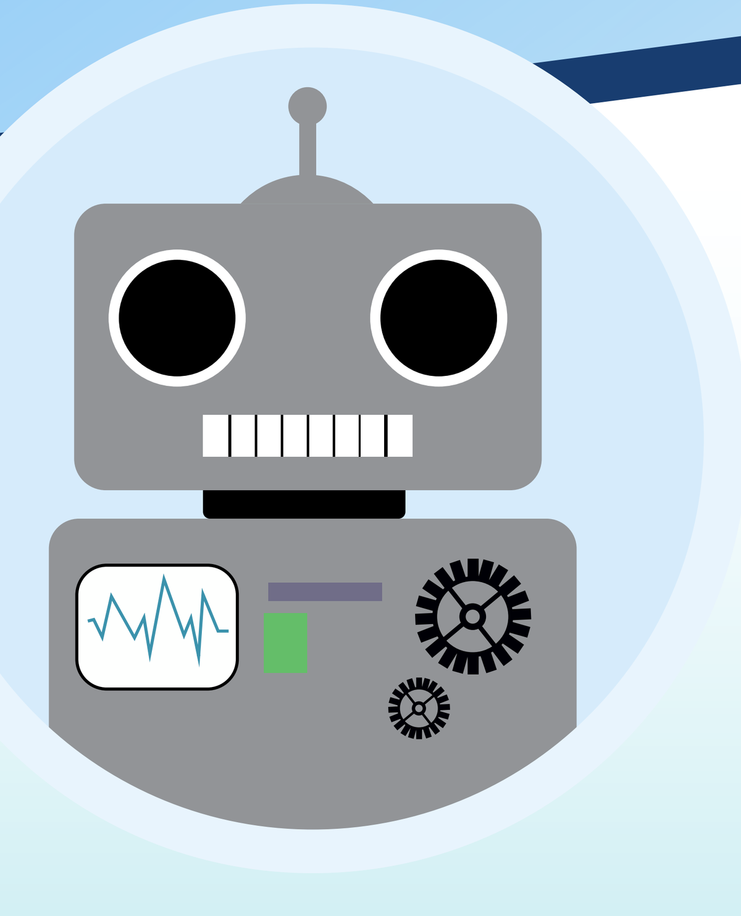
ARTIFICIAL INTELLIGENCE IN

HEALTH CARE

HOW TECHNOLOGY COULD IMPACT END-OF-LIFE CARE

MANY BUSINESSES ARE INVESTING IN THE POTENTIAL FOR ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGY TO CHANGE THEIR INDUSTRY.



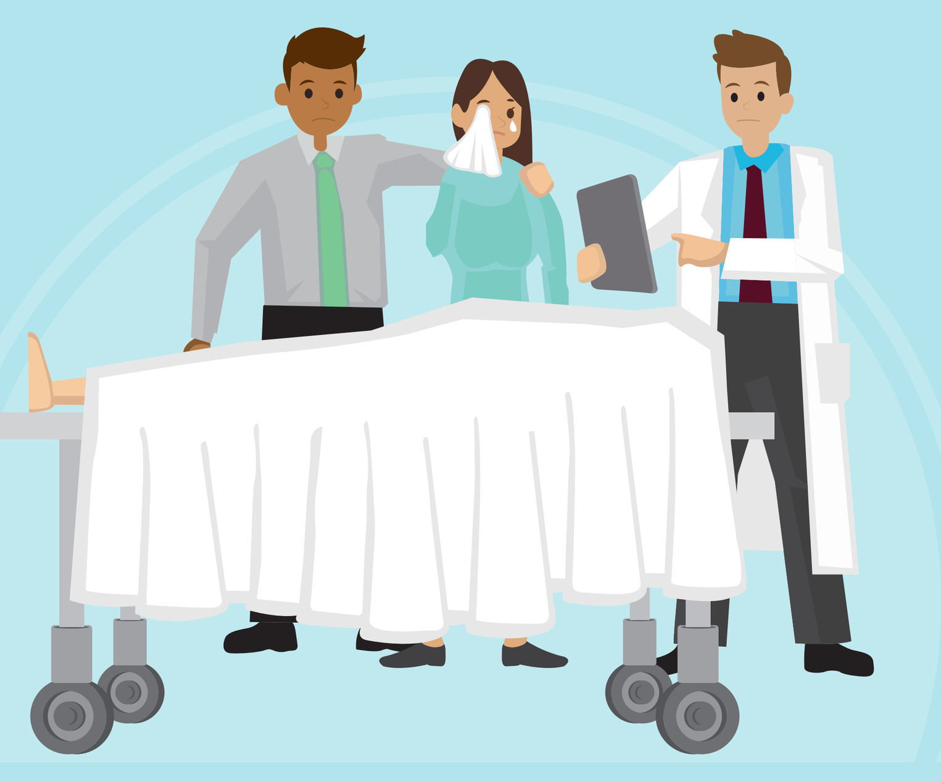
While people are fascinated by the possibilities of AI in gaming, entertainment and consumer products, there is also genuine promise in the health care industry, where AI holds the potential to improve the quality of care patients receive. The ability of AI to predict inpatient mortality, in particular, could bring substantial advancements in palliative care.

STATISTICS ON PATIENT MORTALITY

INPATIENT MORTALITY IN UNITED STATES

The life expectancy was **78.6 YEARS** for the U.S. population as of 2016.

The 3rd leading cause of death is medical error and fatal lapses in care in the U.S.



According to the CDC, the number of inpatient hospital deaths was **715,000** in 2010.

THE COSTS OF END-OF-LIFE CARE

Inpatient hospital care accounted for

51% of Medicare spending by decedents

27% of Medicare spending by survivors in 2014.

$554 BILLION in Medicare spending in 2011 in the U.S.,

$170 BILLION was spent on the last 6 months of patients' lives.

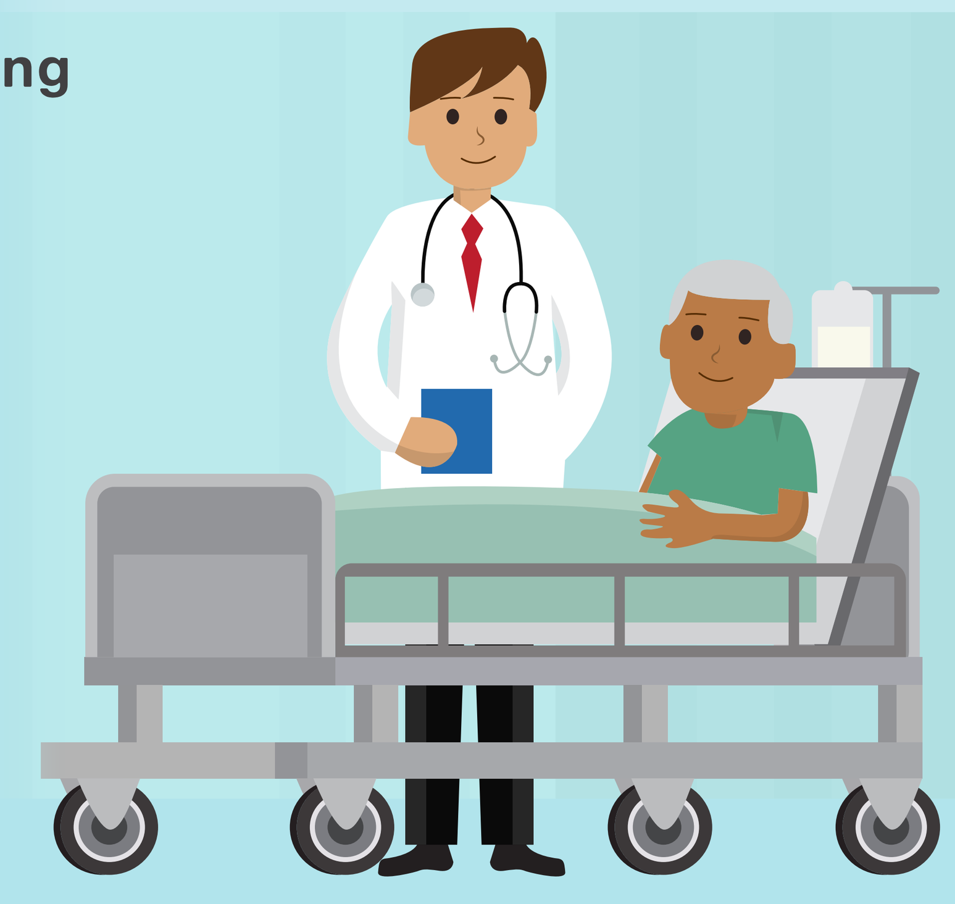
According to a study by the University of Pennsylvania School of Medicine, end-of-life care cost **$18,500** per patient in the U.S. in 2012.

HOW PATIENTS PREFER END-OF-LIFE CARE

According to a Stanford study, "Improving Palliative Care with Deep Learning,"

80% of Americans would like to spend the end of their life at home.

60% Americans spend their final days in acute care hospitals receiving medical treatments.



PREDICTING INPATIENT MORTALITY

THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN HEALTH CARE

AI
Computer technology designed to mirror human cognitive abilities while analyzing vast amounts of health care data.

Machine Learning
Techniques for analyzing imaging, genetic and electrophysiological data to determine the probability of disease outcomes in patients.

Natural Language Processing
Methods for turning texts, clinical notes and unstructured data into digital data to be used for machine learning.

Deep Learning
AI software which creates a many-layered virtual "neural network" to confront non-linear, complex patterns.

HOW AI CAN BE USED TO PREDICT PATIENT MORTALITY

- Stanford researchers developed an AI algorithm which can predict the 3-12 month mortality of patients to determine who would benefit from palliative care.
- Researchers used the EHR data of 2 million adult and pediatric patients treated with advanced illness at the Stanford Hospital and Lucile Packard Children's Hospital to train the Deep Learning Neural Network.

EHR data factors considered in predictions include prescribed medications, severity of diagnosis and number of days spent in the hospital.

The AI's mortality prediction's is used as a proxy to proactively identify patients in need of palliative care.

It also provides explanations to doctors of the AI model's mortality predictions.

THE BENEFITS OF AI & PALLIATIVE CARE

BENEFITS FOR PATIENTS

- According to the National Palliative Care Registry, less than half of the 7-8% of people admitted to hospitals who need palliative care actually receive it.
- AI predicting patient mortality helps patients in need receive palliative care sooner.
- It may give patients more time for documenting their preferred end-of-life care.
- There may be patient deaths occurring in intensive care units (ICUs), especially if it is not in the patient's end-of-life plan.

BENEFITS FOR HEALTH CARE PROFESSIONALS

Palliative care teams can proactively treat patients instead of relying on waiting for physicians' referrals and time consuming chart reviews.

Takes the pressure off of doctors to recommend palliative care because specialists will reach out to doctors about patients who may qualify and benefit from palliative care.

Doctors can learn from the patterns and reasons behind the AI's mortality predictions.

Incorporating AI technology into everyday health care practices is still in the initial stages. As trials give promise to the many exciting uses of AI, machine learning and deep learning neural networks, health care professionals will benefit from understanding the unlimited possibilities for the future of their industry.

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