

Artificial Intelligence (AI) and Future of Pharmacy Practice

Mohammad Siddiqui, PharmD, MBA, CPHIMS

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What happens in an Internet minute?

The hours of video watched on Netflix?

- a) 23,146
- b) 12,345
- c) 99,520

What happens in an Internet minute?

Number of messages are sent through Facebook?

- a) 1.2 million messages
- b) 6.9 million messages
- c) 0.5 million messages

What happens in an Internet minute?

Number of searches performed with Google

- a) 1 million
- b) 2 million
- c) 4 million



What Happens in an Internet Minute?

1,572,877 GB of global IP data transferred¹

10 Million ads displayed²

347,222 Tweets³

3.3 Million pieces of content shared⁴

6.9 Million messages sent⁴

Netflix + Youtube = more than 1/2 of all traffic⁵

438,801 Wiki page views⁷

\$400 Million during Alibaba peak day sales⁶

10 Million WeChat messages at its peak⁹

34.7 Million instant messages (MIM) sent⁸

194,064 app downloads¹⁰

\$133,436 in sales¹¹

31,773 hours of music played¹²

38,194 photos uploaded¹³

57,870 page views¹⁴

100 hours of video uploaded¹⁶

138,889 hours of video watched¹⁶

4.1 Million searches¹⁵

23,148 hours of video watched¹⁷

And Future Growth is Staggering



By 2017, mobile traffic will have grown **13X** in just 5 years¹



In 2017, there will be **3X** more connected devices than people on Earth¹

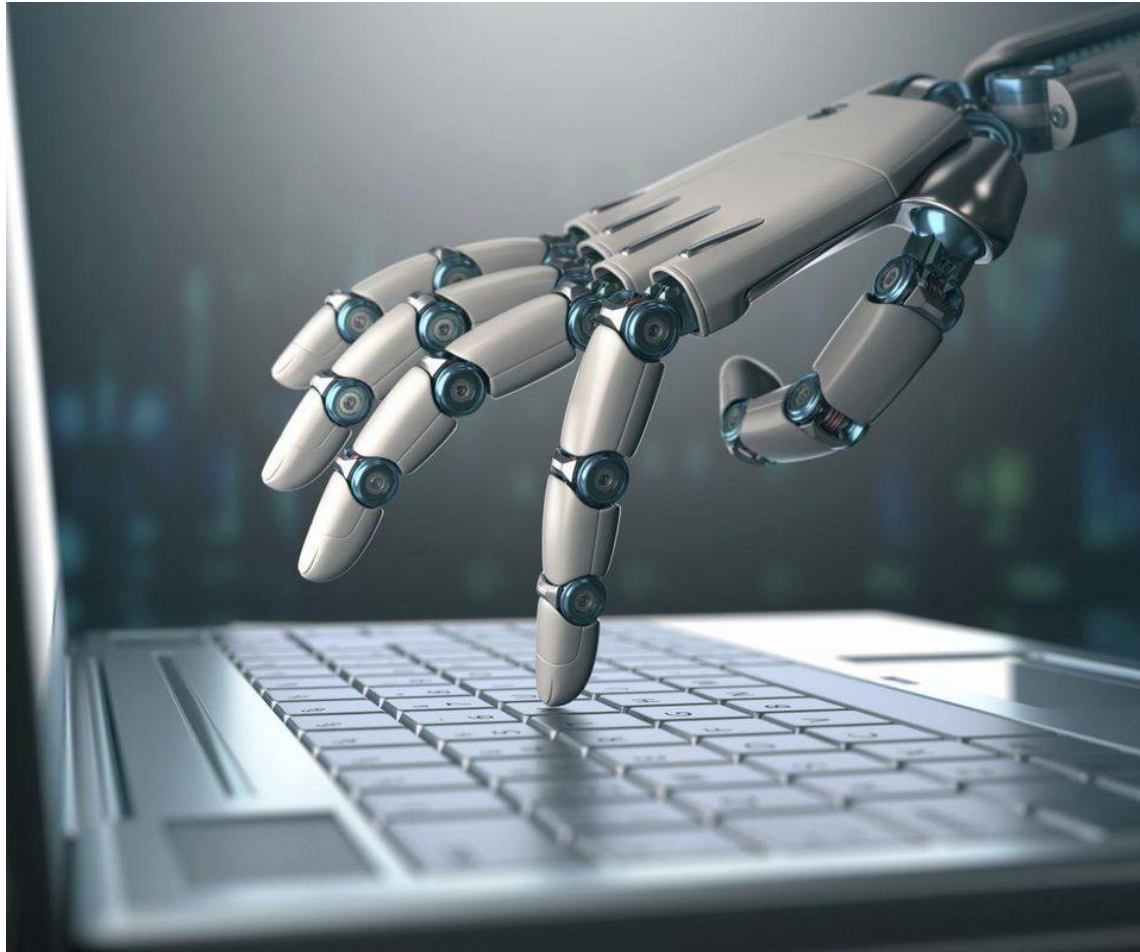
All digital data created reached **4 zettabytes** in 2013¹⁸

Disclosure Information

Name of Presentation: Artificial Intelligence (AI) and Future of Pharmacy Practice

Name of Presenter: Mohammad Siddiqui, PharmD, MBA, CPHIMS

- I have no financial relationship to disclose.



Learning Objectives

- At the completion of this activity, you will be able to:
 - Define what is artificial intelligence (AI)
 - List at least three (3) examples of current products using AI in our daily living
 - List at least three (3) examples of AI applications used in healthcare or pharmacy

Definition of Artificial Intelligence (AI)

AI is a branch of computer science that loosely attempts to mimic the intelligence and behavior of human beings.

The term AI was introduced in 1956



Data is at the heart of Digital Transformation

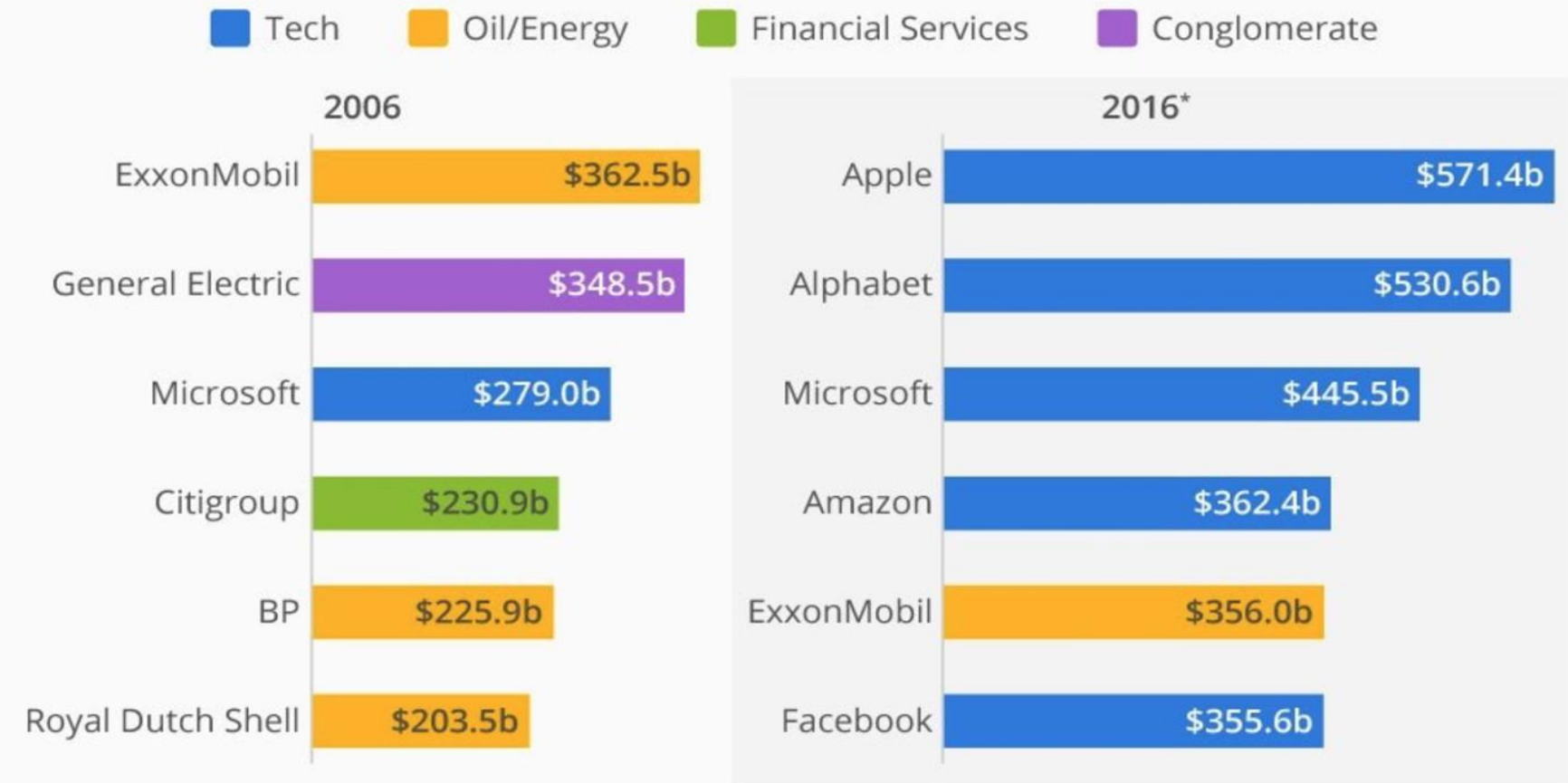
data
is the new oil

we need to find it,
extract it, refine it,
distribute it and
monetize it.

David Buckingham

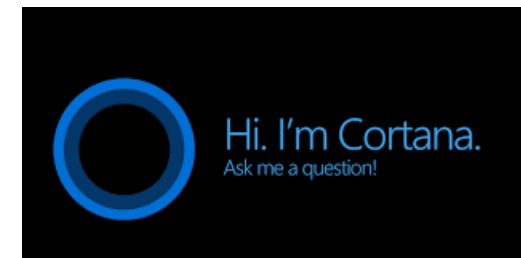
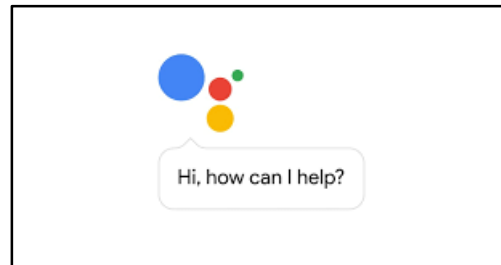
The Age of Tech

Market capitalization of the world's most valuable public companies



Artificial Intelligence in daily living

But one of the most visible manifestations of this AI war has been the rise of virtual assistants, such as Apple's Siri, Amazon's Alexa, the Google Assistant, and Microsoft Cortana.



<https://www.forbes.com/sites/williamfalcon/2018/07/31/10-successful-applications-of-ai-in-business/?ss=ai-big-data#4553cf6d664a>

Artificial Intelligence in Healthcare

- Ada health companion
- GP at Hand
- Arthritis virtual assistance
- Adherence to medication and treatment

GP at hand
powered by ♥ babylon



Hi, I'm Ada.
I can help if you're
feeling unwell.

Artificial Intelligence in Healthcare

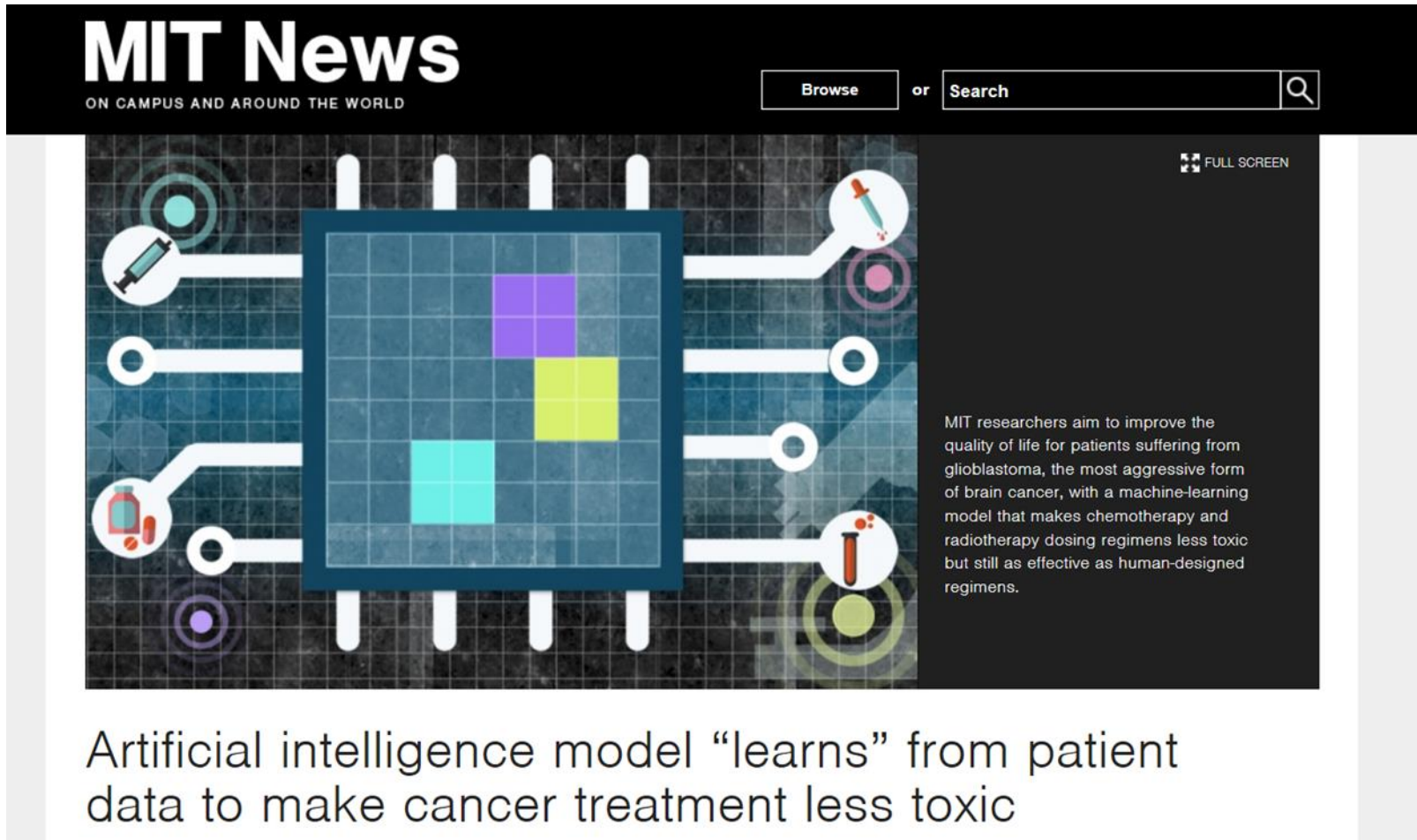
- canSAR database
- Robot scientist
- Clinical Studies enrollment

BIOETHICS
BRIEFING NOTE

NUFFIELD
COUNCIL ON
BIOETHICS

Artificial intelligence (AI) in healthcare and research

Artificial Intelligence in Pharmacy



The image shows a screenshot of an MIT News article. At the top left, the text reads "MIT News" in a large, bold, white font, with "ON CAMPUS AND AROUND THE WORLD" in a smaller font below it. To the right of this is a navigation bar with a "Browse" button, the word "or", and a search box containing the word "Search" and a magnifying glass icon. The main content area features a large graphic on the left and a text block on the right. The graphic depicts a central blue grid with several colored squares (purple, yellow, cyan) and is surrounded by various medical and scientific icons like a syringe, a pill bottle, and a test tube, all connected by white lines. The text on the right, in white, states: "MIT researchers aim to improve the quality of life for patients suffering from glioblastoma, the most aggressive form of brain cancer, with a machine-learning model that makes chemotherapy and radiotherapy dosing regimens less toxic but still as effective as human-designed regimens." A "FULL SCREEN" button is visible in the top right corner of the article area.

MIT News
ON CAMPUS AND AROUND THE WORLD

Browse or Search

FULL SCREEN

MIT researchers aim to improve the quality of life for patients suffering from glioblastoma, the most aggressive form of brain cancer, with a machine-learning model that makes chemotherapy and radiotherapy dosing regimens less toxic but still as effective as human-designed regimens.

Artificial intelligence model “learns” from patient data to make cancer treatment less toxic

<http://news.mit.edu/2018/artificial-intelligence-model-learns-patient-data-cancer-treatment-less-toxic-0810>

Artificial Intelligence in Pharmacy

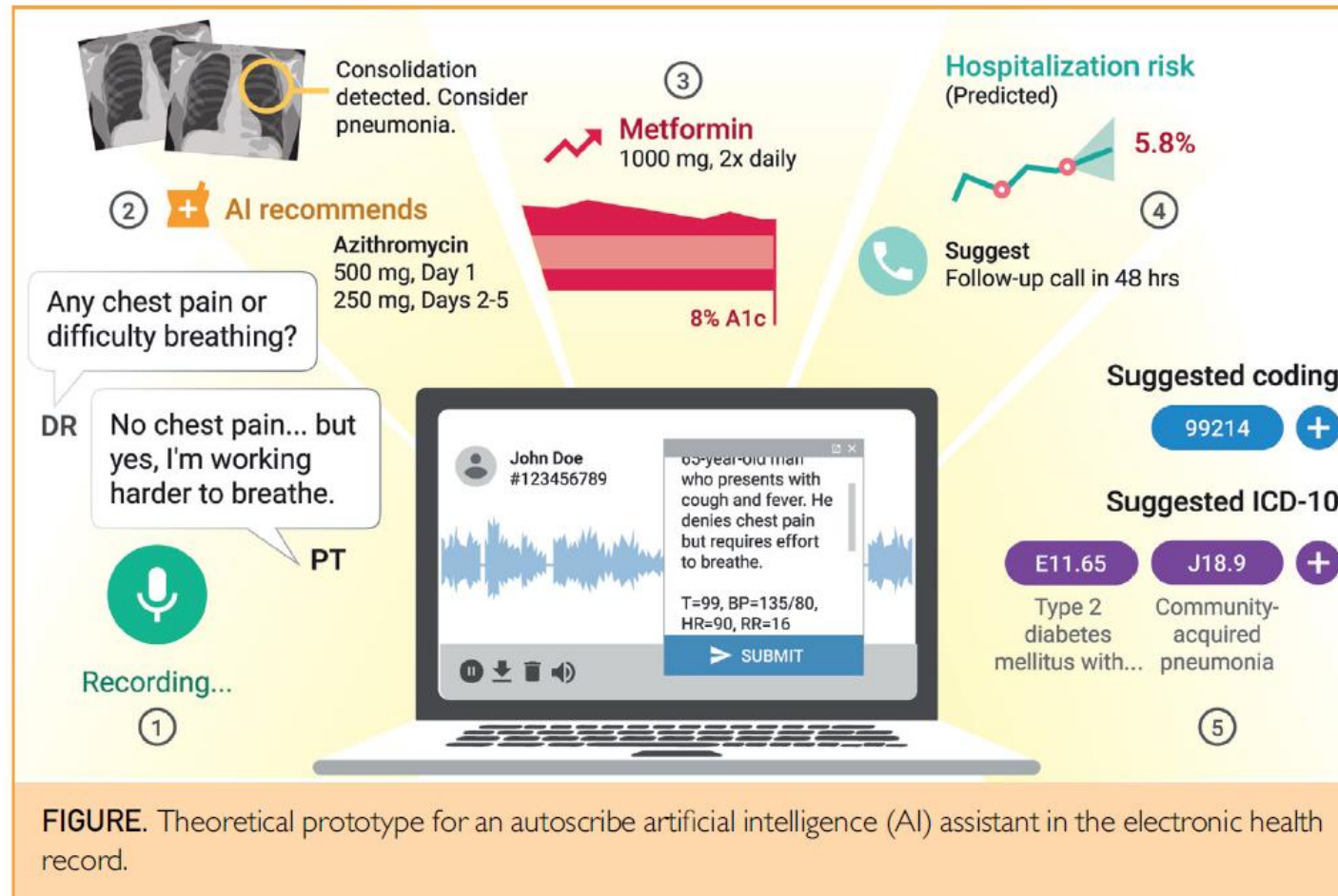
- Prediction of adverse drug reactions (6.5% of all hospital admissions in UK)

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Artificial intelligence (AI) in healthcare and research

Artificial Intelligence in Healthcare



[https://www.mayoclinicproceedings.org/article/S0025-6196\(18\)30142-3/pdf](https://www.mayoclinicproceedings.org/article/S0025-6196(18)30142-3/pdf)

Artificial Intelligence in Pharmacy

- Drug re-positioning
- Alternative indication identification
- Clinical trial research
- Epidemic outbreak prediction (Ebola)

Artificial Intelligence in Pharmacy

- Optimizing claims submission and denials management
- Rule based refill management
- Enhancing patient experience
- Managing continuous infusions
- Automating Order verification

Artificial Intelligence and Jobs

- In 2017, the economy destroyed 62.6 million jobs, but it also created 64.7 million—meaning that the economy added 2.2 million net jobs.
- On average, the economy destroys low-productivity jobs and replaces them with higher-productivity jobs—opening the door for higher wages and rising living standards.
- In the end, as a recent Deloitte report argues, technology creates far more jobs than it destroys.

Is Artificial Intelligence threatening Pharmacists Jobs?

- Workers of the future will spend more time on activities that machines are less capable of, such as managing people, applying expertise, and communicating with others.

- The skills and capabilities required will also shift, requiring more social and emotional skills and more advanced cognitive capabilities, such as logical reasoning and creativity.

One Hundred Year Study on Artificial Intelligence

We won't be putting the genie back in the bottle," he said. "AI technology is progressing along so many directions and progress is being driven by so many different organizations that it is bound to continue.

AI100 is an innovative and far-sighted response to this trend—an opportunity for us as a society to determine the path of our future and not to simply let it unfold unawares.“

<https://ai100.stanford.edu/about>

Conclusion

AI is not meant to replace medical professionals, but the ones using AI will probably replace those who don't.

We also think that it is every caregivers' duty to prepare for future like that



References

- Mayo Clinic – 2017 MFMER
- <https://futurism.com/ai-medicine-doctor/>
- [https://www.mayoclinicproceedings.org/article/S0025-6196\(18\)30142-3/pdf](https://www.mayoclinicproceedings.org/article/S0025-6196(18)30142-3/pdf)
- <http://news.mit.edu/2018/artificial-intelligence-model-learns-patient-data-cancer-treatment-less-toxic-0810>
- <https://nypost.com/2018/08/07/apple-watch-saves-man-from-hole-in-his-heart/>
- <https://www.ncbi.nlm.nih.gov/pubmed/29668763>
- Bioethics briefing notes: Artificial Intelligence in healthcare and research by Nuffield Council on Bioethics – Published May 2018
- <https://www.mckinsey.com/featured-insights/future-of-organizations-and-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages>
- <https://www.forbes.com/sites/washingtonbytes/2018/08/18/there-is-work-to-be-done-ai-and-the-future-of-work/?ss=ai-big-data#56c451c02665>
- Mesko et.al. BMC Healthcare Services Research (2018) 18:545

Contact

Mohammad Aslam Siddiqui, *PharmD, MBA, CPHIMS*
Director, Inpatient Pharmacy Services
Cleveland Clinic Abu Dhabi
siddiqm2@clevelandclinicabudhabi.ae
Mobile - 0526997757