET INCLUDES:

- Surgical robots
- Rehabilitation robots
- Hospital robots

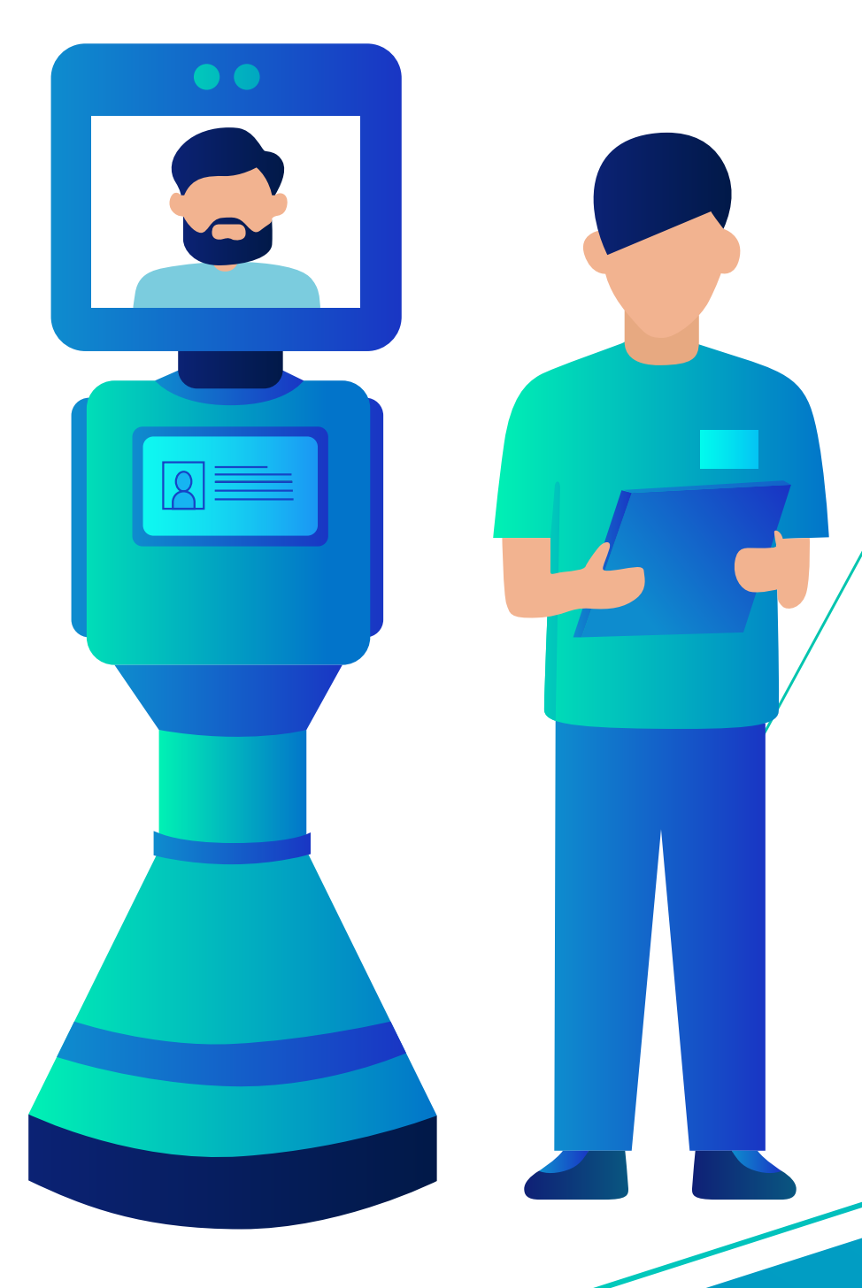
MORE DETAILED SEGMENTATION OF ROBOTICS APPLICATIONS IN HEALTHCARE INCLUDES:

- Surgical robot training
- Exoskeletons
- Smart prostheses and bionics
- Assistive robots
- Therapy robots
- Cleaning robots
- Logistics robots
- Telepresence robots
- Pill robots
- Robotic nurses
- Surgical robots



TECHNOLOGIES ENABLING HEALTHCARE ROBOTICS:

- Gesture control
- Machine vision
- Speech/voice recognition
- Tactile sensors



BENEFITS OF ROBOTS IN HEALTHCARE:

- Save costs
- Reduce waste
- Improve patient care

Provide sophisticated levels of measurability and traceability

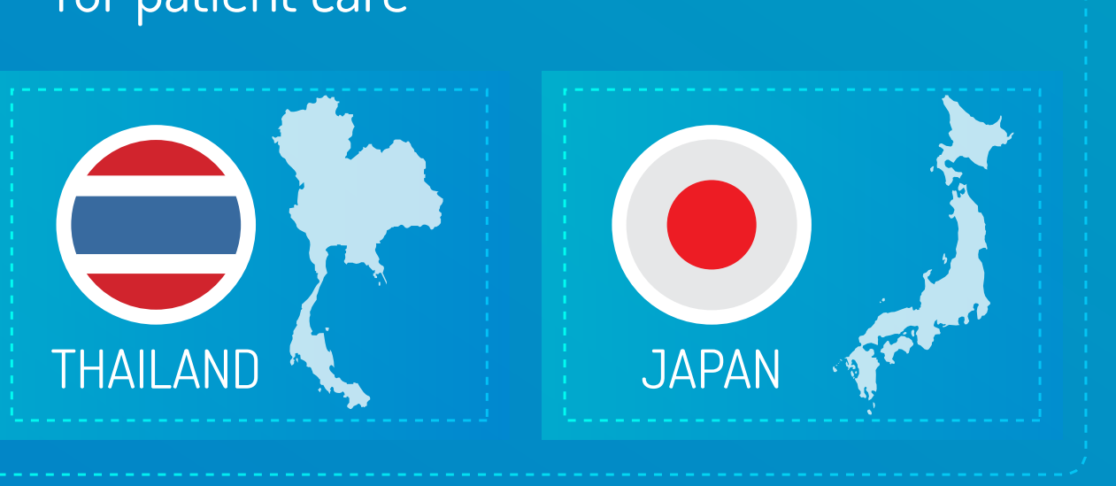
FAMOUS NURSE ROBOTS

Robotics in healthcare is well past the early developmental stage, and robot nurses have become well known for their contributions in the healthcare setting.

ROBOT DINSOW

APPLICATION TODAY:

- Used by hospitals in Thailand and Japan for patient care



SKILLS:

- Monitors elderly by video and sets up video chat with their relatives
- Alerts caregivers of patient activity by phone
- Provides reminders for medication and exercise
- Exercises alongside the elderly
- Provides entertainment with karaoke and games

ROBOT PARO

APPLICATION TODAY:

- Used in hospitals and extended-care facilities all over the world

SKILLS:

- Stimulates interaction between patients and caregivers
- Imitates the voice of a baby harp seal to help relax patients
- Is able to adapt behavior to each patient

BENEFITS:

- Reduce patient stress
- Improve patients' relaxation and motivation
- Improve patients' socialization with each other and with caregivers

FIVE TYPES OF SENSORS:

- Light, audio, temperature, posture, and tactile

ROBOT PEPPER

APPLICATION TODAY:

- Works at reception area of two Belgian hospitals greeting people
- Guides patients to the proper department

SKILLS:

- Recognizes 20 languages and can identify gender
- Identifies joy, sadness, anger and surprise
- Interprets non-verbal language, such as the tilt of the head, a frown, a smile and tone of voice

VISION:

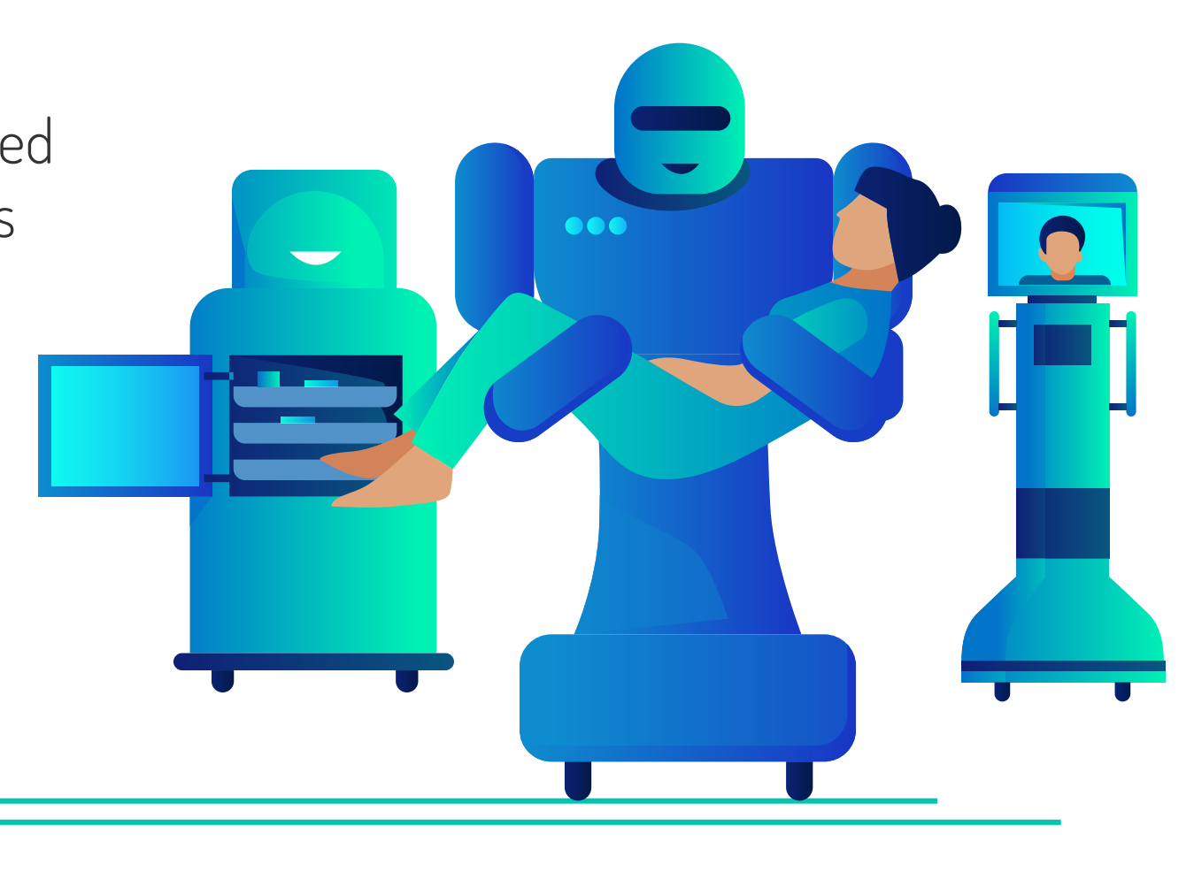
- Two high-resolution cameras and a 3D camera
- Shape recognition software processes captured images

MOVEMENT:

- 20 engines and three multi-directional wheels enable the robot to move at a maximum speed of 3 km/h
- Six laser sensors, two ultrasound transmitters, and three obstacle detectors placed in the legs help Pepper identify the distance of objects within a range of 3 meters

Establishing a Middle Ground

Rather than pitting robots against humans, individuals should consider the opportunities created by robots in healthcare and the reasons why robots can never completely replace human nurses.



WHY HUMAN NURSES ARE IRREPLACEABLE

COMMON SENSE

Robots rely on programming and lack the common sense reasoning ability

For example: If a person is considering tipping over a cup, they don't need exact specifications, such as the shape of the cup, the physical properties of the contents of the cup, or the motion the cup will be exposed to, in order to make a decision.

EMPATHY

Robots require programming to understand emotions and exhibit a response

For example: Pepper the robot may have been programmed to respond with emotions but still is not capable of fully understanding human emotions.

CREATIVITY

Artificial intelligence (AI) can mimic a famous artist's style but is not capable of creating art that will resonate with humans

For example: Algorithms can be created to produce sequences of paintings, but it is much more difficult to teach AI how to recognize the difference between emotionally powerful art and lackluster creations.

ETHICAL DECISION MAKING

When faced with novel circumstances, robots may waste time making a decision that could potentially affect a patient's life

For example: An experiment tested a robot's ability to protect other robots (called human proxies) from entering a danger zone on a table game. In 14 out of 33 trials, the robot wasted time making a decision, which resulted in both human proxies falling into the hole.

HOW NURSE ROBOTS OFFER A HELPING HAND

REPETITIVE TASKS

- Nurse robots can take over tasks such as retrieving medical supplies, delivering food and medication, and transferring or moving patients.

TRAINING

- Robots can help train staff. For example, a robot patient could simulate the behavior of patient's limbs for patient-transfer training.

EDUCATION

- At Duquesne, students can interact with DUSTIN, short for **Duquesne** University Simulating Telepresence in Nursing.
- According to Joe Seidel, the director of technology in the School of Nursing, students "can connect to him through an iPad or iPhone app or any computer. Once connected, they can use DUSTIN to see, hear, speak, and communicate with anyone in the room. DUSTIN's screen displays a live video feed of the person at a distance, so it feels like he or she is part of the team."
- Duquesne is the second nursing school in the US to have a nurse robot.

HOW NURSE ROBOTS CREATE AND EXPAND CAREER OPPORTUNITIES

ROBOTIC COORDINATOR

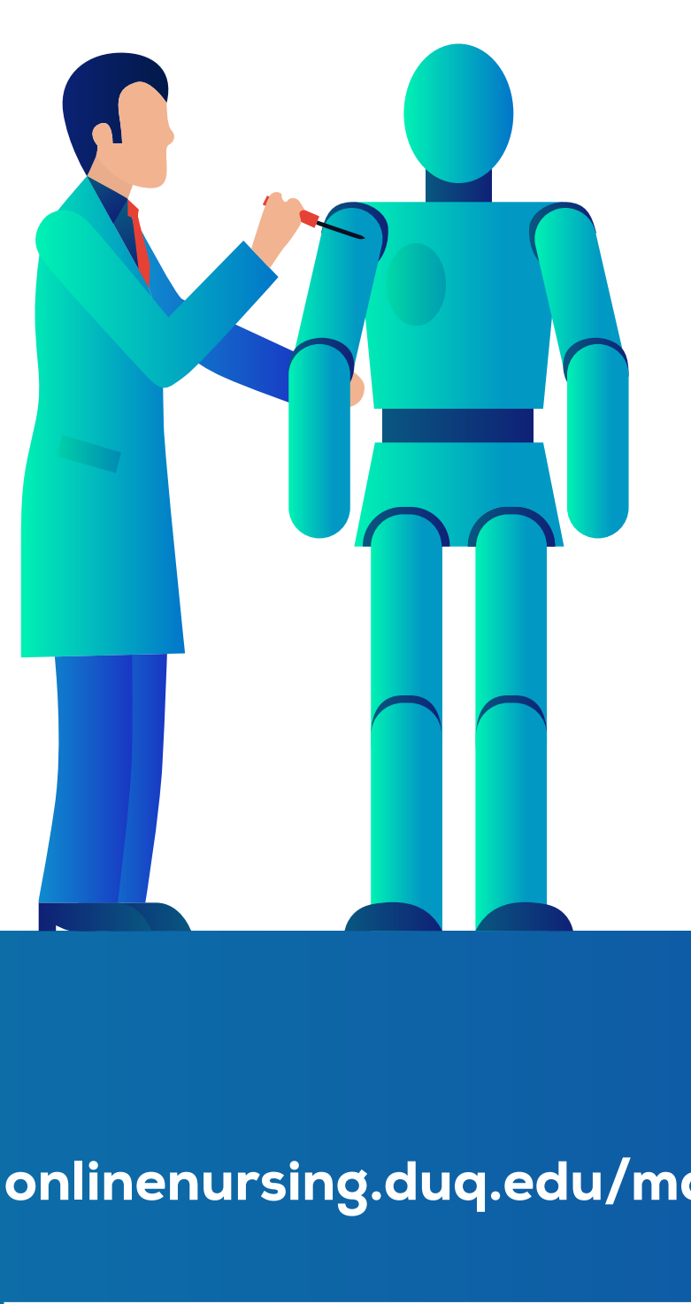
As robots continue to become more common in healthcare, the need for individuals to oversee the duties of robots will create a new job opportunity.

ROBOTIC TELEMEDICINE

Patients living in rural areas or those in urgent need of a specialist can receive a diagnosis and treatment plan through a robot that can be remotely controlled using a desktop, laptop, or mobile device. Nurses will play a vital role in assisting robots and remote healthcare practitioners.

RESEARCH

Since nurses are well aware of the needs in the healthcare environment, they can participate in the technological advancement of developing robots.



CONCLUSION:

No doubt healthcare today is an exciting, rapidly evolving industry. Technology companies have noticed the needs in the healthcare setting and are continuing to develop and advance technologies that will benefit both the patient and the healthcare professional. Students entering the field will face challenges and opportunities in adopting and adapting to new technologies and shifting responsibilities as a result.

onlinenursing.duq.edu/masters-nursing-education

DUQUESNE UNIVERSITY
School of Nursing

SOURCES:
https://globenewswire.com/news-release/2017/02/01/912865/0/en/Global-2-8-Billion-Healthcare-Robotics-Market-Analysis-and-Forecasts-2016-2021.html
https://www.robotics.org/content-detail.cfm/Industrial-Robotics-Industry-Insights/Robots-and-Healthcare-Saving-Lives-Together/content_id/5819
http://www.businessinsider.com/things-humans-can-do-better-than-machines-2015-10
http://www.dailymail.co.uk/sciencetech/article-3641468/Pepper-robot-finds-job-healthcare-friendly-droid-trialled-two-hospitals-Belgium.html
https://www.ald.softbankrobotics.com/en/robots/pepper/find-out-more-about-pepper
http://www.parorobots.com/
https://www.reuters.com/article/us-thailand-ageing/firms-in-aging-thailand-bet-on-demand-surge-for-robots-and-diapers-idUSKCN10Q284
https://theconversation.com/nurses-of-the-future-must-embrace-high-tech-86042
https://ieeexplore.ieee.org/document/7542122/
https://www.smithsonianmag.com/innovation/doctors-can-use-robotic-telemedicine-to-assess-coma-patients-180962145/
http://www.duq.edu/assets/Documents/nursing/about/_pdf/Nursing%202017%20Magazine.pdf