EMERGING TECHNOLOGIES IN HEALTHCARE

Olga Kagan, PhD, RN, FHIMSS, FAAAAI, NYAM Fellow

ABOUT

Olga Kagan, PhD, RN, CIMI, FHIMSS, FAAAAI, NYAM Fellow is a nurse scientist, educator, and entrepreneur. Her research is centered around food-induced anaphylaxis, health policy, and nursing innovation through the lens of informatics and education. She teaches at two NY-based universities, contributes to textbooks, mentors nurses, volunteers on committees at the Society of Nurse Scientists, Innovators, Entrepreneurs, and Leaders (SONSIEL), the Health Information Management System Society (HIMSS), the American Academy of Allergy, Asthma and Immunology (AAAAI) and New York Academy of Medicine (NYAM). She has been leading committees and serving on boards of professional organizations & start-up companies. She founded the Food Allergy Nursing Interest Professional Group (FANI) to provide scholarly and educational forum for nurses interested in the field of food allergies. Dr. Kagan is a recipient of several awards for her contributions to research, leadership, mentorship, and service, and was featured on HIMSS TV and several podcasts.

LEARNING OBJECTIVES

❑Learners will become familiar with resources that enable nurses to be leaders in the adaptation of emerging healthcare technologies within their organizations.

❑Learners will be able to apply resources like such as the 5 Rights of AI for Healthcare to facilitate the ethical use of emerging technologies in their practice.

❑Learners will be able to give examples of how emerging technologies, such as AI, impact nurses in practice, research, and education

RESOURCES TO ENABLE NURSES TO LEAD IN THE ADAPTION OF EMERGING HEALTHCARE IT

RESOURCES

1. Organizations
2. Publications
3. Tools

ORGANIZATIONS

Nurse-led innovation & innovation events

- American Nurses Association (ANA)
  - Mentorship
  - Nurse Pitch
- Health Information Management System Society (HIMSS)
  - Nursing committee NYS chapter
  - Annual Spring Nursing symposium
  - Nursing Innovation Advisory Group
- Society of Nurse Scientists, Innovators, Entrepreneurs and Leaders (SONSIEL)
  - Hackathons
  - Pitch-a-Thons
  - THInC innovation conference
  - SONSIEL at AONL innovation sprint

ARTIFICIAL INTELLIGENCE

"AI is an area of computer science that emphasizes the creation of machines that work and react like humans. This means a system that can depict or mimic human brain functions including learning, speech (recognition and generation); problem-solving, vision, and knowledge generation."

AI in Health - A Leader's Guide to Winning in the New Age of Intelligent Health Systems by Tom Lawry

SELECTED AI PUBLICATIONS

✓ ANA Center for Ethics and Human Rights. The ethical use of artificial intelligence in nursing practice. 2022. www.nursingworld.org/~48f653/globalassets/practiceandpolicy/nursing-excellence/ana-position-statements/the-ethical-use-of-artificial-intelligence-in-nursing-practice_bod-approved-12_20_22.pdf

✓ World Health Organization. WHO calls for safe and ethical AI for health. 2023. www.who.int/news/item/16-05-2023-who-calls-for-safe-and-ethical-ai-for-health

✓ White House Office of Science and Technology Policy. Blueprint for an AI bill of rights making automated systems work for the American people. 2022. www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf

✓ What is ChatGPT, DALL-E, and generative AI? McKinsey & Company. 2023. www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-generative-ai

✓ HIMSS Policy Principles: Artificial Intelligence and Machine Learning. https://www.himss.org/resources/ai-global-policy-principles/

SELECTED AI TOOLS

✓ CEConnect, 2.0 ANCC Credits: https://nursing.ceconnection.com/public/modules/18909

✓ 5 Rights of AI in Healthcare available at HIMSS.org

✓ AI Teaching Slides: coming soon to HIMSS.org!

✓ Generative AI in a Nutshell Video: https://youtu.be/2IK3DFHRFfw?si=kGx3-rDjAjTHr_H3

FEATURE: NCPD CONNECTION

Implications of artificial intelligence for nurse managers

Ross, Angela DNP, MPH, RN, PMP, DASM, PHCNS-BC, FHIMSS; Freeman, Robert DNP, MSN, RN, NE-BC; McGrow, Kathleen DNP, MS, RN, PMP, FHIMSS, FAAN; Kagan, Olga PhD, RN, CIMI, FAAAAI, FHIMSS
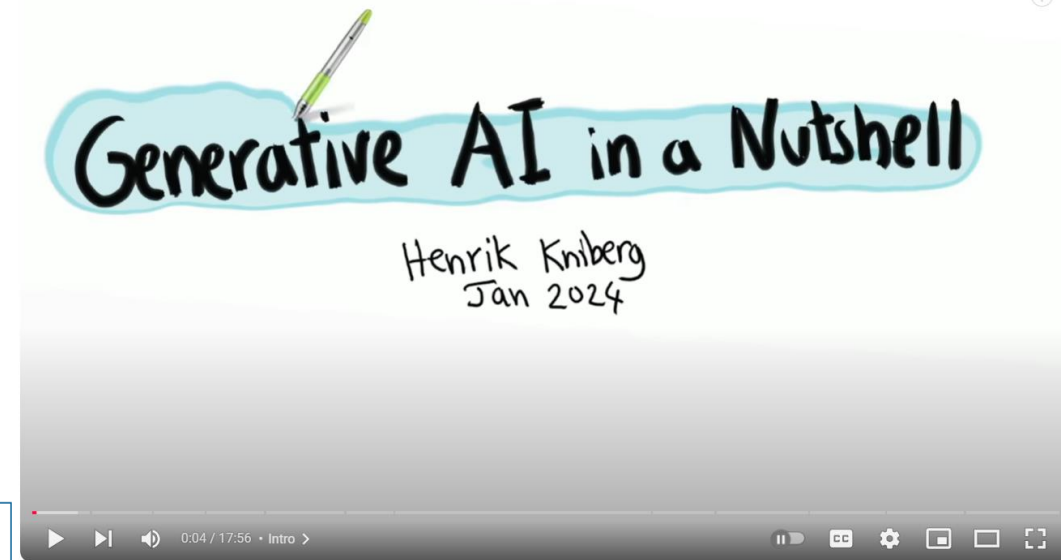
Author Information ⌄

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FREE   CE TEST

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Generative AI in a Nutshell
Henrik Kniberg
Jan 2024

0:04 / 17:56 • Intro ›

Generative AI in a Nutshell - how to survive and thrive in the age of AI

SELECTED EXAMPLES OF DIFFERENT AI TYPES

Type of AI	Description	Healthcare Example
Machine Learning (ML)	Algorithms that learn from data to make predictions or decisions.	Predicting patient deterioration by analyzing vital signs data.
Natural Language Processing (NLP)	AI that understands, interprets, and generates human language.	Analyzing patient records to identify trends in symptoms or treatments.
Deep Learning	A subset of ML based on artificial neural networks, mimicking human learning.	Analyzing imaging scans to identify abnormalities or disease markers.
Computer Vision	AI that can interpret and understand visual information from the world.	Monitoring a colonoscopy video feed to ensure no abnormalities are missed.
Predictive Analytics	Analyzing current and historical data to make predictions about the future.	Forecasting patient admission rates to optimize staffing and resource allocation.
Speech Recognition	AI that can understand and transcribe spoken words.	Transcribing verbal nursing assessments into structured electronic health records.
Generative AI	AI capable of generating novel data like images, sounds, and text.	Creating patient education materials tailored to individual health conditions.

EXAMPLE: AI-BASED CHATBOTS

As AI evolves so does the AI language models and products that enter healthcare.

- AI-based chatbots which are "computer programs or software applications that have been designed to engage in simulated conversation with humans using humanlike language" (Clark).

  - A more specific example is the generative pretrained transformer (GPT) tool from OpenAI and Microsoft partnership that offers powerful generative AI-enabled chatbots like GPT-4.

  - More common and simpler versions of chatbots are Siri or Alexa that are limited to a specific device;

  - GPT-4 (GPT-4), Microsoft Copilot (Microsoft Copilot) and Google Gemini (Gemini) AI assistants have a more extensive database and are build with advanced machine learning algorithms that can generate natural language responses to inquiries that are more detailed and nuanced either via the web browsers or on handheld devices.

  - Nurses may interface with chatbot technology as its effectiveness becomes more established in clinical practice offering benefits to patients with 24/7 access to information, such as symptom assessment, health education, medication reminders, or appointment scheduling, and allowing access to information when health care providers are not available.

EXAMPLES OF HOW EMERGING TECHNOLOGIES IMPACT HEALTHCARE
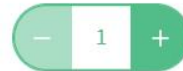
EXAMPLE: NH4H INNOVATION

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Anaphylaxis Interactive Learning Guide

Anaphylaxis is a serious allergic response that often involves swelling, hives, difficulty breathing, lowered blood pressure and in severe cases, shock. If anaphylactic shock isn't treated immediately, it can be fatal. Anaphylaxis may occur in people with allergies to foods, insect stings, medications or latex. If you are at risk for anaphylaxis, be prepared with an anaphylaxis action plan and by carrying epinephrine.

In order to help patients and caregivers understand this condition, the AAAAI developed a web-based audio-visual anaphylaxis recognition-and-response tool. This guide is intended to evaluate the viewer's/learner's ability to recognize promptly and respond effectively to anaphylactic emergencies as presented in proposed scenarios. These common presentations of anaphylaxis include pre-hospital/pre-Emergency Medical Services, community-based scenarios in children and adults.

https://www.aaaai.org/tools-for-the-public/anaphylaxis

EXAMPLE OF INTEROPERABILITY & DATA EXCHANGE

Hixny & Healthix are Nonprofit electronic health information exchanges (HIEs) covering Eastern New York to support the flow of electronic health information as part of the Statewide Health Information Network for New York (SHIN-NY)

SHIN-NY with oversight by the NYS DOH enables:
- collaboration & coordination of care to improve patient outcomes,
- reduce unnecessary and avoidable tests & procedures,
- lower costs statewide &
- provide access to a patient's electronic medical records.

TIME MAGAZINE'S ANNUAL BEST INVENTIONS LIST

9 Israeli startups listed:

1. Nuvo: Wearable Invu remote pregnancy monitor (Home Health).
2. Aporia Guardrails: Real-time AI risk mitigation (AI).
3. OrCam Hear: AI-powered hearing aid for noisy environments (Accessibility).
4. UVeye: Drive-thru vehicle inspection in 30 seconds (Automotive).
5. BeeHero: Beehive management and pollination monitoring (Agriculture).
6. InnerPlant: CropVoice platform for plant stress signaling (Agriculture).
7. Emulait: Customizable baby bottle mimicking mother's breast (Special Mention).
8. BelongAI: "Dave" chatbot for cancer support (Special Mention).
9. D-ID Agents: Customizable conversational AI avatars (Special Mention).

DIGIT, A HUMANOID ROBOT FROM AGILITY ROBOTICS, CLOCKS IN AT WORK

FIREFLY PETUNIAS, FROM LIGHT BIO, GLOW IN THE DARK

APPLE'S HEARING AIDS
GOOGLE'S PROTEIN PREDICTOR
YONDR'S ATTENTION-SAVING PHONE POUCHES
VOLKSWAGEN'S ELECTRIC BUS
ON'S NEXT-GEN RUNNING SHOE
& 193 MORE

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INNOVATION FROM ISRAEL

Sigal Shafran Tikva CCRN, MPH, MHA, PhD · 1st

Health Tech expert | EntrepreNurse | Founder & Head of Research...

Tel Aviv District, Israel

5K followers

מרכז הדסה למחקר
וחדשנות בסיעוד
Hadassah research & innovation center

JERUSALEM
COLLEGE OF
TECHNOLOGY

APPLYING RESOURCES TO FACILITATE THE ETHICAL USE OF EMERGING TECHNOLOGIES

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5 Rights of AI in Healthcare

Artificial Intelligence in healthcare must apply a systematic and standardized approach to ensure its application is optimal, safe, effective, and compassionate.

1 RIGHT OBJECTIVE

Problem & Population: A clear understanding of the problem to solve informs the design of appropriate workflows, key metrics, outcomes, and aids in validation to evaluate responses for biases.

2 RIGHT APPROACH

Workflow & Technology: The right solution and perspective are key success factors. It is essential to have a testing phase, to fine tune and optimize the logic and performance.

3 RIGHT COMPETENCY

Clinical & Intelligent: A well-trained project team can effectively recognize and mitigate biases in both data and algorithms. Knowledgeable nurse leaders are crucial for informed decision-making and successful integration for meaningful healthcare application.

4 RIGHT DATA

Reasonable Logic: Validating the accuracy of the data source, dataset, and algorithms is critical. This ensures that the AI system operates with reliable and trustworthy information.

5 RIGHT SAFEGUARDS

Checks and Balances: Ensuring compliance with regulatory requirements is key to guaranteeing transparency, data integrity, privacy, and security. Clinicians help ensure responsible and ethical use of this technology.

HIMSS

EXAMPLE OF HOW TO APPLY 5 RIGHTS OF AI IN PRACTICE

An AI-assisted Clinical Decision Support System (CDSS)
for ED triage to alleviate overcrowding and reduce wait times

Nurse manager is working with the nursing informatics team and the third party vendor on AI-assisted CDSS that can help clinicians in determining which patients should be admitted to or discharged from a unit.

*How can 5 Rights of AI in Healthcare guide nurse leaders
when considering this AI technology?*

Petersson L, Vincent K, Svedberg P, Nygren JM, Larsson I. Ethical considerations in implementing AI for mortality prediction in the emergency department: linking theory and practice. *Digit Health*. 2023;9.

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Objective: *Safe and effective ED triage system.*

- The patient is protected from inappropriate or irrelevant data used to design ED systems.
- Patients can trust they will be diagnosed with accurate, present, and timely data utilizing evidence-based practice.
- The data solves the right problem and provides alternatives for care solutions.

Approach: *Workflow and AI Assisted CDSS Technology.*

- The proposed technology is congruent with the ED workflow to alleviate overcrowding & long patient wait times.
- The technology meets the primary objective with potential benefits or unintended consequences.
- Down time procedures to be in place for unforeseen technology failures.

Competency: *Nurse leader as a project manager or facilitator.*

- Nurse leaders to identify experts such as nursing informatics team to help with the new technology and develop a change management strategy to integrate AI-assisted CDSS triage tool into the workflow.
- Ensure informed and proper use at the point of care.

Data: *AI-assisted CDSS does not have algorithmic discrimination.*

- Algorithmic discrimination occurs when automated systems contribute to unjustified treatment.
- Patient triage in the ED shouldn't reflect & reproduce existing unwanted inequities or embed new harmful biases.
- Nurse leaders can inquire on the type of data the AI-assisted CDSS was trained and tested on to validate performance.

Safeguards: *Data privacy & security.*

- Patients should be provided information on privacy and consent explaining how data is used.
- The end-user should know that an automated system is being used and how and why it contributes to outcomes.

AI IMPLICATIONS FOR EDUCATION

1. **Enhanced Learning Platforms**: AI-powered interactive learning platforms can adapt to individual learning paces, preferences, and styles, providing a personalized educational experience.
2. **Advanced Assessments**: AI-assisted assessment tools can identify educational and skill gaps, ensuring targeted and effective training.
3. **Curriculum Integration**: Full integration of AI and informatics competencies into nursing curricula is urged to ensure that nurses are equipped to deliver person-centered services using advanced technology.
4. **Support for Nurses**: AI tools provide valuable support for nurse by offering customized on-the-job training and upskilling for the existing workforce, enhancing overall healthcare delivery.
5. **Impact on Patient Outcomes:** The use of AI and informatics can positively impact patient outcomes by supporting healthcare processes and clinical thinking.

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AI IMPLICATIONS FOR RESEARCH

1. **Big Data**: AI relies heavily on big data, but challenges in data accuracy, potential bias, and robustness need to be addressed through focused research.
2. **Patient Data Utilization**: Patient data from EHRs, insurance claims, and wearable devices can be used to train organization-specific AI models, conduct population-based studies, and assist in AI-driven clinical trials.
3. **Privacy Concerns**: When using biometric data, such as DNA or fingerprints, it is essential to maintain privacy and confidentiality as these data types are unique and traceable.
4. **Improving Patient Care**: Ethical AI in nursing research can enhance patient care, efficiency, and overall quality while preserving patient trust and confidentiality.
5. **Supporting Nurses**: AI tools can assist nurses in ensuring the responsible and ethical implementation of AI technologies in clinical practice.

INVEST IN YOURSELF

1. Advancement via formal education
   - ➤ Graduate degrees (Masters, Doctorate, Post-Doc)
   - ➤ Certification programs
2. Self- enrichment via informal education
   - ➤ Book Clubs
   - ➤ Mentorship
   - ➤ Conferences, webinars, hackathons
3. Service & Volunteering :
   - ➤ Workplace committees and councils
   - ➤ Professional organizations
   - ➤ Local community/ places of worship
4. Networking
   - ➤ Membership in professional communities
   - ➤ Events and conferences (OJNA, ANA, SONSIEL, HIMSS etc.)
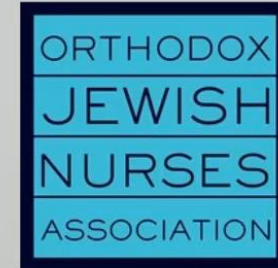   - ➤ Social media (LinkedIn, ResearchGate)

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AI WON'T REPLACE HUMANS — BUT HUMANS WITH AI WILL REPLACE HUMANS WITHOUT AI
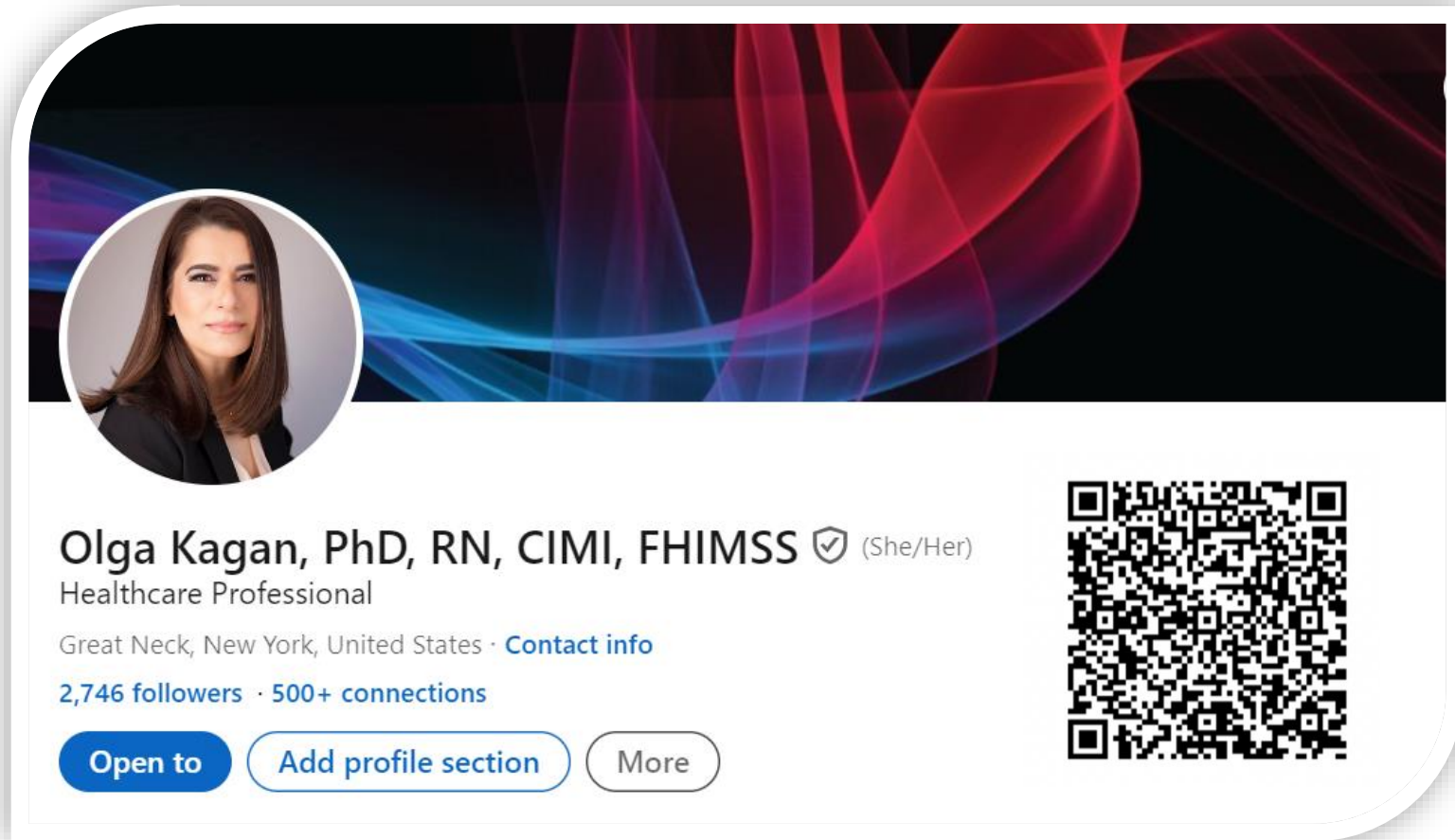
Karim Lakhani

Professor at Harvard Business School

Thank you!

Olga.Kagan@outlook.com
X @Olga_Kagan

Q & A