FAPESP Week Illinois
ONE HEALTH

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April 9, 2024

UIC UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE

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Disclosures

Consultant for Alcon, Santen, Laurel Therapeutics, Roche.

Co-Founder Visstor and Vistronics.

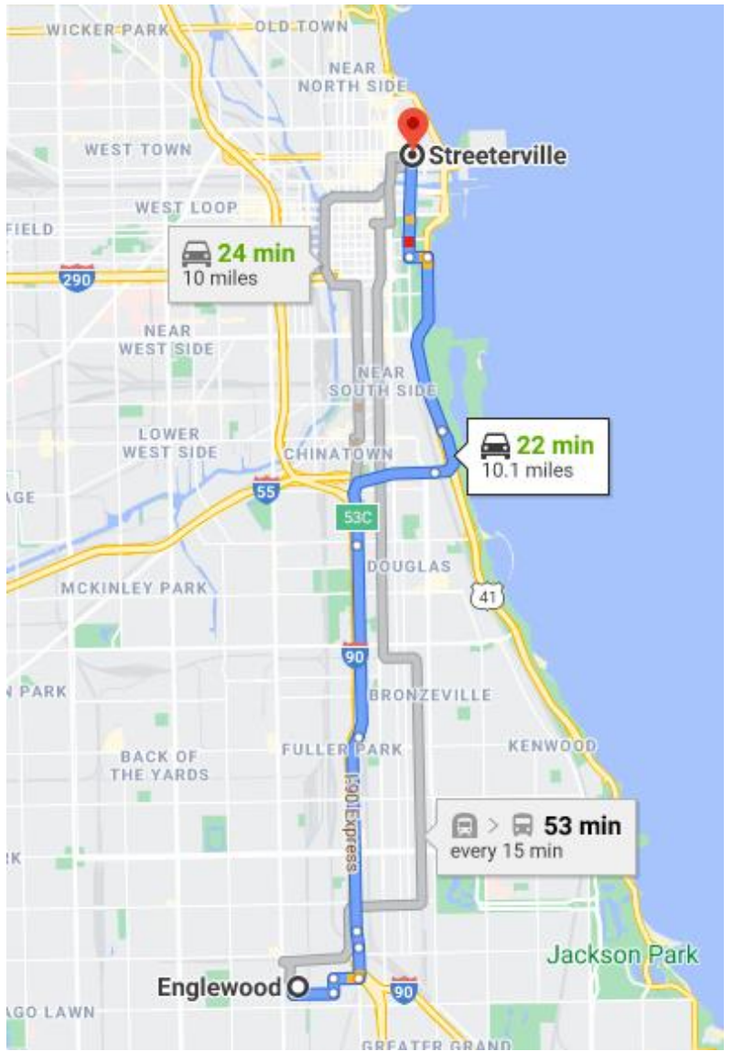
Intellectual property disclosed for use of growth factors in regenerating peripheral nerves, novel silk-based biomaterials used in ocular surface reconstruction, and the use of magnetic forces to control eyelid position.

Research supported by grants from the Falk Foundation, DoD, NIH, RPB, and NSF.

Off-label use of potential therapeutics.

Life Expectancy

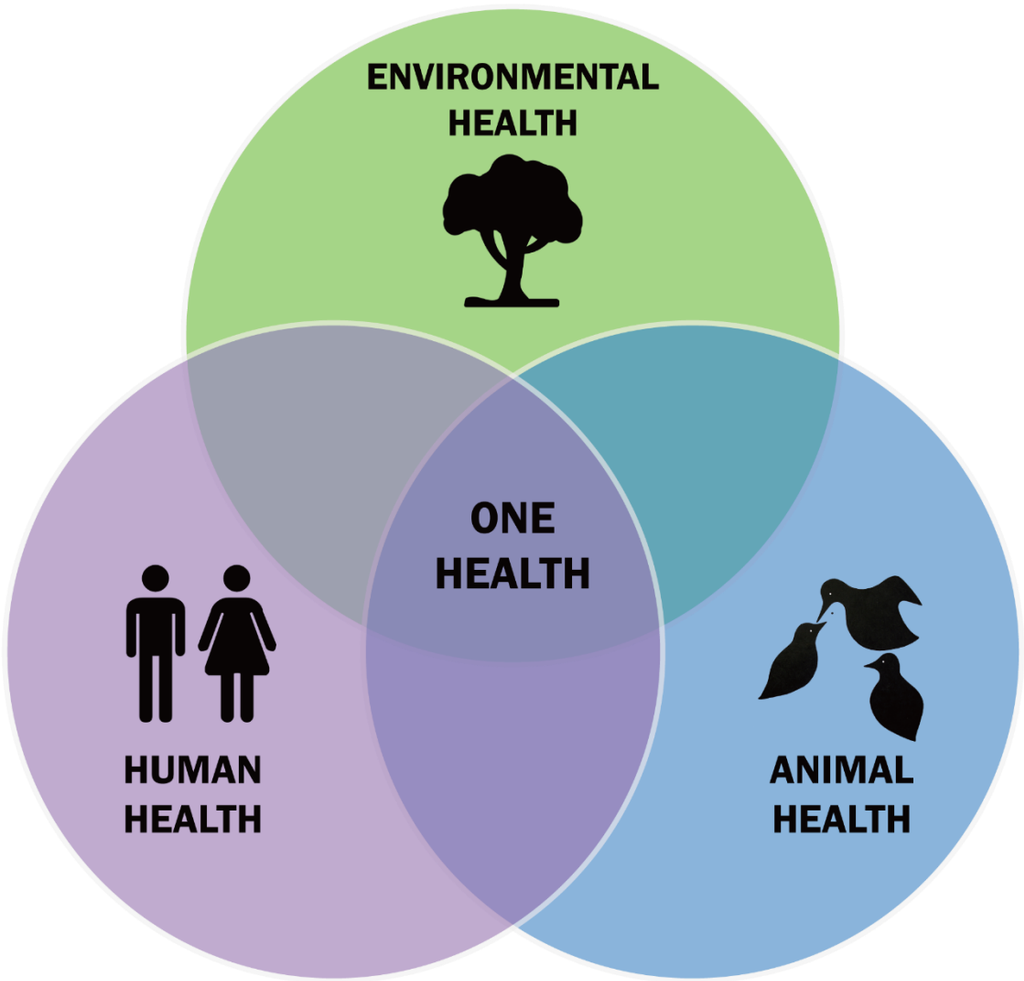
Streeterville
90 years



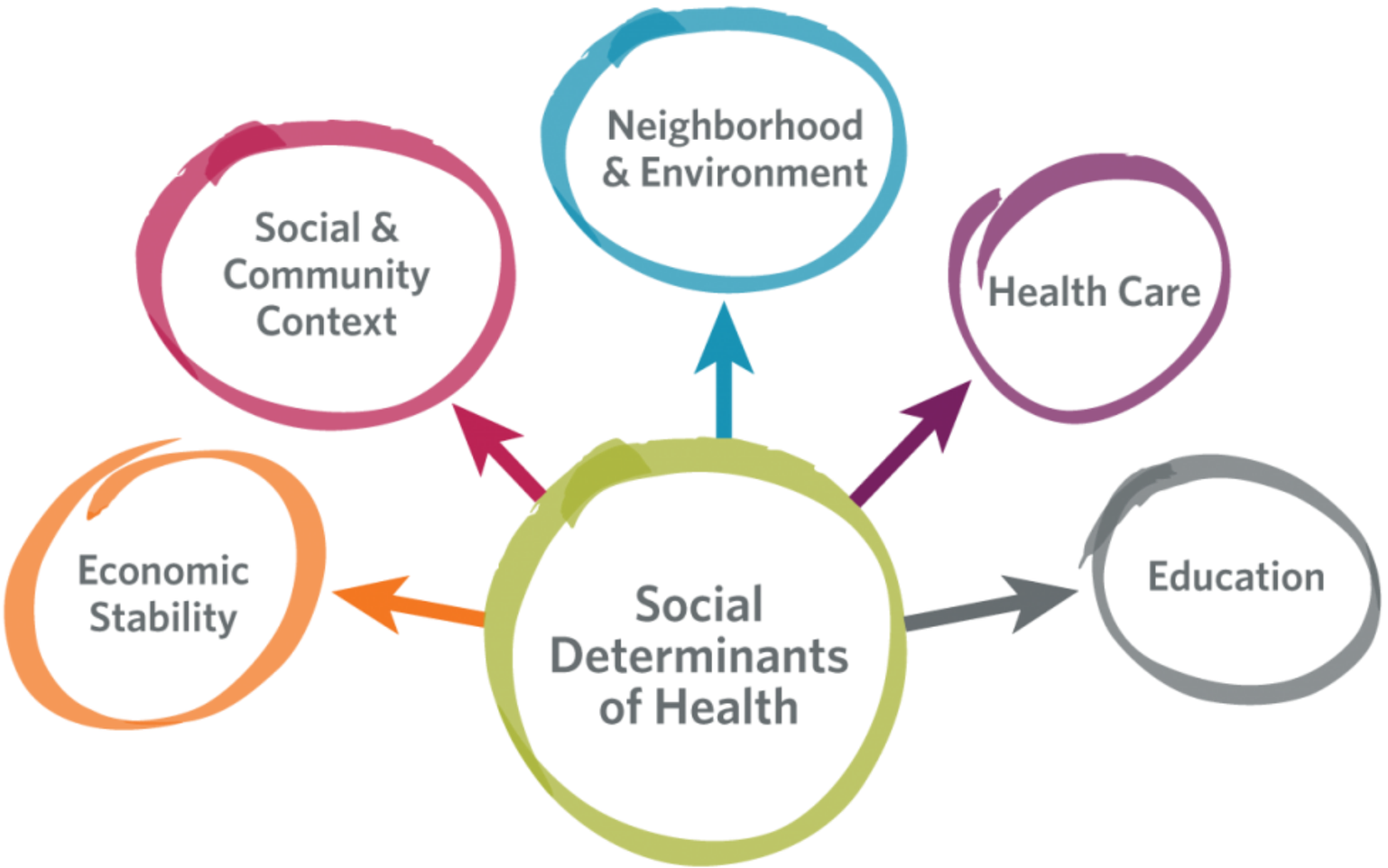
Englewood
60 years

Source: NYU Langone

ONE HEALTH


ENVIRONMENTAL HEALTH
ONE HEALTH
HUMAN HEALTH
ANIMAL HEALTH

Social Determinants of Health



Health Equity

Source: Research America

UNIVERSITY OF ILLINOIS
COLLEGE OF MEDICINE

Academic Health Centers and Universities uniquely advance clinical care, research, and education.

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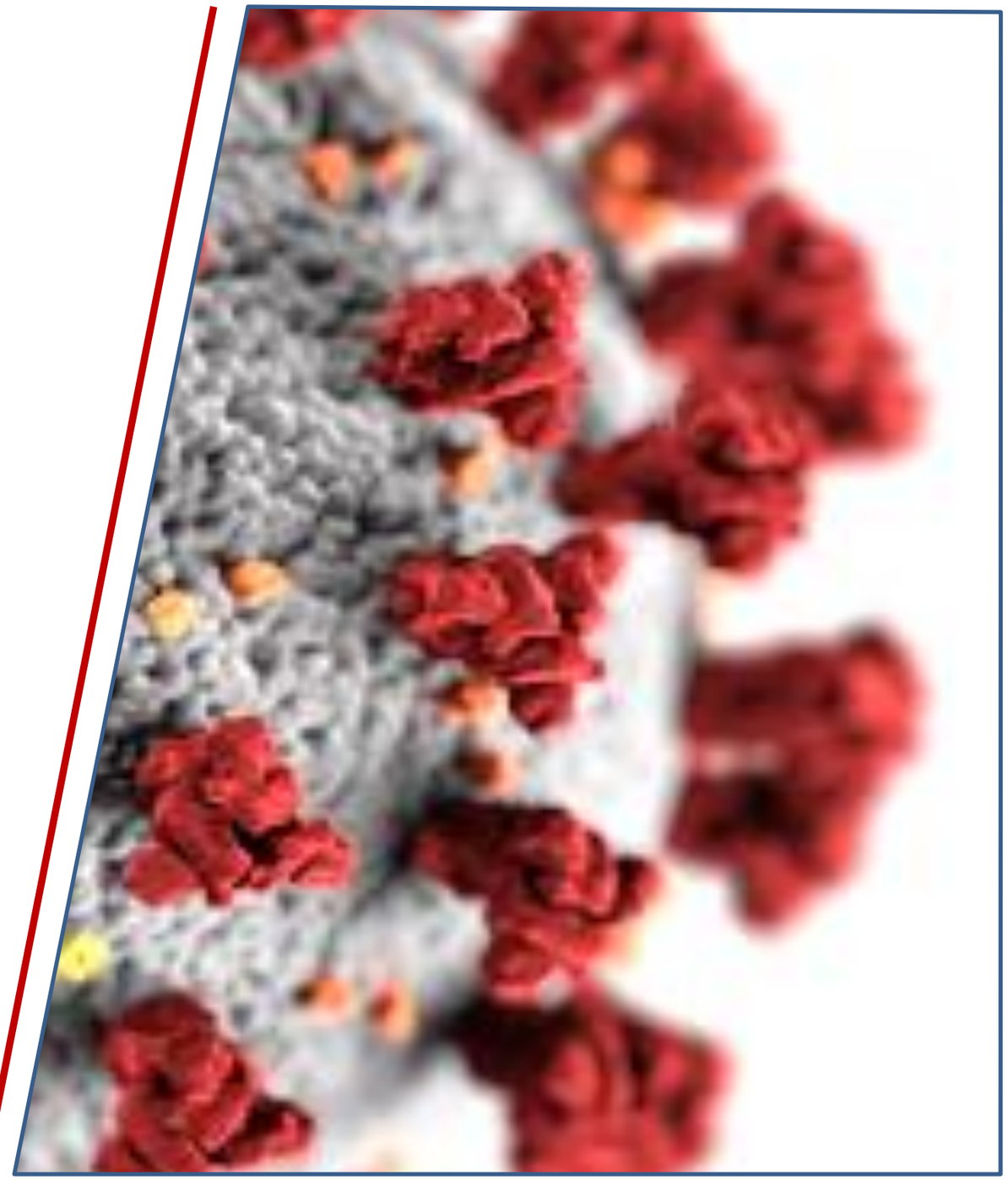

WE ARE UI HEALTH

Our foundation in academic excellence leads to expertise in **HEALTHCARE DELIVERY**

7 health sciences colleges

- Applied Health Sciences
- Dentistry
- Medicine
- Nursing
- Pharmacy
- Public Health
- Social Work

40+ care locations

- UI Hospital & Clinics
- Mile Square Health Center (FQHC)
- Health Sciences College Faculty Practices

UI Cancer Center
Urban Health Program

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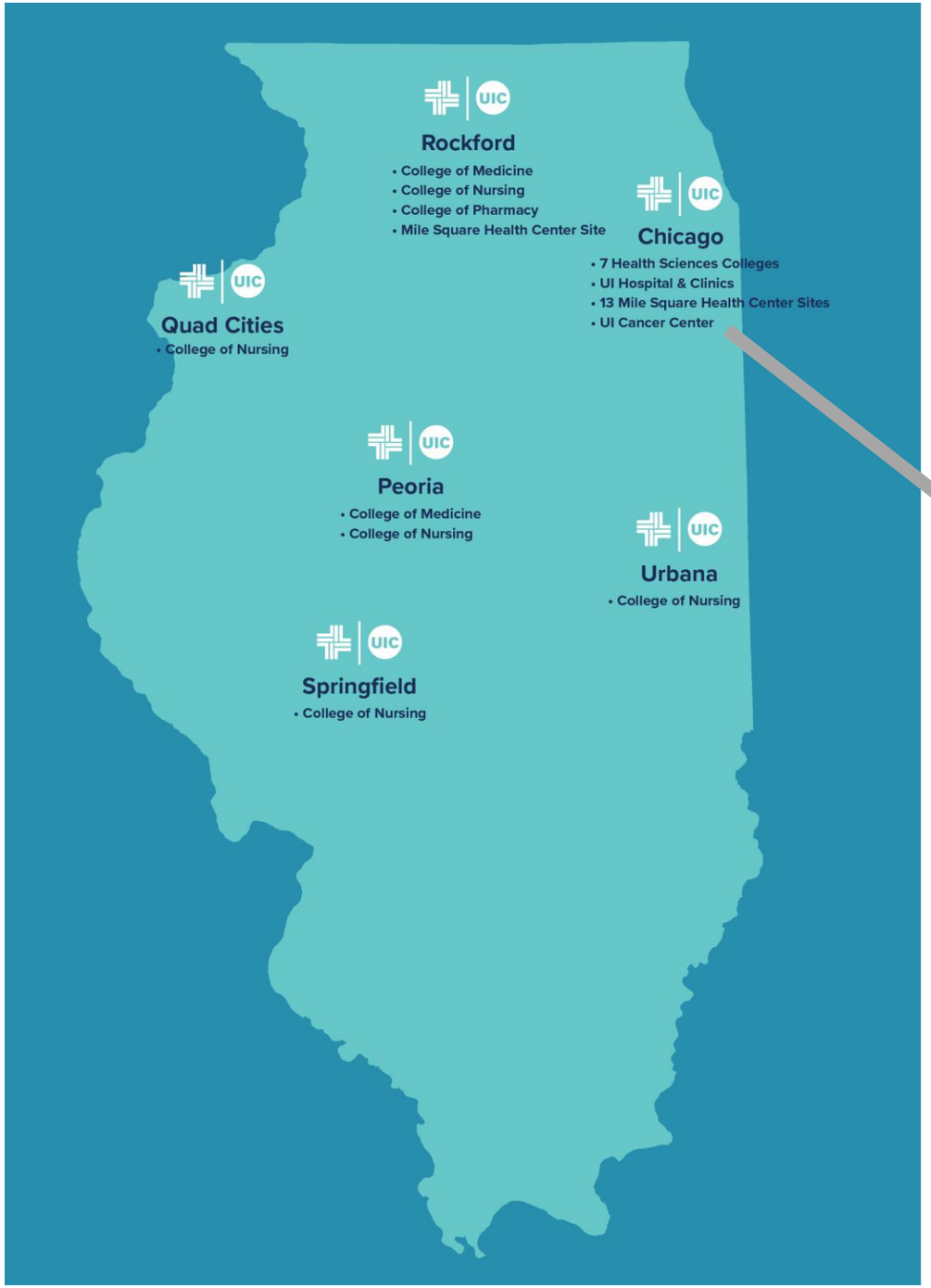
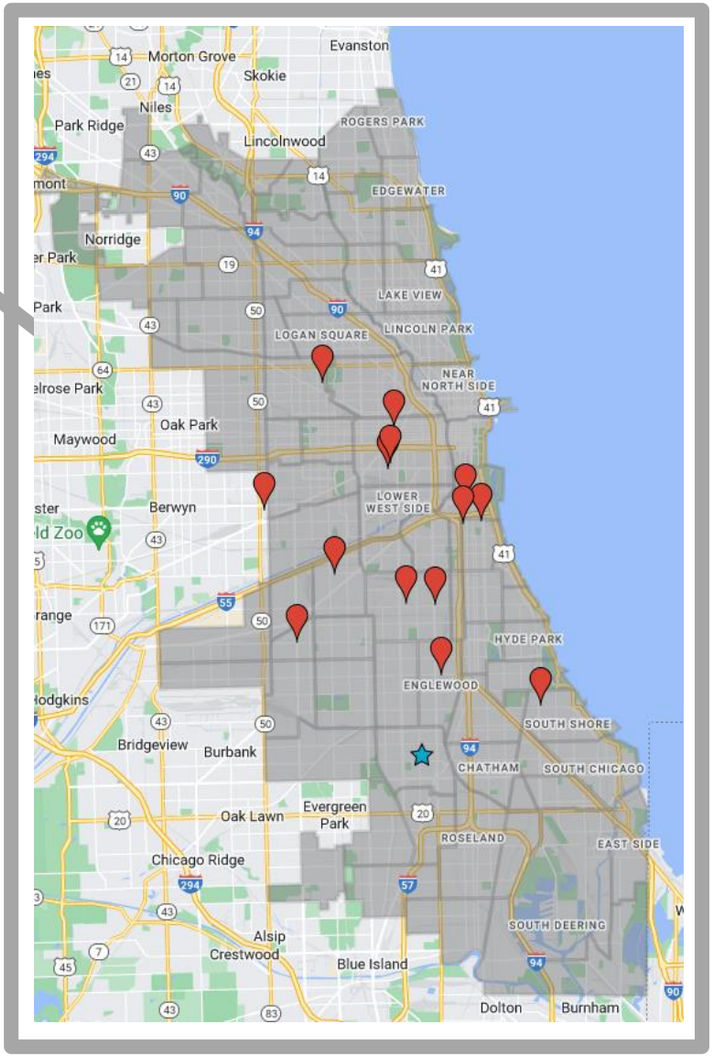
Reaching Out:

Health & Wellness in the Community

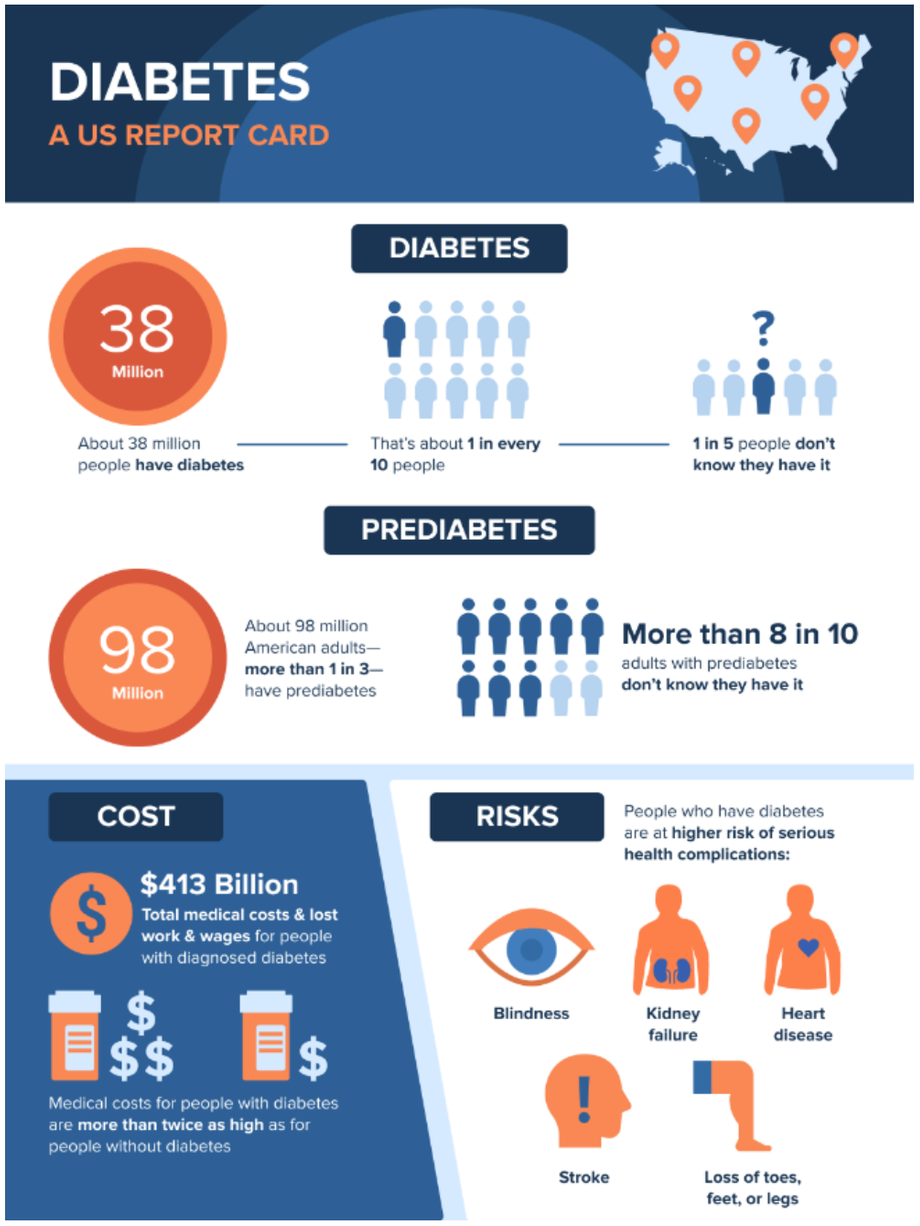




UI HEALTH'S TRAINING IMPACT

- 1 in 3 IL Physicians were trained at UI Health
- 1 in 5 IL Physicians received MD here
- Over 1 in 3 IL Pharmacists trained
- Over 8,000 Practicing IL Nurses trained
- More than 1 in 3 IL Dentists trained
- Nearly 1 in 4 IL Social Workers trained

Metabolic Diseases



Cancer

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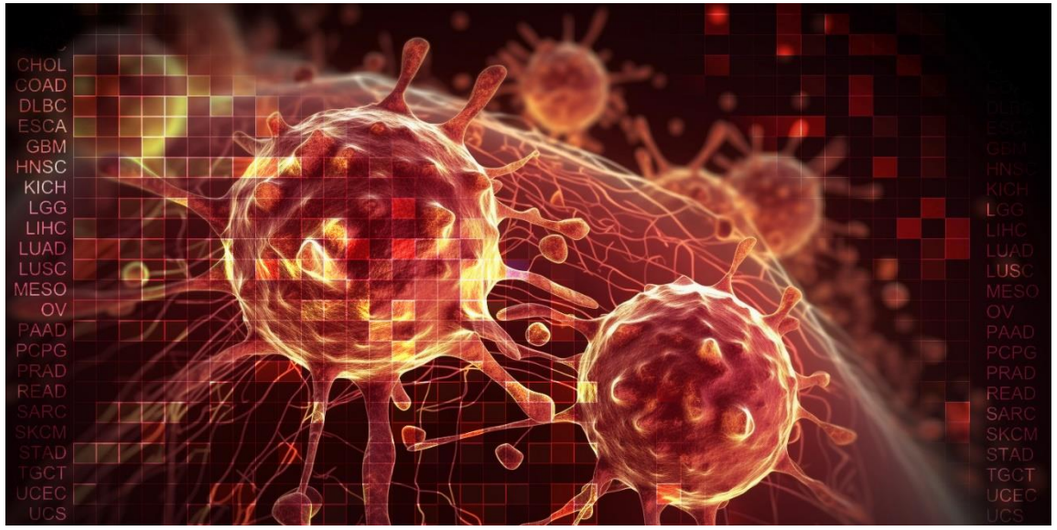
UNIVERSITY OF ILLINOIS
CANCER CENTER



U.S. Cancer Health Disparities at a Glance

Adverse differences in numerous measures of cancer burden exist among certain population groups in the United States. Examples of such disparities include:

111% and 39% HIGHER RISK	African American men and women have a **111 percent and 39 percent higher risk of dying from prostate cancer and breast cancer**, respectively, compared with their white counterparts.
20% and 38% MORE LIKELY	Hispanic children and adolescents are **20 percent and 38 percent more likely to develop leukemia** than non-Hispanic white children and adolescents, respectively.
TWICE AS LIKELY	Asian/Pacific Islander adults are **twice as likely to die from stomach cancer** as white adults.
TWICE AS LIKELY	American Indian/Alaska Native adults are **twice as likely to develop liver and bile duct cancer** as white adults.
3.5X HIGHER	Men living in Kentucky have **lung cancer incidence and death rates that are about 3.5 times higher** than those for men living in Utah.
<HALF AS LONG	Patients with localized hepatocellular carcinoma, the most common type of liver cancer, who have no health insurance have **overall survival that is less than half as long** as those who have private health insurance (8 months versus 18 months).
35% HIGHER	Men living in the poorest counties in the United States have a **colorectal cancer death rate that is 35 percent higher** than that for men living in the most affluent counties.
70% MORE LIKELY	Bisexual women are **70 percent more likely to be diagnosed with cancer** than heterosexual women.

American Association for Cancer Research (AACR) Cancer Disparities Progress Report 2020

AI

Source: Forbes

Chatbot

1. Representative Data

- Data sets may not include data from a diverse population.
- Lack of data diversity could lead to AI with “scotomas” and that serves only a particular population.

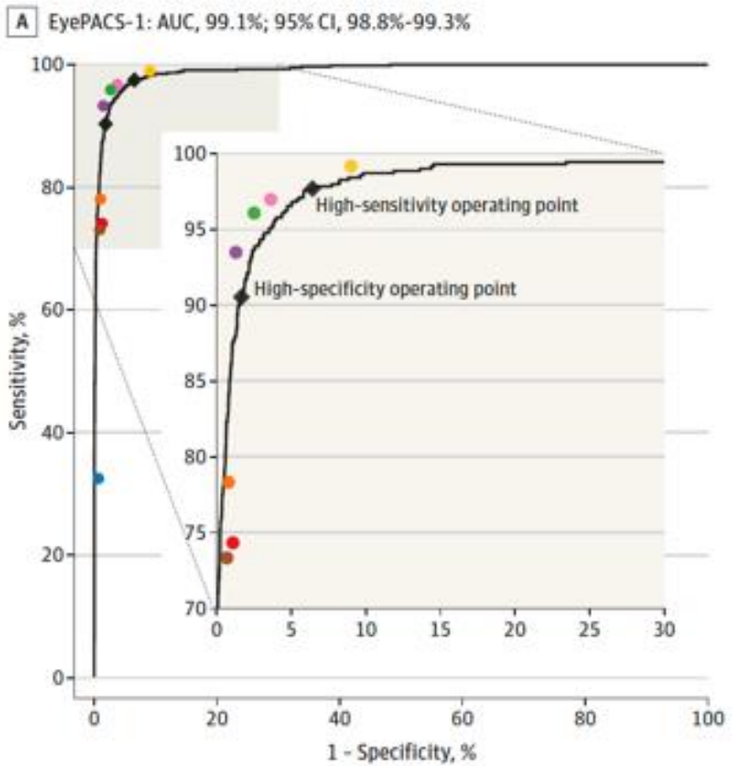
Health Equity and AI

Source: EyeRounds.org

JAMA | Original Investigation | INNOVATIONS IN HEALTH CARE DELIVERY

Development and Validation of a Deep Learning Algorithm for Detection of Diabetic Retinopathy in Retinal Fundus Photographs

Varun Gulshan, PhD; Lily Peng, MD, PhD; Marc Coram, PhD; Martin C. Stumpe, PhD; Derek Wu, BS; Arunachalam Narayanaswamy, PhD; Subhashini Venugopalan, MS; Kasumi Widner, MS; Tom Madams, MEng; Jorge Cuadros, OD, PhD; Ramasamy Kim, OD, DNB; Rajiv Raman, MS, DNB; Philip C. Nelson, BS; Jessica L. Mega, MD, MPH; Dale R. Webster, PhD



I-ODA, Real-World Multi-modal Longitudinal Data for Ophthalmic Applications

- Illinois Eye and Ear Infirmary real world data set
- Reflects the diversity of the patients seen at University of Illinois Hospital & Clinics
- Darvin Yi, PhD, Co-Executive Director of the AI in Ophthalmology Center, Asst Professor

2. Clinical Applications

- AI technology is applicable to almost any disease.
- Bias in the selection of clinical problems may lead to neglect of key diseases.

PubMed Search

"Artificial Intelligence" +

"Cancer"
17,187 Hits

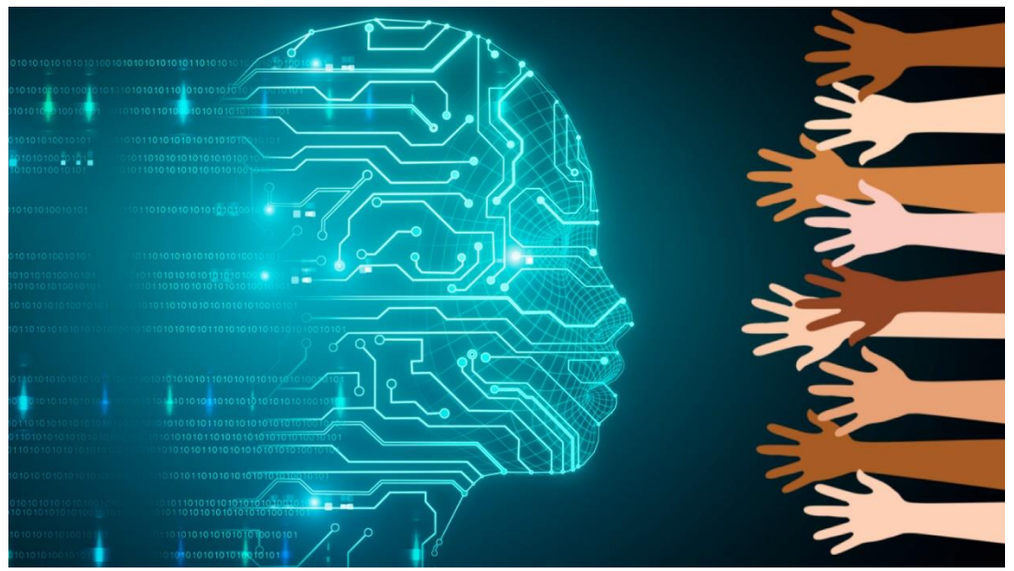
"Macular Degeneration"
215 Hits

"Sickle Cell"
29 Hits

PubMed.gov

Democratization of AI

- AI industry is characterized by a lack of diversity.
- AI technology is not easily independently applied by clinicians or biological scientists.
- Dr. Darvin Yi, UI COM: End-to-End AI Pipelines



3. Access

- AI has the potential to remove or accentuate health access issues.
- Access to technology necessary to avail oneself of AI remains a barrier.

Digital Divide

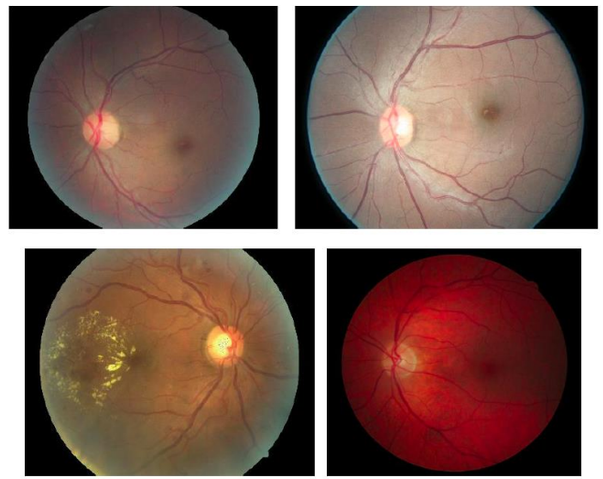
- Only 55-60% of patients over 65 have access to a smartphone and broadband.
- Low-income Americans have only 53% digital literacy.

Source: AMA

Embedding AI

- AI is frequently "embedded" in or reliant upon other technology.
- Lack of access to non-AI technology is also lack of access to AI.

ACCEPT



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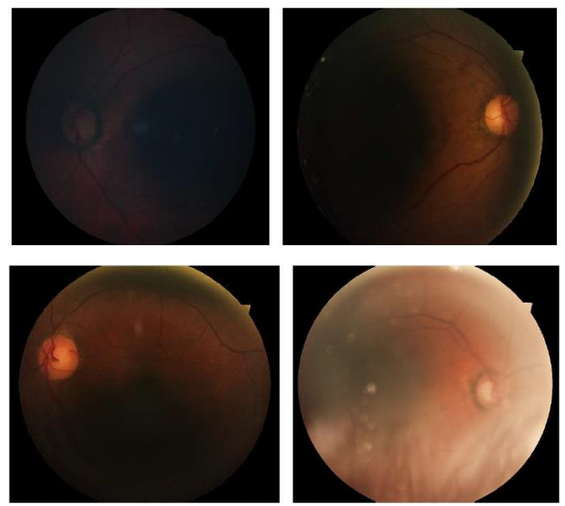
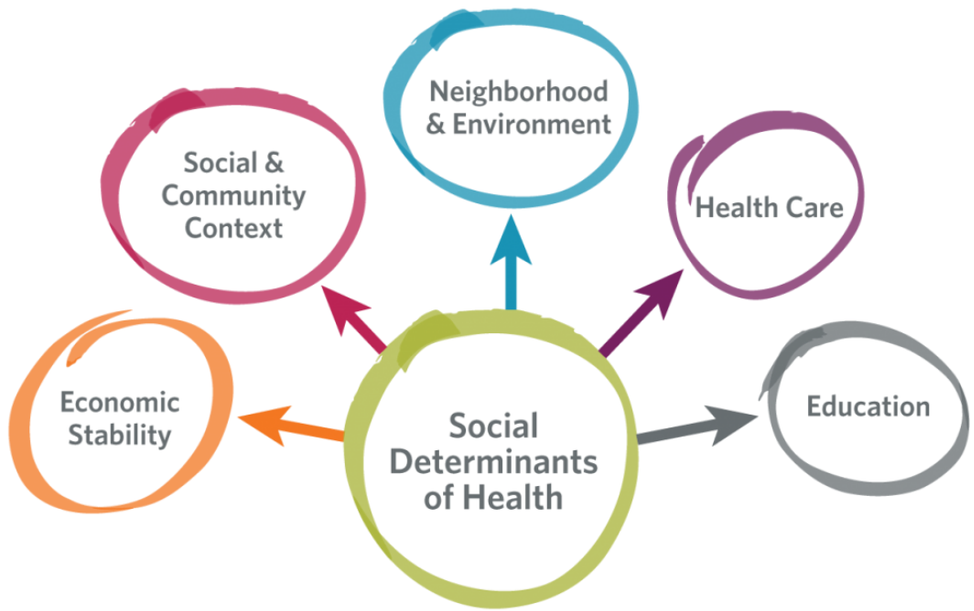


Saha, et al.

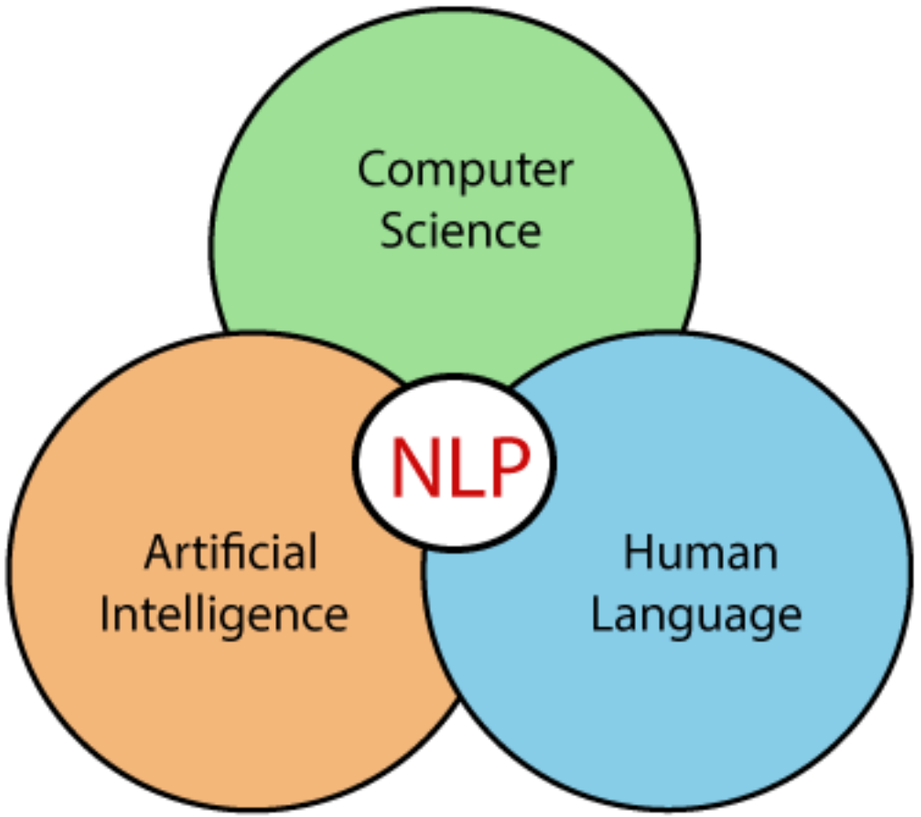
4. Social Determinants of Health

- Many determinants of health reside outside of the healthcare system.
- AI can be applied to many areas which will impact health.



5. Natural Language Processing

- Branch of AI giving computers the ability to understand text and spoken words in much the same way human beings can.
- Patients and physicians may communicate in different languages and dialects



IBM; Javapoint

6. Data Privacy

Forbes

Artificial Intelligence
may possess the greatest potential
of any technology
to create health equity.

Center for Health Equity Using Machine Learning & Artificial Intelligence (CHEMA)

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“Optimism is the faith that leads to achievement. Nothing can be done without hope and confidence.“

Helen Keller