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Barriers to Wellness

A more ethical alternative to curative care is technically possible but faces numerous cultural and economic challenges.



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By several measures, [Healthcare is a big deal](#): it impacts each and every one of us and our families, healthcare spending in the U.S. in 2021 was 18.3% of GDP (almost \$12,000 per citizen), and 14% of adults in the U.S. (over 46 million) earn their living from healthcare related jobs. Therefore, it is unsurprising to expect **strong resistance to any proposed changes** to care delivery with all these patients, dollars, and jobs at stake.

[The Emperor of All Maladies: A Biography of Cancer](#) [1] tells several stories of delay and obstruction in the study, treatment, and prevention of cancer by the established authorities of the time. For instance, statistical studies of cancer stalled due to surgeons controlling access to cancer patients (and thus their data); only progressing once applied to blood (leukemia), which of course had no surgical oversight. Hindsight now highlights devastating impacts of this delay, including decades-long continuation of agonizing-yet-ineffective medical treatments which persisted out of ignorance and stubborn arrogance.

We would like to believe we now practice an enlightened form of medicine, but how might today's curative care be judged in future hindsight?

Wellness Care

Today's practice of healthcare predominantly takes the form of **curative** interventions — mainly structured for **reacting** to a health situation. But this can often shift consequential decision-making to a moment of stress and time pressure, and while “healthy” (need for a reaction remains absent), individuals can “gamble” with a no-cost (no-coverage) option.

Over 40% of Americans are inadequately insured, and high medical bills cause over 60% of bankruptcies [[Zippia](#)]. As [Andy Strunk notes](#): “People with resources (medical insurance, affordable co-pays, access to care, and an available support network) likely choose treatment. Those without such resources (financial, cognitive, or familial) may delay or avoid care.”

Contrasting curative care, **Wellness Care** focuses on preventative and predictive health maintenance. The prior article, [Destination Wellness](#), sketched a vision of the techniques and technologies of this alternative approach,

seeking to highlight transformative benefits of wellness care to motivate the will to overcome political, cultural, and economic obstacles.

[Destination Wellness](#)

[Opportunity for more ethical, effective, & pragmatic healthcare.richardarthur.medium.com](#)

Biomedical Digital Twins

The article illustrates a crucial technique to enable wellness care called [digital twins](#). The digital twin notion refers to an approach to studying something in the real world by making a copy of it on a computer, which can then use apps and measured data (updated through sensors) to assess the condition of the physical thing — and even test out *what-if* predictions based on simulations.

Engineers developed these sensor-connected models for care of machinery — for example, monitoring engine oil quality to schedule maintenance based on use, rather than following a calendar schedule. Creation and use of patient-related digital twins could help plan surgeries or assess treatment options, then track recovery results against expectations.

[Destination Wellness](#) begins with a young and healthy Steve receiving a [whole-body MRI](#) [2] as part of the creation of his [physiological digital twin](#) [3]. This MRI scan maps his body into a 3-dimensional image dataset which can be used for measurements and later comparisons after an injury or symptom. For example, when Steve’s grandfather breaks a hip, an exact [personalized copy of the original hip](#) is made based on a pre-injury scan.

Having essentially no harmful side effects, using MRI (or ultrasound) for baseline scans would be non-controversial. However, bone measurements as in the hip example would be scanned today with [CT rather than MRI](#). But CT scans are used sparingly today due to exposing the patient to [ionizing radiation](#). One of the most valuable aspects of a patient digital twin is this baseline “healthy state” personalized data — making a solution to this one important technical challenge to overcome.

In January 2023, the National Academies held a workshop on [Opportunities and Challenges for Digital Twins in Biomedical Sciences](#), considering these sorts of technical opportunities and obstacles — but also observed that even if we take for granted solutions to the technical problems, significant cultural and economic barriers remain.

In present-day America, it is naïve to separate economic factors from any cultural discussion. Economics have become deeply embedded in personal identity and the ability of individuals, families, and communities to assert their own agency and dignity.

[Existential Questions on the Future of Work \(Part 1: People & Civilization\)](#)

Economic Impediments

The scale and complexity of the U.S. healthcare system almost certainly ensures the vision for wellness through patient digital twins will be available far sooner in other nations. The vastness of disruption will confine U.S. introduction to focused pilots and incremental evolution.

Financial Stakes

Repeating: [Healthcare is a big deal](#) economically, not only in the **costs**:

2021 US Healthcare costs	
\$12,300	per citizen – of that, contributions from:
\$ 2,300	paid by individuals out of pocket and to insurance premiums
\$ 2,700	paid by businesses for private insurance
\$ 7,300	paid through taxes (Medicare, Medicaid, VA, CHIP, etc.)

(Centers for Medicare & Medicaid Services: [National Health Expenditure Data](#))

(heading to **\$4 trillion per year in the U.S.**) and also as a **source of income**.

Contemporary curative care spending supports not only well-compensated physicians, surgeons, specialists, and executives — but a staggering number of households and communities. These include:

- 20 million U.S. **health care workers** with average salary of \$61,000 at 900,000 businesses [[Zipppia](#)],
- the salaries to 560,000 **health insurance administration employees**, investors relying on returns from **pension and private equity funds** whose portfolios include [for-profit health care](#) companies.

Therefore, beyond the potential benefits of wellness care to patients, any disruption to the structure of care delivery represents substantial risk and uncertainty to the financial stability of numerous regular folks (motivated to vote accordingly!) Change must be implemented prudently, and afford meticulous attention to wider economic impacts.

(Watch also): politically-balanced comparison of [universal healthcare and the U.S. system](#).

As competitive performance and wealth-generation obligations impinge upon budget margins, providers must set **risk-adjusted prices** to account for factors *additional to the base costs of healthcare delivery* including:

1. overhead of complex billing (and inconsistencies between insurers)
2. return on investment (ROI) profit targets set by shareholders / owners
3. salaries and incentives for administrators and executives
4. collections services and write-offs for non-payment / bankruptcies
5. fraud and malware data ransom payments
6. malpractice insurance & legal fees
7. mismatches in fee-for-service rates vs. target profit margins

While #1-#6 disappear into pricing overheads, #7 will vary procedure-to-procedure. Patients will commonly encounter prohibitively expensive costs for diagnostics and therapeutics considered *unproven* (to the insurer) or *elective* (at the patient's discretion). Therefore, shifts in care delivery will be very sensitive to acceptance and categorization by insurers.

Reimbursement

For those with abundant disposable income, healthcare in the U.S. offers unparalleled quality and options — with timely access as well. There also exist health plans providing generous caps and co-pays, often available to members of strong labor unions (*perhaps the one financial break we afford teachers!*) But far more commonly, insurer obligations only kick in after families reach deductible thresholds — and even then are still only partial.

A **reimbursement rate** is set by the insurer, presuming the appropriate pricing by the provider — and where these match, the patient is well-served. Otherwise, patients pay the gap between what insurers agree to reimburse and what providers decide to charge. So most “consumers of healthcare” bear payment responsibilities that are highly sensitive to results of negotiations between providers and insurers.

([YouTube video](#) From [Ashley Hodgson](#). See also [HHS report](#)[4].)

While reimbursement rates do evolve over time, they are grounded in **historical** data and **proven** outcomes, and therefore **lag covering new discoveries and innovations in care**.

As a novel innovation in health care by its nature, patient and biomedical digital twins will be particularly vulnerable to this financial obstacle. Let's focus on the very specific example of gathering “healthy state” data and scans — essential to initializing the *personal baseline* of wellness that is then subsequently managed.

Collecting these data carry a significant cost and draw on resources (like radiology labs) for which there may well be an existing and even untenable backlog. But even assuming these people and equipment are available, their costs represent the first hurdle.

Today, these baseline scans fall into the *non-reimbursable* category, and carry the label “[vanity scans](#)” — an *elective* procedure accessed mainly by affluent patients (example: [Prenuvo](#)).

Providers will rationally and responsibly bias options presented to patients based on the patient's insurer's reimbursement agreements and the out-of-pocket burden that will result. This may not present the most favorable or contemporary care for individual cases, and certainly not "vanity" options.

Informed and aggressive patients can push on the system to access such care, but may end up with crippling debt, mortgaging their homes or spending their retirements. (*This financial dynamic alone illustrates the abnormality of healthcare-as-a-market, departing from conventional market supply and demand behaviors.*)

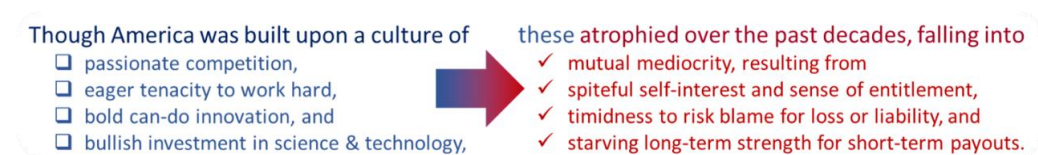
Bottom-line, systemically, patients have diminished insight and limited control over services and costs in the absence of competitive pricing transparency, when accepting services under duress of impairment and/or urgency, and the resignation from learned experience of their opaque final reimbursement of out-of-pocket costs only settling long after care delivery.

Creating change for the better while navigating economic barriers has been addressed in the past through political leadership, will, and vision.

Culture of Mediocrity

Americans hold strong conviction in a cultural identity building upon passionate competition, eager tenacity to work hard, bold can-do innovation, and bullish investment in science & technology.

But over recent decades these have atrophied in comparison to growing sense of entitlement, spiteful self-interest, timidity to risk blame for loss or liability, and starvation of long-term strength to feed all the above in short-term payouts. The result of this shift is a state of mutual mediocrity.



Individuals and institutions with the vision and will to lead struggle against [mercenary financial preoccupation](#) with shareholder returns, [adversarial legalism](#)^[5] and [negativity bias](#) in the public discourse of (mass and social) media. These fuel cynical political behaviors rewarding [avoidance of blame](#) and the fomenting of blame-liability upon rivals, while waging ideological battles ahead compromises to act in serving their constituents' interests.

Timid to Risk

I've examined the topic of blame avoidant behaviors in more detail in [Irresponsible Caution](#) and the topic of financialization of institutions in [The Future of Work: Institutions & Economics](#).

[Irresponsible Caution](#)

[Incentives that reduce value, waste time, & weaponize risk](#)richardarthur.medium.com

The articles consider results of systemic (dis)incentives and behaviors, which in the context of barriers to wellness, include:

- *practice of defensive medicine* — which leads to intentional opacity, formulaic conformation to norms, redundant testing and consultation, guarded medical record annotation, radical risk avoidance unless by channeling through specialists, and shifting aggressiveness based upon gaming potential exposure to malpractice litigation-in-hindsight,
- *practice of risk-adjusted profit-driven medicine* — with incentives toward procedures with coding favorable to lucrative reimbursement, and establishing corresponding practitioner metrics (patient throughput, compliance to norms, conservative testing and release, etc.)

Additionally, *protecting patient privacy* — from HIPAA (US) to GDPR (EU), creates liability for potentially leaking identifiable patient data (and adds associated overhead and costs to manage the sensitive data). Though well-

meaning, such protections can also hinder gathering valuable data in benign cases, such as where family history would be relevant to treatment of a genetic relative — and calibrating those patient digital twins [8][9]. Risk also provides logical camouflage to simply avoid having to change.

Obstinate to Change

Layered on top of *risk* are entrenched expectations of incumbents holding control and influence over the practice and delivery of health services. Physicians, specialists, and surgeons have invested deeply in legacy training and certifications to enjoy both respect for their professional authority and the correspondingly generous financial compensation from the contemporary system for providing interventional curative care.

[The Future of the Professions](#) frames how technological advances compel re-assessment of conventional norms for credentialing, work hours, scope of responsibility, and practitioner knowledge of tools and methods — including medical professionals[6].

Wellness care delivery poses potential disruption to traditional roles, responsibilities, requisite knowledge and training, work hours and staffing, and even the nature of the relationship between patient and physician. For example, providing what [Geeta Nayyar, MD MBA](#) calls “[Dr. Mom](#)” with greater visibility into long-term prognoses and costs in the process of decision-making through patient digital twins, calibrated through data in expanding participant populations with wearable-collected data.

Contemporary practice of medicine in the US hedges against exposure to malpractice (Google: *failure to treat*), compelling patient guidance toward additional tests, and on to specialists and aggressive treatment, [particularly in end-of-life contexts](#). Any data-rich diagnostic may thereby set events into motion raising anxiety and costs through enhanced medical treatment. The healthy state whole-body scans on which to base a patient digital twin are such opportunities for [incidental findings](#) [7]. The website for the [Prenuvo](#) service cited above specifically calls out numerous potential findings. Can our medico-legal litigation precedent tolerate variance from established standard operating protocols?

[Extreme application of protocols, Standard Operating Procedures, the impending struggle in medical...](#)

Yet, Change

Despite all this, change is underway. Visionaries such as [Tina Morrison](#) have advanced the adoption of in-silico methods at the US FDA [10]. Data and encoding knowledge into computational models, wearable sensors, digital twins of pathogens, populations, and the environment, etc. offer opportunities to transform the clarity with which we assess and treat health conditions. At the National Cancer Institute, advocates like [Emily Greenspan](#) and [Eric Stahlberg](#) pursue oncology digital twins, connecting with biomedical twin efforts such as in the [EU](#).

*Always hopeful, yet discontent
He knows changes aren't permanent,
But change is — Rush (Tom Sawyer, 1981)*

See also presentation given at BioITWorld 2023: [Biomedical Digital Twins, Perspective from Industry](#), which includes numerous questions posed for consideration to those with the courage and conviction to make this vision come to be.

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