

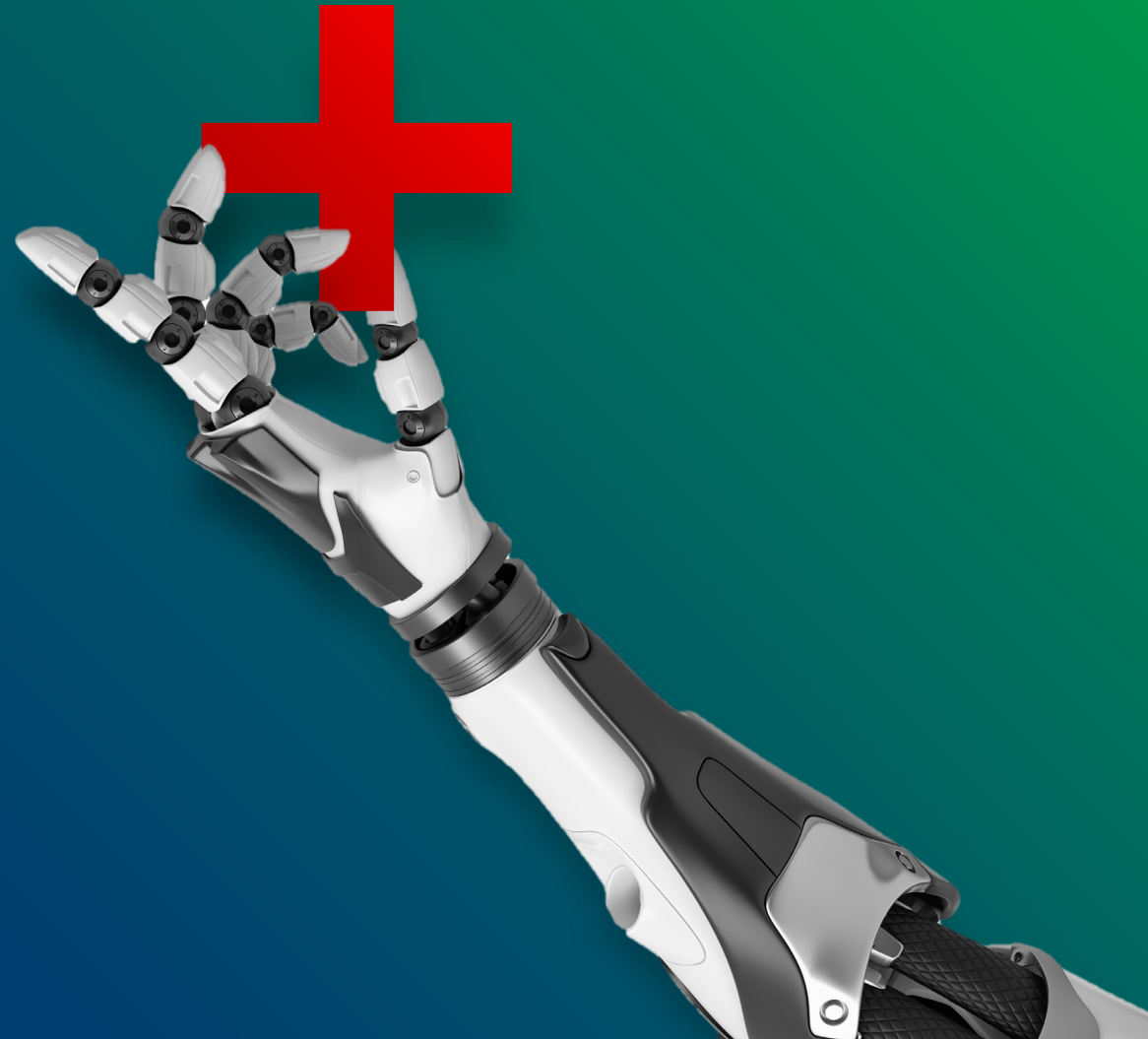
Not Peer Reviewed

AI in healthcare

Ready for prime time?
We are just skimming the surface

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A business of Marsh McLennan



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Status
(September
2023)

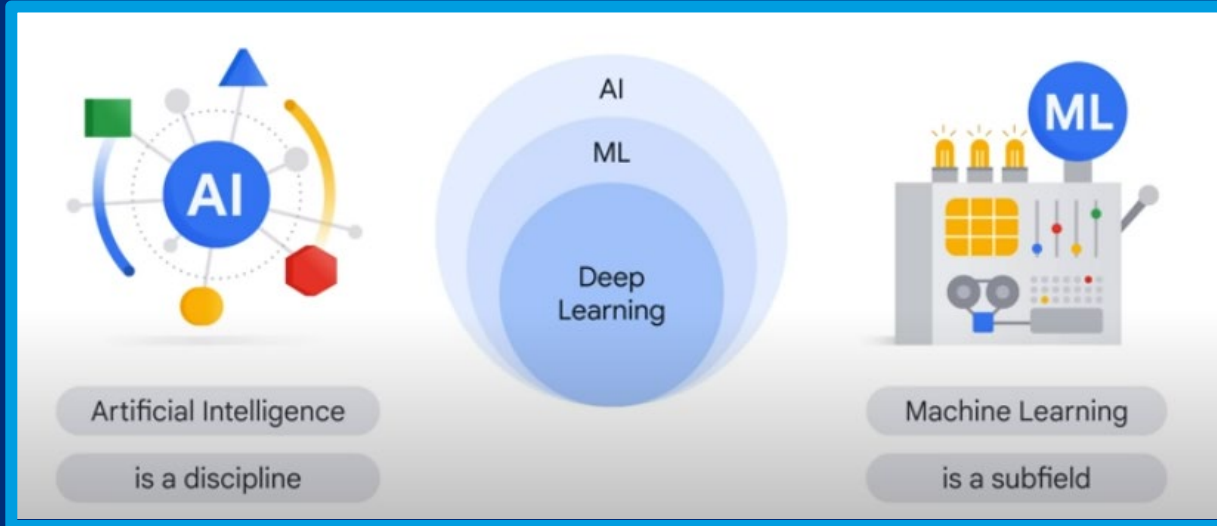
Application of AI in healthcare



AI hype

From Google

- **Artificial Intelligence (AI)** is the theory and development of computer systems able to **perform tasks normally requiring human intelligence**
- **Machine Learning (ML)** gives computers the ability to **learn without explicit programming**



Generative AI: Generative artificial intelligence is a form of machine learning that can produce text, video, images, and other types of content (e.g., ChatGPT)



OpenAI
ChatGPT **4.0**

Application of AI in healthcare

Specific areas of AI usage – Top 12

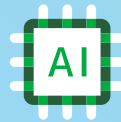


Application of AI in healthcare

Ways to apply AI directly impacting patient care and experience

AI continues to transform the healthcare industry, allowing providers to effectively deliver **intelligent, outcomes-based care**

Predictive Analytics



Predictive analytics can estimate the likelihood of future outcomes based on patterns of historical data

- Use of predictive calculators to determine appropriateness of bariatric surgery for patients

Operational Efficiencies



Automation comes for healthcare administration and delivery

- Manage claims denials and prior auth
- Scheduling, auto-populating intake forms, and managing patient records

Medical Image Analysis



Clinicians are turning to AI to help decipher large quantities of scans to better identify and treat diseases

- Eliminating the need for invasive biopsies for cancers difficult to distinguish with the human eye

Personalized Medicine



Drug manufacturers and health systems are using AI to develop treatment plans tailored to individuals

- AI to determine exact dosage of painkillers
- Nutrigenomics to create diet plans based on genetics

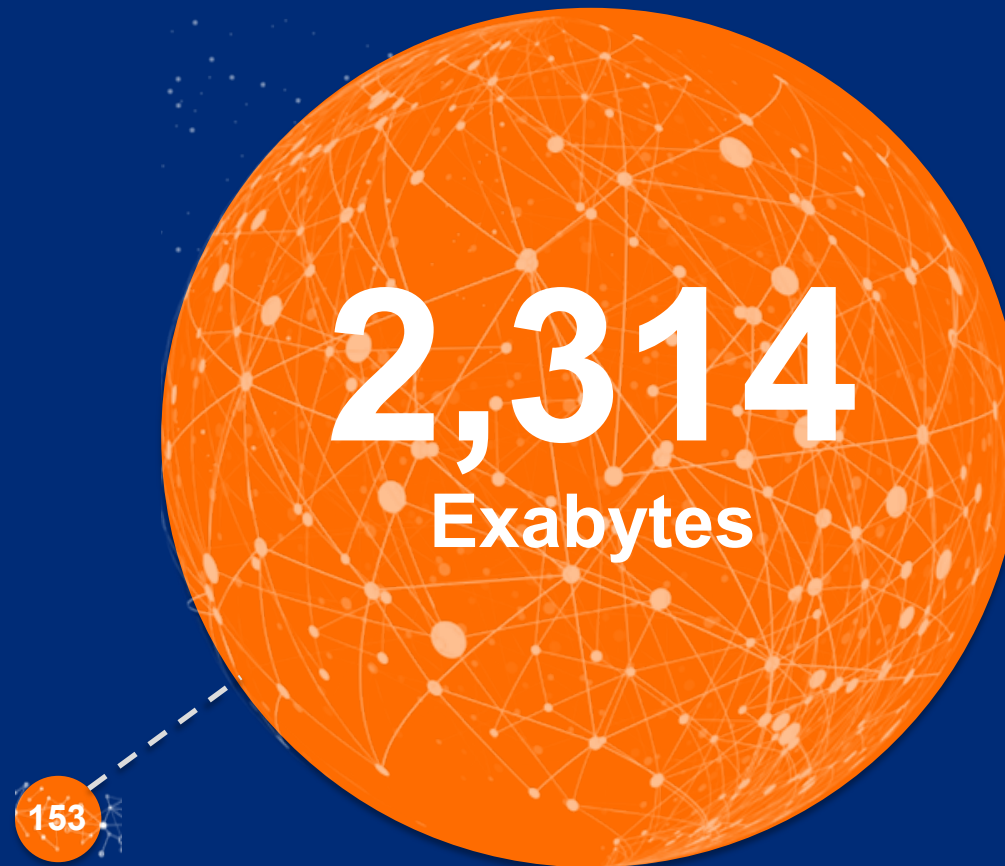


Discovery: Big data meets AI and machine learning

2

Exponential growth of healthcare data

IDC predicts healthcare data will grow from 153 Exabytes in 2013 to 2,314 Exabytes in 2020



What drives healthcare data increase?

48% annual growth of data in healthcare – fastest growing segment*



Growth of EMR adoption and digitization of records



Complex and high-frequency data in patient care



Increase in adoption of wearables and remote monitoring devices

Achieving practice-based evidence



- Lengthy research process
- Rely on research data
- Research data not always available

- Using existing structured patient data
- Quick time to patient, and to market
- Reflects the current population

Achieving real-world evidence

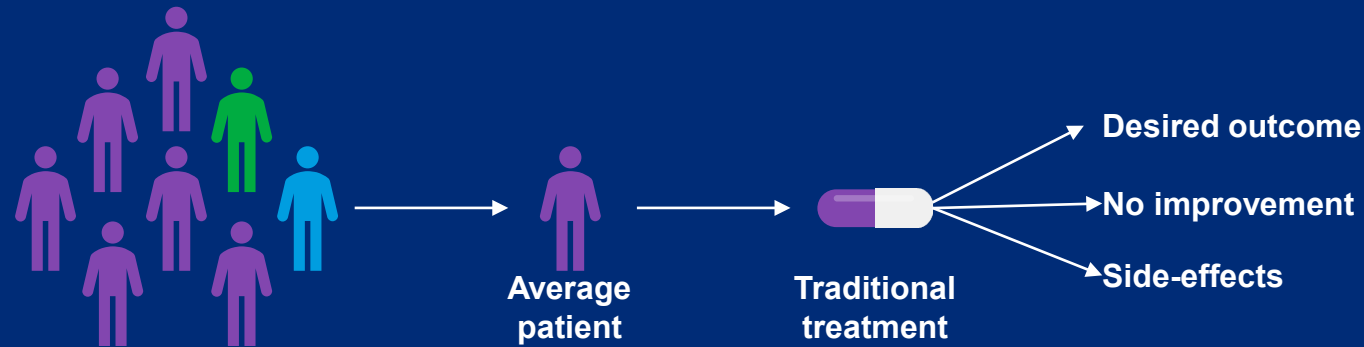


“Real world data (RWD) and real world evidence (RWE) are playing an increasing role in healthcare decisions ...

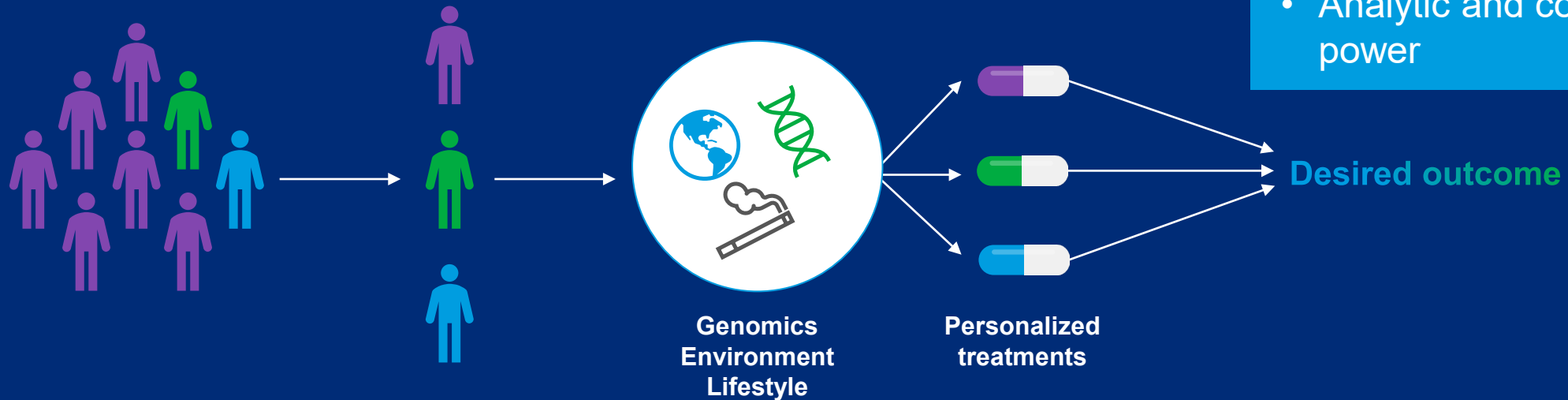
... The healthcare community is using these data to support coverage decisions and to develop guidelines and decision support tools for use in clinical practice.”

Pharmacogenomics and beyond

Specific gene or genes that determine our response to treatment



- Lots of patients
- Lots of data...Big Data
- Analytic and computing power

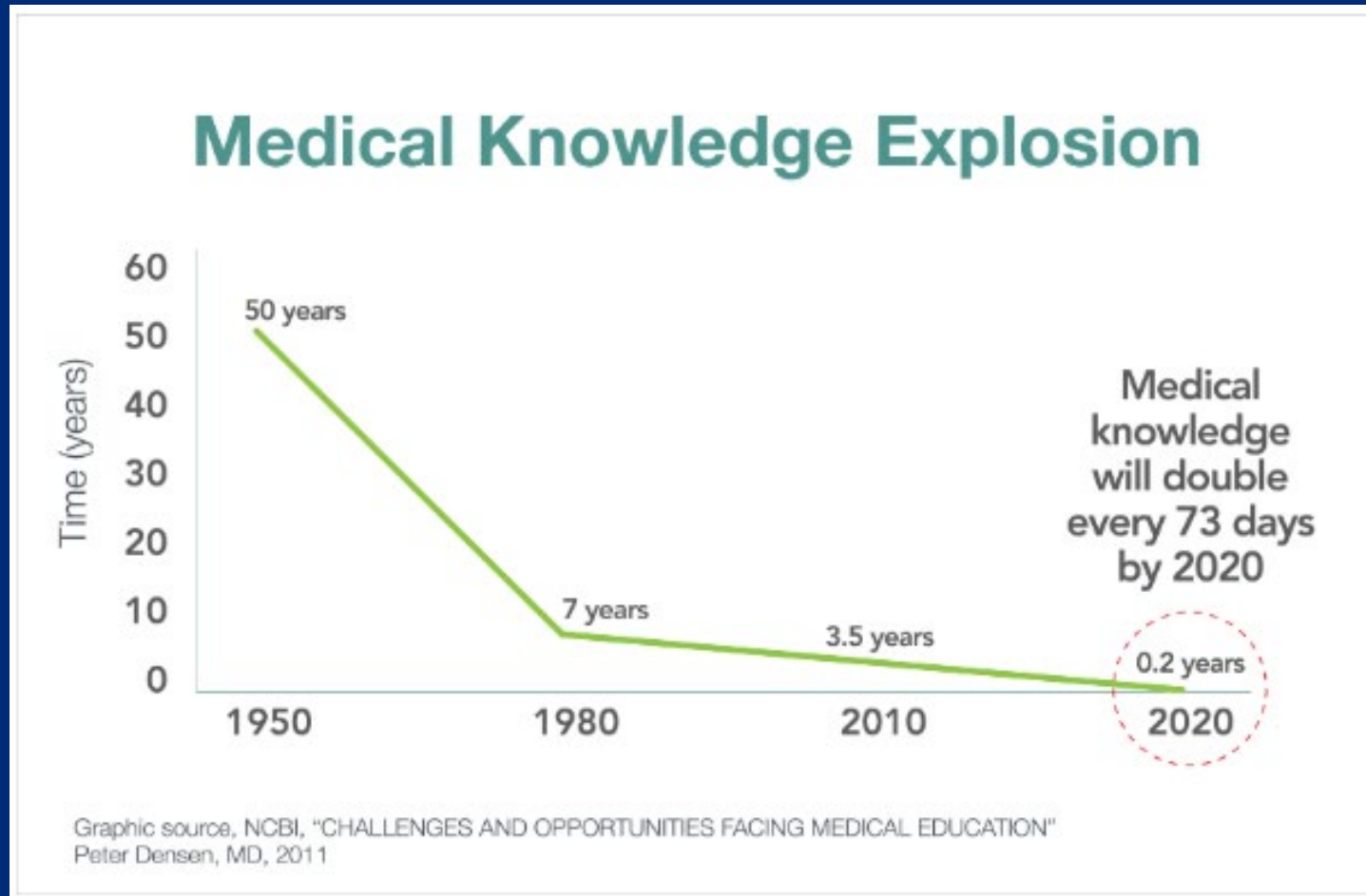


**Driving the latest
knowledge to practice**

3

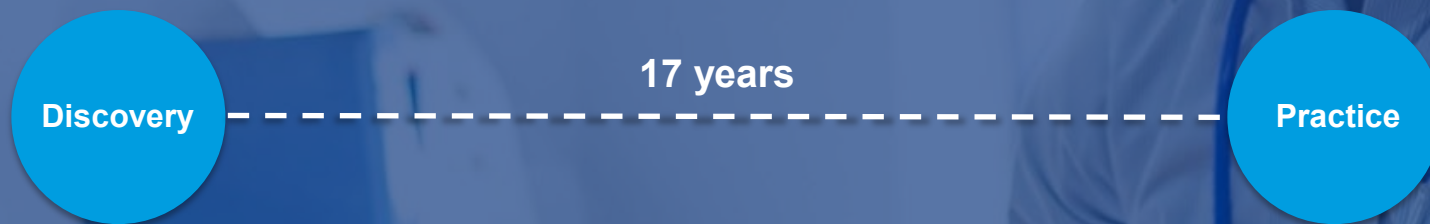
Doubling time of medical knowledge

From 1950 to 2020



Speed from discovery to practice

Yet it takes **17 years** for only **14%** of new scientific discoveries to find their way to daily practice.



Two ends of data explosion in healthcare

Adding to clinician stress and burnout...and limitations

Knowing what to know

Knowing what to do



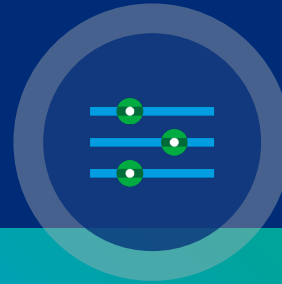
Medical knowledge

Patient data

Harnessing AI to improve clinical outcome



AI and machine learning can analyze existing patient data to study clinical data to draw new findings



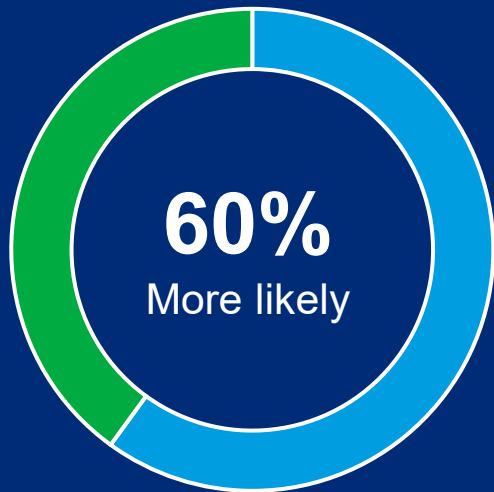
The future of clinical decision-making based on real world evidence through use of AI



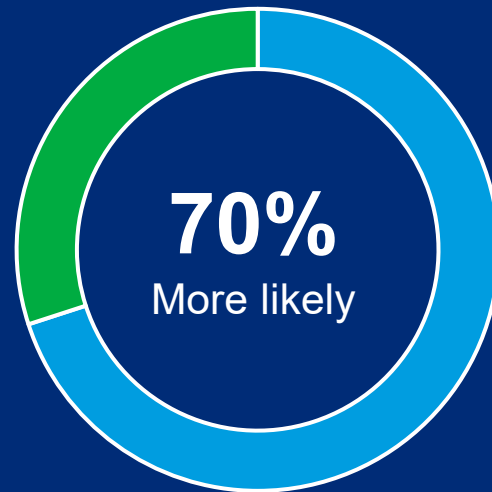
Thought leaders in clinical research suggest that EHRs should be used to lower the cost of real-world evidence and data capture into the clinical process

Common goal: Reducing care variability

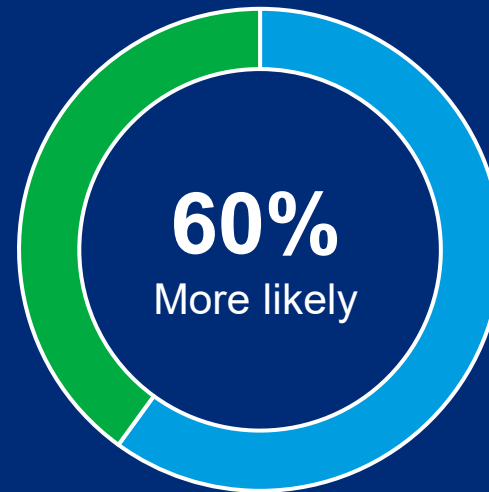
It's been proven CDS can positively reduce care variability



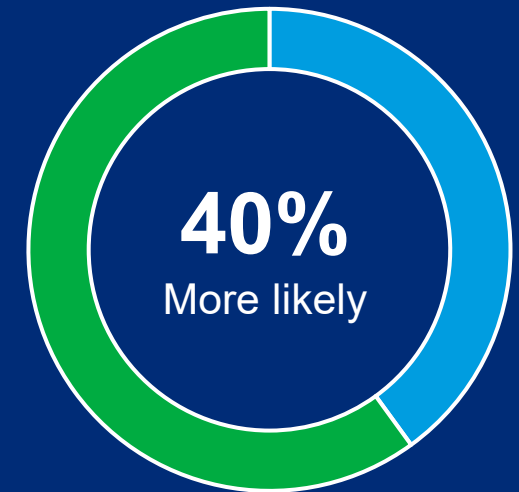
To **prescribe** the correct medicines or other therapies



To **order** the required diagnostic tests



To **monitor** drug effects in line with evidence



To take appropriate **preventative** measures

“What medications are good for NYHA II CHF in an African American woman?”

AI augmenting the clinician decision-making process

I am not a doctor, but I can provide you with some general information about medications commonly used to treat NYHA (New York Heart Association) class II congestive heart failure (CHF) in African American women. It's important to note that treatment plans should always be discussed with a qualified healthcare professional who can consider the individual's specific medical history and needs.

In general, the treatment of heart failure aims to relieve symptoms, improve quality of life, and reduce the risk of complications. The following medications are often used:

1. **Angiotensin-Converting Enzyme Inhibitors (ACE inhibitors):** Medications like lisinopril, enalapril, or ramipril are commonly prescribed for heart failure. They help dilate blood vessels, reduce the workload on the heart, and improve overall heart function. ACE inhibitors have been shown to be effective in African American patients, although they may be used with caution due to a potential risk of angioedema, a rare but serious side effect.
2. **Angiotensin II Receptor Blockers (ARBs):** If ACE inhibitors are not well-tolerated or are contraindicated, ARBs like losartan or valsartan might be considered. ARBs work in a similar way to ACE inhibitors, helping to relax blood vessels and lower blood pressure.
3. **Beta-Blockers:** Medications like carvedilol, metoprolol, or bisoprolol are often prescribed to slow down the heart rate, reduce the heart's workload, and improve its pumping efficiency. Beta-blockers are known to be effective in improving symptoms and survival in heart failure patients, including African Americans.
4. **Aldosterone Antagonists:** Drugs such as spironolactone and eplerenone can help regulate fluid balance and reduce the strain on the heart. These medications are particularly useful in cases of heart failure with reduced ejection fraction (HFrEF).
5. **Diuretics:** Water pills like furosemide or bumetanide are used to help reduce fluid retention and alleviate symptoms like swelling and shortness of breath. They can be particularly helpful in managing fluid buildup associated with heart failure.
6. **Hydralazine and Isosorbide Dinitrate:** This combination is sometimes used, especially in African American patients, to dilate blood vessels and improve blood flow. It has shown benefits in certain populations with heart failure.



Where AI can improve diagnosis

4

AI assistance in radiology

Augmented clinical decision support

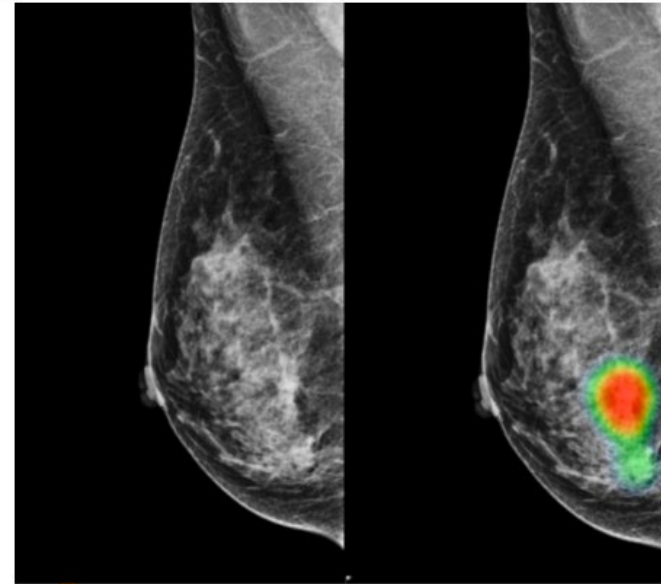
Address known limitations in radiology image analysis:

- Inter-radiologist variability
- Intra-radiologist variability
- Omission and commissions
- AI is more consistent with pixel discrimination and analysis

NEWS | ARTIFICIAL INTELLIGENCE | FEBRUARY 11, 2020

AI-assisted Radiologists Can Detect More Breast Cancer with Reduced False-positive Recall

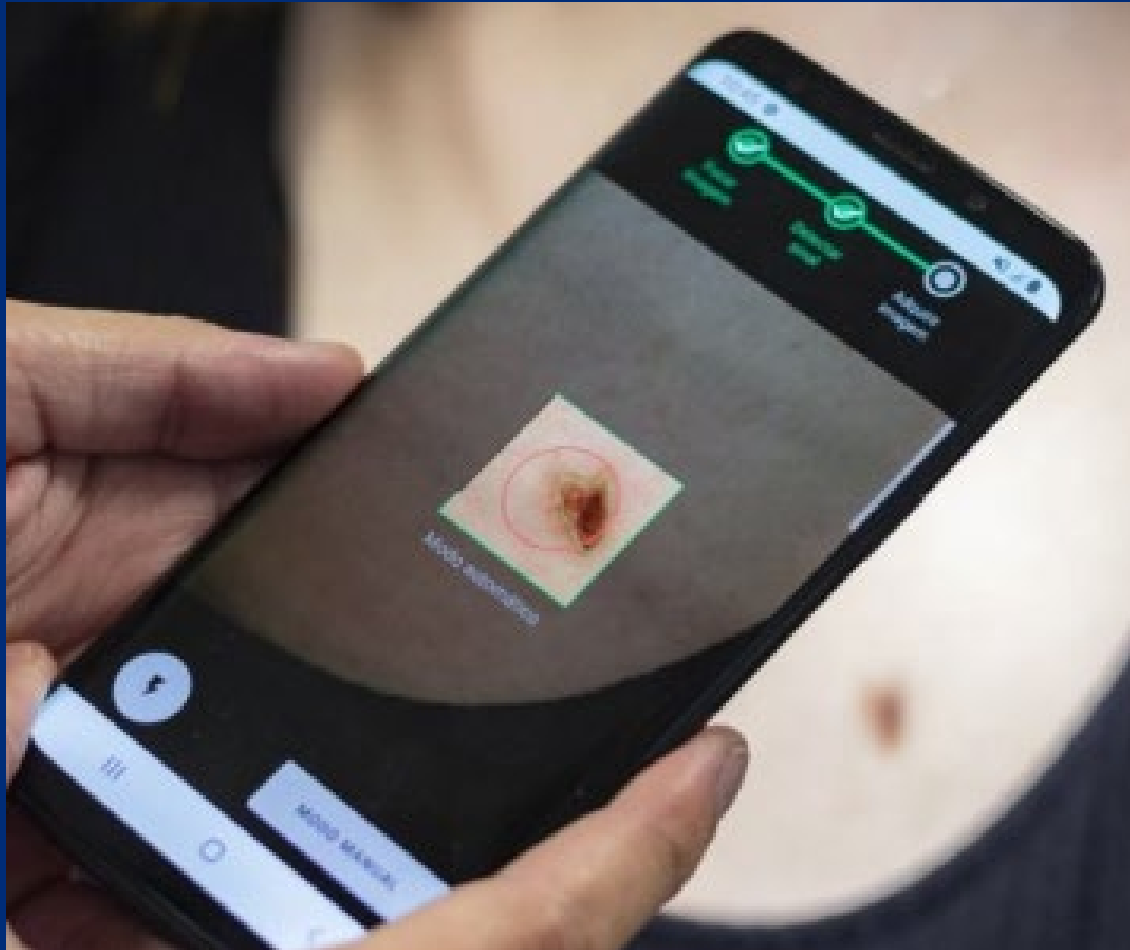
A new study published in Lancet Digital Health shows a significant improvement in the performance of radiologists, before and after using AI



Mammograms of a 49-year-old woman with invasive lobular carcinoma on the right-side breast. A small mass with micro-calcifications on the right-side breast was detected correctly by AI with an abnormality score of 96%. This case was recalled by 7 out of 14 radiologists (4 breast radiologists and 3 general radiologists) initially (without AI) and all 14 radiologists recalled this case correctly with the assistance of AI.

Dermatology

Complex image process and abnormality detection of skin cancer



- Human analog approach: 5 Dimensions (ABCDE)
 1. **A**symmetry
 2. **B**order irregularity
 3. **C**olor variegation
 4. **D**iameter size
 5. **E**volving change over time
- Digital data and AI analysis:
 - Large reference database
 - Looking for high risk features/changes
 - Ultimately, confirmation is based on biopsy and pathology analysis
 - Opportunity to put the consumer in control for timely and frequent skin analysis and earlier detection
 - Democratization of care to the masses for tracking and screening

End of memory-based medical education?

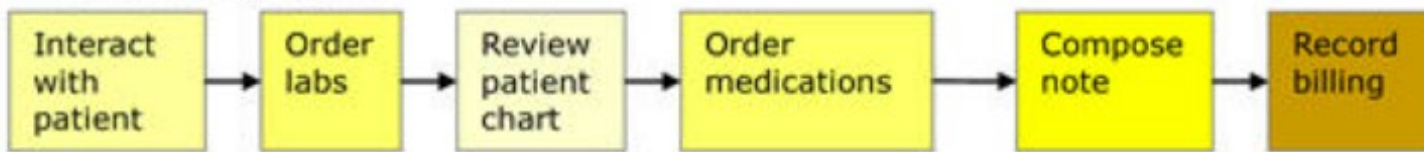
Difference between not knowing/not understanding versus not remembering

Promises — and pitfalls — of ChatGPT-assisted medicine

By Rushabh H. Doshi and [Simar Bajaj](#) Feb. 1, 2023

[Reprints](#)

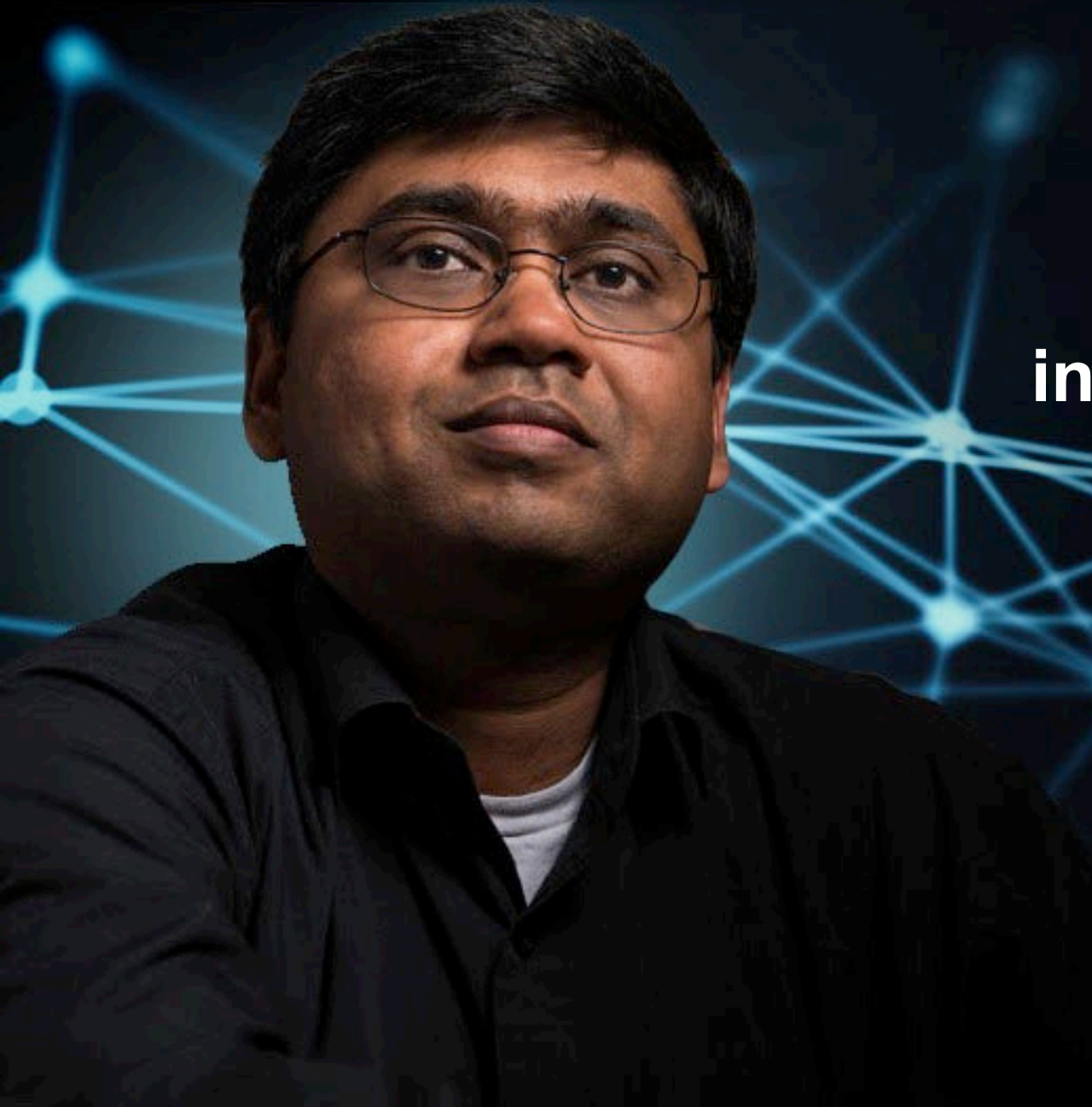




- Instead of the physician seeking out information across different EMR sections
- AI can search, retrieve and compose the relevant information in context of the clinical workflow

**Precision medicine leads
to personalized medicine**

5



“Clinical trials select only a small, artificial subset of the real population. A regular, ordinary person who walks into the doctor’s office doesn’t usually fit.”

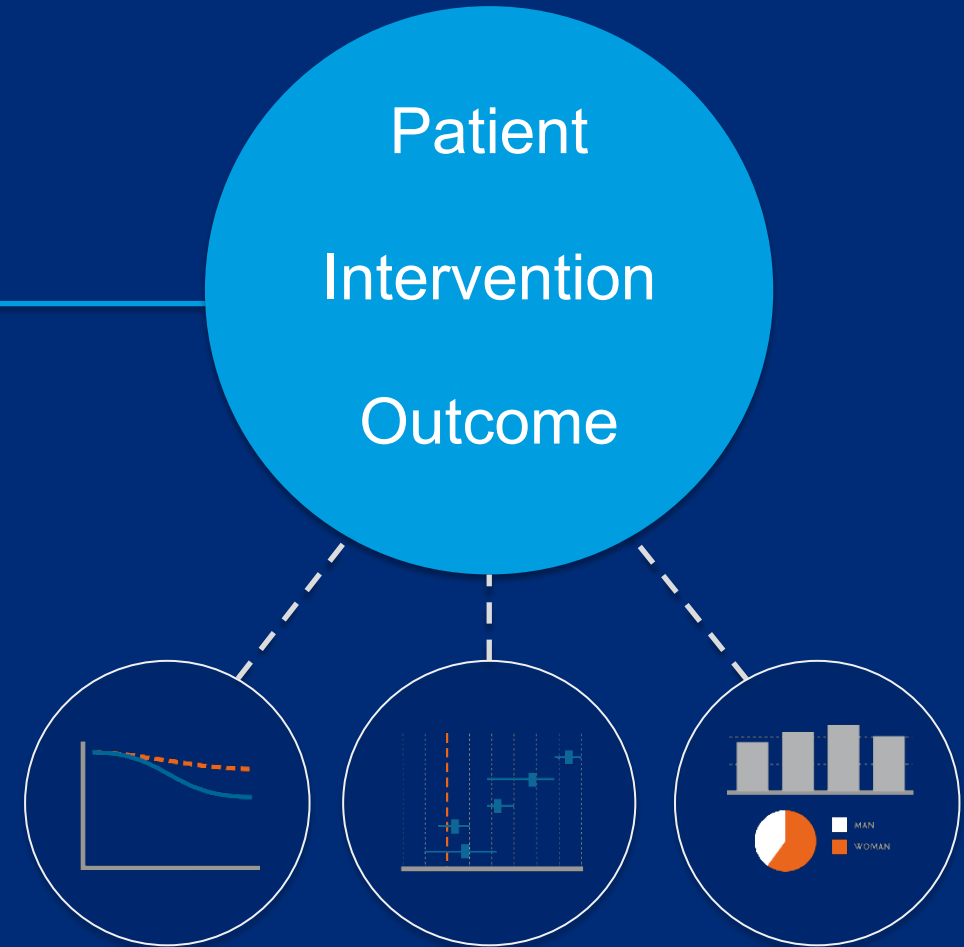
Nigam Shah, Stanford University

AI technology expedite evidence to practice

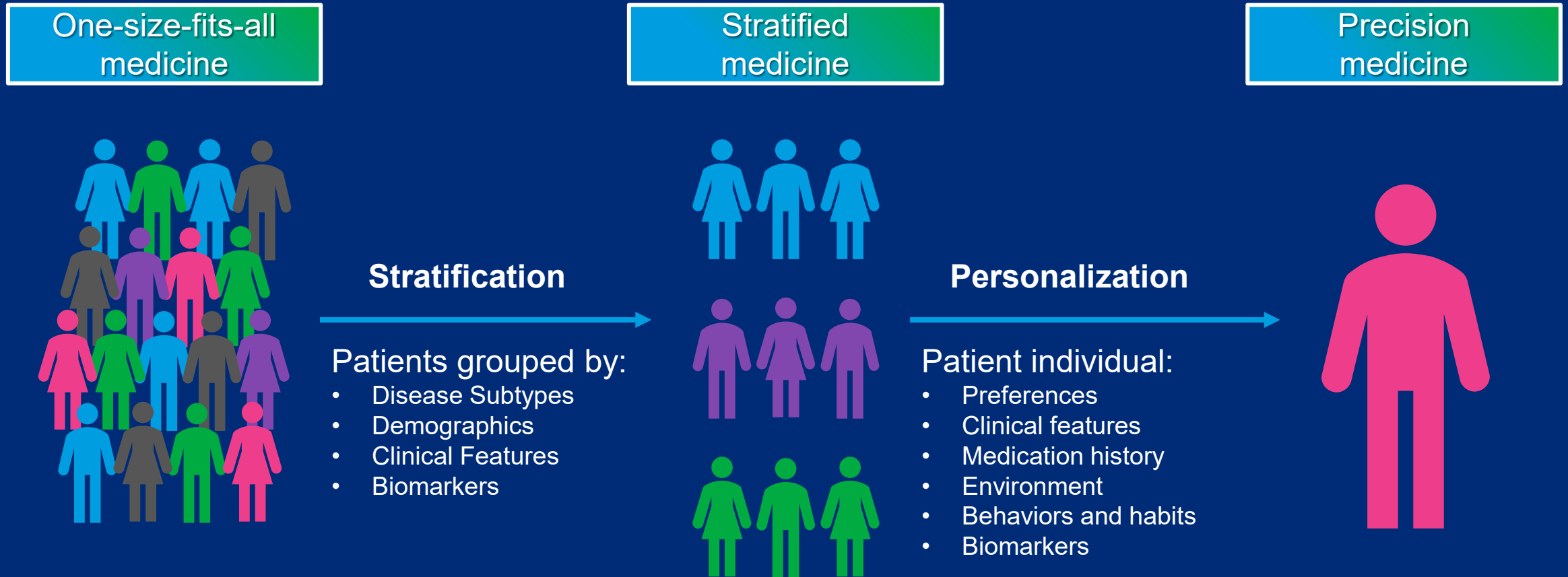
The 'green button' idea

Problem – A lot of medical care is educated guesswork

Opportunity – Decisions based on what happened to similar people

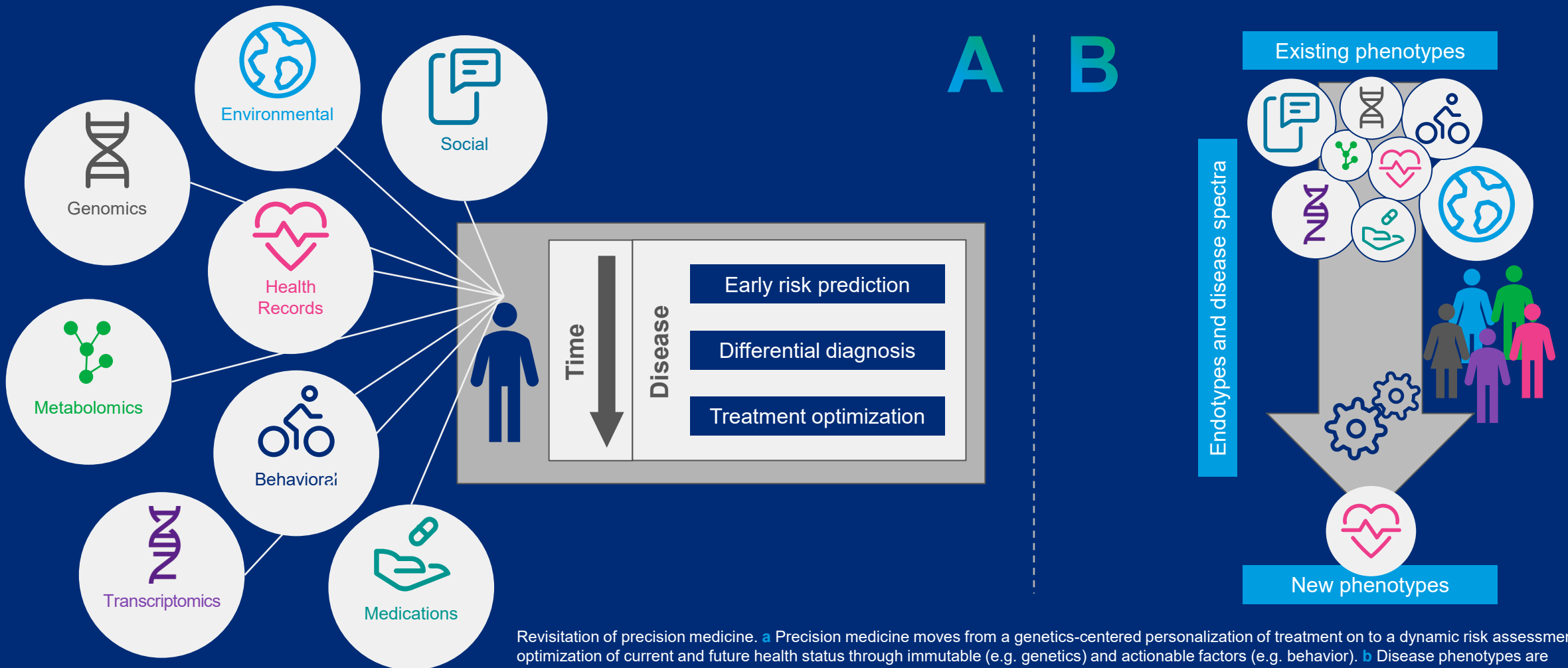


Precision medicine



Combination and permutations of factors

Highly individualized



Revisitation of precision medicine. **a** Precision medicine moves from a genetics-centered personalization of treatment on to a dynamic risk assessment and optimization of current and future health status through immutable (e.g. genetics) and actionable factors (e.g. behavior). **b** Disease phenotypes are reclassified on the basis of new system-level evidence, identifying pathophysiological endotypes associated with common, known phenotypes. The logos are trademarks of their respective companies and institutions, and their uses do not represent affiliation or endorsement

ChatGPT: Generative AI for consumers



Balanced, thoughtful replies to common queries...in seconds

“I’d like to lose weight, perhaps 10 lbs. Do you have any advice on how best to do that?”

Of course, I'd be happy to provide some advice on how to lose weight in a healthy and sustainable way. Remember, it's important to consult with a healthcare professional before making significant changes to your diet or exercise routine. Here are some general tips to help you get started:

1. **Set Realistic Goals:** Aim for a gradual and sustainable weight loss of about 1-2 pounds per week. This approach is healthier and more likely to lead to long-term success.
2. **Healthy Eating Habits:**
 - **Balanced Diet:** Focus on a well-balanced diet that includes a variety of fruits, vegetables, lean proteins, whole grains, and healthy fats.
 - **Portion Control:** Be mindful of portion sizes to avoid overeating. Using smaller plates and bowls can help with this.
 - **Limit Processed Foods:** Minimize consumption of processed foods high in added sugars, unhealthy fats, and refined carbohydrates.
3. **Stay Hydrated:** Drinking plenty of water can help control your appetite and prevent overeating.
4. **Regular Exercise:**
 - **Cardiovascular Exercise:** Engage in moderate to high-intensity cardio activities like brisk walking, jogging, cycling, or swimming to burn calories.
 - **Strength Training:** Incorporate strength training exercises to build muscle mass, which can boost your metabolism and help with weight loss.
5. **Consistency:** Establish a consistent workout routine and make it a habit to stay active on a regular basis.
6. **Sleep Well:** Aim for 7-9 hours of quality sleep per night. Poor sleep can negatively impact your weight loss efforts by affecting hormones that regulate hunger and appetite.
7. **Mindful Eating:** Pay attention to what you eat and savor each bite. Avoid eating while distracted (such as in front of the TV) to prevent overeating.
8. **Track Your Progress:** Keep a food journal or use a mobile app to track your meals, snacks, and exercise. This can help you stay accountable and identify areas for improvement.
9. **Reduce Sugar and Processed Carbs:** Cutting back on sugary foods and drinks, as well as refined carbohydrates, can help stabilize your blood sugar levels and reduce cravings....

“What about Wegovy?”

From ChatGPT

Wegovy, also known as semaglutide 2.4 mg, is a prescription medication that has been approved by the U.S. Food and Drug Administration (FDA) for chronic weight management in adults who have obesity or who are overweight and have at least one weight-related condition (such as high blood pressure, type 2 diabetes, or high cholesterol). It's a once-weekly injection that belongs to a class of medications called GLP-1 receptor agonists, originally developed to treat type 2 diabetes.

Wegovy works by mimicking the action of a hormone called GLP-1, which helps regulate appetite and food intake. It can help people feel fuller and more satisfied after eating, leading to reduced calorie consumption and, consequently, weight loss.

Here are some important points to consider if you're interested in Wegovy:

1. **Prescription Requirement:** Wegovy is available only by prescription and should be prescribed by a healthcare provider after a thorough assessment of your health, medical history, and weight loss goals.
2. **Target Population:** Wegovy is generally recommended for individuals with a body mass index (BMI) of 30 or higher, which is considered obese, or individuals with a BMI of 27 or higher with at least one weight-related condition.
3. **Medical Supervision:** It's essential to use Wegovy under the guidance and supervision of a healthcare provider. Regular check-ups and monitoring of your progress and any potential side effects are crucial.

4. **Lifestyle Changes:** Just like with other weight loss medications, lifestyle changes such as adopting a healthy diet and increasing physical activity are important components of the weight loss journey.
5. **Potential Side Effects:** Like any medication, Wegovy can have side effects. Common side effects may include nausea, vomiting, diarrhea, and constipation. Your healthcare provider will discuss potential side effects and address any concerns you might have.
6. **Long-Term Approach:** Wegovy is not a magic solution for weight loss. It's meant to be used as part of a comprehensive weight management plan that includes healthy eating and increased physical activity.
7. **Individualized Decision:** Whether or not to use Wegovy is a decision that should be made in consultation with a healthcare provider who can assess your individual situation, health status, and weight loss goals.

It's important to note that while medications like Wegovy can assist in weight loss, they are most effective when combined with lifestyle changes. Before considering any weight loss medication, consult your healthcare provider to discuss the potential benefits, risks, and appropriateness of such treatment for your specific circumstances....

“Aren’t there online clinics that will prescribe Wegovy without difficulties?”

Yes, there are online clinics and telemedicine platforms that offer prescription services for medications like Wegovy (semaglutide 2.4 mg) without requiring in-person appointments. These platforms often have licensed healthcare providers who can assess your eligibility for the medication and prescribe it if they determine it's appropriate for your situation.

However, it's important to approach these online clinics with caution and research. Here are some factors to consider if you're looking to use an online clinic to obtain a prescription for Wegovy:

1. **Legitimacy:** Ensure that the online clinic is reputable, licensed, and follows appropriate medical and legal guidelines. Check for accreditation and verify the qualifications of the healthcare providers.
2. **Medical Assessment:** A responsible online clinic should require you to provide detailed medical history and information. The healthcare provider should review this information to determine if Wegovy is suitable for you.
3. **Eligibility Criteria:** Remember that Wegovy is typically prescribed for individuals with obesity or those who are overweight with certain weight-related conditions. The online clinic should assess your eligibility based on established medical guidelines.
4. **Consultation Quality:** The consultation process should be thorough and comprehensive. The healthcare provider should discuss potential risks, benefits, and alternatives to Wegovy.
5. **Transparency:** The online clinic should be transparent about the cost of the consultation, the medication, and any potential additional fees.
6. **Privacy and Security:** Verify that the platform follows strict privacy and security standards to protect your personal and medical information.
7. **Medication Safety:** The healthcare provider should educate you about how to properly use Wegovy, its potential side effects, and what to watch out for. They should also discuss how it fits into a comprehensive weight management plan.
8. **Follow-Up:** A responsible online clinic should have a system for follow-up appointments to monitor your progress, adjust the treatment plan if necessary, and address any concerns you may have.
9. **Alternative Options:** While obtaining a prescription online may be convenient, consider discussing your weight loss goals with your primary healthcare provider first. They can provide guidance and ensure that you're making a well-informed decision....

Status (September 2023)

7

Current realities in healthcare

- **Only 6% of health systems have a generative AI strategy in place**
- **Operational priority areas of opportunities and focus:**
 1. Reduce administrative burdens
 2. Improve productivity and reduce administrative burdens
 3. Cost efficiencies
- **Clinical areas:**
 1. Clinical documentation
 2. Structuring and analyzing patient data
 3. Optimizing clinical workflow

Source: Bain&Co Brief, 2023

Thank you!

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Partner, MercerWELL, Clinical Services Physician

