

## Trends Impacting Health & Healthcare Delivery

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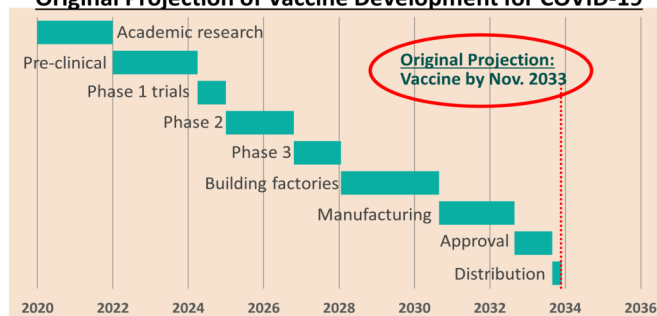
## A Look Back and A Look Forward

Recently, work by Drs. Katalin Kariko and Drew Weissman resulted in their award of the Nobel Prize in Physiology or Medicine for 2023 for their discoveries concerning the nucleoside base modifications that enabled the development of effective mRNA vaccines against COVID-19.

Their work came to the fore during the recent COVID pandemic. Many will recall the New York City epicenter which was inundated with people dying from the COVID virus. Many of the hospitals and health systems were overwhelmed with sick patients and the parking lots behind hospitals which were home to trucks of temporary morgues.

There were projections going back to April 2020 that we could have a vaccine to protect from the virus within 18 months. Some didn't believe that could happen and some even thought the date would be closer to 2033. (see graph to the right) However, the mRNA COVID vaccines began being distributed in 2020 which was an unprecedented, accelerated timeline. Two large Phase 3 randomized trials, with over 74,000 participants, demonstrated 95% reduction in symptomatic COVID. The chart below shows the rapidity with which mRNA technology came to the fore to save millions of lives.

Original Projection of Vaccine Development for COVID-19



Source: Adapted from Ground Truths, E.Topol, 2023.

Many people think the Nobel Prize awarded to Kariko and Weissman was for their invention of the mRNA vaccines. What they accomplished, though, was a monumental discovery published in 2005 in the *Journal of Immunity*. The path to mRNA vaccines took decades, beginning with Kariko's seminal work in the 1990s, together with Weissman and colleagues at the University of Penn. Technology in mRNA continues to evolve and will likely continue to be a part of new vaccine development going forward. The work that Drs. Kariko and Weissman did is testimony of the amazing contributions science has made to our healthcare. In 2021 alone an estimated 20 million lives were saved by the vaccines. (data source: collated by Our World in Data) [M](#)

### Actual Vaccine Development Timeline

DATE	MILESTONE
Dec 1, 2019	COVID-19 illness documented (unpublicized Nov 17 <sup>th</sup> )
Jan 10	SARS-CoV-2 virus sequenced
Jan 15	NIH designed mRNA vaccine in collaboration with Moderna
Mar 16	Moderna Phase 1/2 trial began
May 2	Pfizer/BioNTech Phase 1/2 trial began
Jul 14	Moderna Phase 1/2 trial published in NEJM
Jul 27, 28	Moderna and Pfizer/BioNTech Phase 3 trial began
Aug 12	Pfizer/BioNTech Phase 1/2 published in Nature
Oct 22, 27	Enrollment in both Phase 3 trials complete; >74,000 participants
Nov 9	Pfizer/BioNTech announced interim analysis efficacy > 90%
Nov 16	Moderna announced interim analysis efficacy 94.5%
Nov 18	Pfizer/BioNTech announced 95% efficacy as final result
Nov 20	1 <sup>st</sup> EUA submitted by Pfizer/BioNTech
Nov 27	Distribution of vaccine by UAL charter flights throughout US
Dec 10	FDA External review of Pfizer/BioNTech EUA
Dec 11, 2020	Phase 1a vaccination began for health care professionals*

Source: Adapted from Ground Truths, E.Topol, 2023.

\*Provisional on positive external review - pending



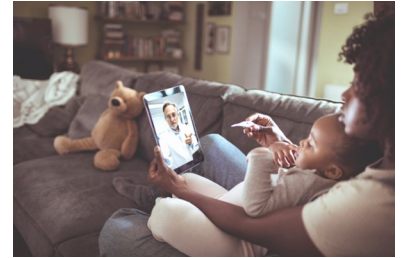
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## Controversy Over Paying for Telehealth

The COVID crisis was also noted for a significant rise in the use of telehealth, promoted in part by payment coverage for use of these technologies. During the pandemic, physicians, nurses, and other allied medical staff learned to perfect their use of telehealth and telemedicine in caring for patients. However, telehealth isn't applicable to the needs of patients in all settings or for all conditions.



As hospitals' and clinicians' in-person capacity to see patients has returned, consumer demand for telehealth visits has waned and many commercial carriers are re-evaluating their virtual health coverage. Congress continues to support telehealth and telemedicine with extensions of existing laws, but the long-term impact of telehealth usage will be dependent on insurance coverage. It should be noted that CMS recently announced that it will let stand its Medicare telehealth waiver through the end of 2024. [M](#)

## States Wrestling with the Issue of "Doctor" Title

Some states are wrestling with how people should be allowed to use the title "doctor" in caring for patients. Of note is the fact that California and Georgia have banned the use of "doctor" for advanced nurse practitioners who have earned a doctorate degree. Two other states, Indiana and Florida, have introduced bills that would ban the "doctor" title. Other states are looking at various forms of legislation along these same lines saying it is confusing to patients who assume use of the title "doctor" implies MD (Medical Doctor) or DO (Doctor of Osteopathy).

Most states currently allow clinicians (nurse practitioners) with a doctorate degree to identify themselves as "doctor" as long as they immediately clarify what their role and qualifications are. Below is a graph showing the various training qualifications between a nurse practitioner and a physician. (see *comparison chart below*) This information in no way should be misconstrued. The message is that advanced practice nurses are absolutely critical and necessary members of the healthcare team. The operative word is team and titles should NOT be misleading for patients. [M](#)

### Nurse Practitioner (NP) vs. Physician (MD or DO)

NP	COMPARE...	MD or DO
2-4 yrs. (online only programs allowed)	Length of graduate level education	4 yrs.
Not required	Yrs of Residency/Fellowship training	3-7 yrs.
500-750 hrs.	Total patient care hours	12,000-16,000 hrs.
<p><b>DID YOU KNOW. . . ?</b></p> <p>In stark contrast to physicians' education, there is no standardization around practice sites, patient population, or type of care that NP students must perform during their patient care training hours. Consequently, the level of exposure to different types of patients and illnesses is highly variable among graduating NPs.</p>		

Source: AMA "Scope of Practice: Education Matters", 2023.



## Clinician Burnout Fueled



CMS has recently announced the addition of 395 new diagnostic codes, 25 deletions from the list previously set, and 13 revisions – all these updates were implemented as of October 1, 2023. These updates come at a time when hospitals and health systems are working to address patients' social needs in a broader array of services and dealing with the issues such as staffing restraints and “burnout” for physicians and other clinical providers. Many surveys attribute the “burnout” that nurses and physicians are experiencing to the complexity and onerous data entry aspects of putting information into computer files for medical records and billing. Ironically, with the complexity of billing, it now takes a computer to decipher and code what has occurred in a transaction and many hospitals are spending a significant amount of money on outside vendors to extract dialogue from medical records to allow for appropriate billing codes resonant with the description entered by nurses and physicians in the chart.

**Takeaway:** Complexity and added computer work has been identified as a strong contributing factor to ‘burnout’ and dissatisfaction. M

## Substance Use Disorder (SUD) in Older Adults

Substance Use Disorder (SUD) is a treatable, chronic disease characterized by problematic pattern use of a substance or substances leading to serious and harmful consequences to a person's physical and mental health, relationships, and social functioning. It effects millions of Americans without regard to age, gender, race, or socio-economic status. While SUD is most common in adolescents and younger adults, research has shown that substance use and misuse is a growing health concern among older adults as well. According to the 2020 National Survey on Drug Use and Health, 40.3M Americans aged 12 or older had SUD in the past. To be diagnosed with SUD, the individual must exhibit at least 2 of the following 11 symptoms within a 12-month period.

- ♦ Losing control over drug/alcohol use
- ♦ Investing large amounts time obtaining a substance
- ♦ Feeling cravings and desire to use the substance
- ♦ Continued use despite relationship conflicts
- ♦ Taking risks such as use while driving
- ♦ Continued use despite the substance contributing to health problems
- ♦ Increasing tolerance levels – needing more of the substance to achieve desired effect
- ♦ Losing interest in activities (social, recreational, occupational)
- ♦ Experiencing withdrawal episodes when not using the substance
- ♦ Failing in attempts to stop using the substance
- ♦ Failing to meet obligations at work, school, or home M



## Paying for Complexity

Of note, hospitals and physicians are also paying millions of dollars for hidden fees to receive reimbursement from payors electronically - according to a ProPublica report of August 15, 2023. There are payors and middlemen involved in the process of billing and recording appropriate interactive codes charging as much as 5% to process electronic payments. The Affordable Care Act (ACA) required payors to offer electronic funds transfers. CMS at one time prohibited processing fees but is now reversing course. These fees extract a significant amount of revenue from medical practices as well as hospitals and health systems. This remains a point of contentious dialogue between healthcare providers, systems, and payors. **M**



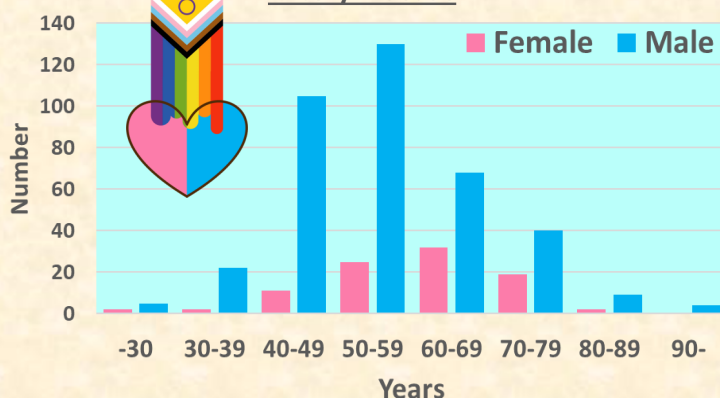
## Men Aren't the Same as Women – You Think?

In today's sometimes confusing dialogue concerning expanded use of pronouns and gender identity, it's important to realize that, from a physician's vantage point, we must know and understand the genetics of the individuals we are treating. For example, there are multiple risk factors for cardiovascular disease (CVD) that are more prevalent in women, including menopausal and pregnancy related issues.

The largest increase of CVD related deaths in women occur in the menopausal and post-menopausal periods. A reduction in estrogen is related to a higher incidence of hypertension, diabetes, dyslipidemia, and obesity and the peripartum setting CVD presentations include chronic hypertension, peripartum cardiomyopathy, gestational hypertension, and preeclampsia. These pregnancy related complications have been shown to substantially increase the risk of CVD in the short and long term. Additionally, symptoms can differ in men and women in different population groups. Treating specialists, especially for CVD, are increasingly aware of the complexity of women's cardiovascular health and significant advancements have been made, but there are many disparities between men and women in terms of timely care received and treatment outcomes and how administered medications are impacted by hormone milieu and genetic issues. These disparities are mostly apparent in certain clinical settings and syndromes. Differences between men and women in certain disease processes allow for unique presentations further complicating treatment patterns and therapies. (see graph and comparison below) **M**

Age Distribution of Patients with Coronary

Artery Disease



Source: Adapted from Sayed Al. Gender Differences in Coronary Artery Disease, Clinical Characteristics, and Angiographic Features in the Jazan Region, Saudi Arabia. Cureus. 2022 Oct 12;14(10):e30239. doi: 10.7759/cureus.30239. PMID: 36381862; PMCID: PMC9652277.


Heart Attack Symptoms:

Men

vs.

Women

The most common symptom of a heart attack for both men and women is chest pain, and other symptoms in common indicated in **BLACK** as listed here. But women may experience less obvious warning signs as indicated in **RED** below.

- 
- Nausea or vomiting
  - Jaw, neck, or back pain
  - Squeezing chest pressure or pain
  - Shortness of breath
  - Nausea or vomiting
  - Jaw, Neck, or **UPPER** back pain
  - Chest pain **BUT NOT ALWAYS**
  - Pain or pressure in the **LOWER** chest or **UPPER ABDOMEN**
  - Shortness of breath
  - **FAINTING**
  - **INDIGESTION**
  - **EXTREME FATIGUE**

Source: Adapted from Amer. Heart Assoc. News, 2023.



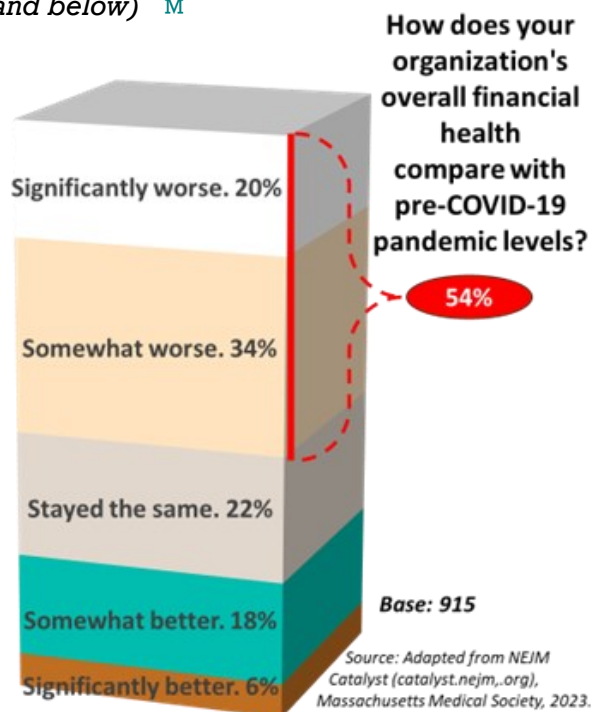
## Challenges, Challenges

Healthcare leaders today contend with many financial pressures. Growth and modernization, as well as the above-mentioned staffing issues, remain some of their major challenges. A recent report from Optum, surveying 150 healthcare leaders from the vice president level up [85% of the respondents came from C-suites of health systems, health plans, employers, life sciences organizations, and government agencies] highlights the top 15 challenges facing healthcare right now as ranked by industry decision makers. (see graphs to the left and below) [M](#)

### Top 15 Healthcare Challenges, per 150 Leaders

CHALLENGE	% MENTIONED
Growth	49%
System modernization	39%
Workforce challenges	35%
Lowering the total cost of care	34%
Data security	33%
Data and analytic insight	32%
Financial sustainability	31%
Emerging technology (tie)	29%
Reducing administrative spend (tie)	29%
Organizational agility (tie)	27%
Price transparency (tie)	27%
Evolving payment methods	23%
Changing regulatory policy	21%
New consumer expectations	20%
Improving health equity (tie)	17%
Access to care (tie)	17%
Evolving delivery methods (tie)	17%

Source: Adapted from Optum Survey, 2023.



## Cost of Physician Turnover Continues to Rise

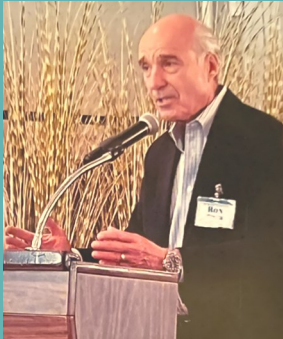
Physician turnover rates continue to increase in the setting of physician and other healthcare provider disengagement and early retirement. The Association for Advancing Physician and Provider Recruitment Report in 2022 found that 76% of physician exits from organizations were due to retirement – many were earlier retirements than anticipated. Physicians finding new roles elsewhere were also among the top reasons for turnover. Of note is the fact that losing a physician means a hospital must hire a new physician, introduce that physician, and have that physician build a patient base. On average, according to recruitment firm Merritt Hawkins, a new physician can generate \$2.4M for affiliated hospitals each year. Revenue loss from the vacancy of a physician depends on the specialty of the physician. On average it takes about 4.3 months to fill an open family medicine role and 5-10 months to fill a specialist role with the subsequent impact on finances. **The takeaway:** physician turnover is an extremely expensive event for hospitals, health systems, medical practices, and in other settings where highly trained people are needed to provide medical care. [M](#)

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## Speaking Engagements

Dr. Riner and his colleagues frequently speak at events across the U.S. The topics offer interesting perspectives on healthcare issues and trends pertaining to strategy and future opportunities for a variety of healthcare practices and healthcare businesses. Some examples of recent topics include:

- ▶ Preparing for Success: Understanding the Past to Build the Future
- ▶ The Anchors of Successful Patient Care
- ▶ Cardiovascular Service Lines of the Future
- ▶ Healthcare's Transfer of Place
- ▶ Leadership for Our Time
- ▶ Skills and Knowledge Necessary for Effective Healthcare Boards

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