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Complexity as a Problem in Healthcare

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ABSTRACT

The American healthcare system is complex. It has multilayered federal, state, and private regulations which have to be handled by its stakeholders. The paper aims to introduce the idea that complexity in itself can be a problem that needs to be recognized, and that complexity cannot be infinitely increased without causing harm.

This paper examines the perspectives of patients, lawmakers, physicians, and hospitals. It introduces the issue of complexity based on examples that highlight how each group at times falls short to implement, understand, or manage the system's complex rules and structure.

The human body is complex, and medicine needs to be individualized, so the solution to complexity is not simplicity, but the understanding that many rules and solutions that may solve one problem may make the whole system less adaptable and efficient. Thus, to improve access and outcomes, the complexity of healthcare systems must be managed.

Key Words: Healthcare, Complexity, Literacy, Prior authorization, Billing, Formularies

Highlights

- Complexity in healthcare burdens all healthcare stakeholders
- Patients struggle with navigating insurance coverages and options
- Administrative burdens delay treatments and increase inefficiency
- Managing complexity is vital for fair, adaptable, and equitable healthcare

INTRODUCTION

While Occam's Razor states that the simpler explanation should always be preferred to the complex, this may not apply to the American healthcare system which tends towards complexity. Cost control, regulations, and administrative and contractual solutions have made the healthcare system more complex, and this complexity has created its own kind of harm to patients. Ultimately, the complexity makes the system less predictable and more unjust.

The American health industry makes up about 17% of the gross national product [1] and serves a population of 320 million Americans through a combination of public and private health services. It is organized on a federal, state and private level, [2] each level with its own regulations. Such a large system cannot be simple. In addition, about 8% of the US population is uninsured and largely struggles to access the healthcare system. [3] Complicated regulations have to assure that these patients get access to both emergency and public health services, albeit minimal, without bankrupting the system.

The American healthcare system spends in total and proportionally significantly more than any comparable healthcare systems on administration, [4] and 60% of insured patients experience problems when they use their insurance. [5] While the burden of healthcare costs and their adverse influence on health is widely appreciated, the administrative burden for patients creates barriers on a similar level. [6]

This paper looks at the complexity of the healthcare system as a problem to be considered when decisions about regulation are made. We examine the perspectives of patients, lawmakers, physicians, and hospitals and show how all players are at times overwhelmed by the complexity of the system.

Patients

Literacy

In order to make informed choices, patients have to understand the options that are available. They have to weigh cost factors against questions of convenience, or accessibility. However, roughly 30% of adults in the US do not have the numeracy skills to develop a household budget or compare the prices of goods and services. [7] Similarly, more than 20% of adults cannot understand texts if that means to compare and contrast information, paraphrasing it, or making low-level inferences based on the texts. [8] Patients above the age of 60 perform even worse. [9] 71% had difficulty in using print materials, 80% using documents such as forms or charts, and 68% struggle to interpret numbers and do calculations]. [9] It is on this background that information about the complexity of patient choices should be interpreted. [10]

Medicare choices

The average Medicare recipient has to choose between sixty Medicare plans. Those who only want medication coverage through part D, the prescription drug benefit, must choose between twenty-four part D plans with premiums ranging from $6-111 per month. [11] While the optimal choice should be determined based on the medications one takes, there is little clarity on how to choose based on diseases one does not yet have.

Those who travel less and do not need nationwide coverage may choose one of the 43 Medicare Advantage plans that are available on average. In 27 US counties, the elderly population can choose between 75 Medicare Advantage plans or more–most of them with varying networks and drug coverage options; yet in 40 US counties, there are none. Even dementia patients are faced with making a choice between Medicare Advantage plans of two different companies [12] but may be fraudulently offered other plans. [13] It is not surprising that this plethora of limiting options is confusing, and as a result, patients lose access to their primary care physicians. [13,14] However, patients are reluctant to change plans, and this willingness declines with age as healthcare costs and morbidity increase. [15] It is clear that patients are overwhelmed by the complexity of the system, especially when they are sick. In 2009, about 1 in 20 patients chose the cheapest plan Medicare part D plan. [16] Since even cancer medication costs vary significantly between plans, it is not even theoretically clear how an optimal decision could be made if the diagnosis is not known when the plan has to be chosen. [17] Older patients substantially underutilize resources that are meant for them, so one way to improve the health of elderly adults is to reduce the administrative burden[18] and to reduce complexity.

Commercial insurance

Private insurance options are less restricted than those of a government program like Medicare. Regularly insured patients in Houston may choose “Oscar”, a qualified health plan with over 66 networks to choose from. However, this plan only covered 9 of 56 hospitals in the area within a 25-mile radius. Choosing the right plan when healthy is not easy, [19] but when sick the information for doctors in the network may not be reliable. A survey in California found that of a sample of 707 primary care providers, about 10% were either not part of their listed insurance plan anymore, or had never been. For 30% (range 16%-43%), the

specialty given in the information of the plan could not be confirmed by the receptionist of the office. [20] Calling insurance companies for help can be futile. Blue Cross Advantage Plans often have more than fifty plans within fifty miles. Recently, an insurance agent mixed up the University of Chicago and University of Illinois at Chicago hospitals, further in the conversation when , she was not able to identify network status of a particular physician and suggested to join a network to find out whether this physician was a part of it. [14] Given prevalence of poor record keeping by insurances in-network services can easily be charged as out-of-network. [14] To further complicate things, patients may encounter out-of-network physicians at in-network hospitals, and have no way to foresee this.

This lack of transparency and complexity when choosing an insurance network is magnified when healthcare costs are supposed to be anticipated or compared by patients. In practice comparison or anticipation is illusionary for any aspect of the healthcare journey.

Loss of Coverage

Denial of care and unexpected loss of coverage are other problems that patients face. Medicare Advantage participants often are denied care, but they have the ability to appeal. In 2021, those who appealed had their denial reversed 82% of the time, according to a Kaiser Family Foundation (KFF) analysis. This high rate of denials seems inconsequential if reversed, however, only 11% of beneficiaries filed appeals. [21] Thus, in reality, these erroneous decisions are not reversed. Coverage rules are often not enforced and thus unpredictable. A report from the inspector general's office determed that one in eight services denied by Advantage plans met Medicare coverage rules [21] Patients with commercial insurance have similar problems, and would like more – and more easily available - information. [5]

Lawmakers

Like the administrative framework for healthcare, federal and state regulations are complex. Some additional complexity is reactionary and a response to adverse events that are observed and need to be rectified – whether it is the COVID epidemic, increasing costs, or the need to provide certain health benefits for reasonable costs. Some of the complexity is the result of political realities. Willbur Mill's "three layered cake" split Medicare A and B into arbitrary categories and separated the care for the indigent – Medicaid – out. [22] Financing was different for all initial three parts. Now, there are five parts and they can exist in different combinations. Needless to say, frictions exist between these parts, and due to the state component of Medicaid, there are virtually 50 different setups with different regulations, all held loosely together by the Center for Medicare and Medicaid Services (CMS).

Ineffective Regulations and Misplaced Benefits

Some laws are hyper specialized solutions to broader problems. They create injustices and intricacies that can only historically be understood. The wait time for Medicare benefits is too long for those who have terminal disease. However, only patients with end stage renal disease – who reasonably need urgent dialysis for survival - and incomprehensibly Amyotrophic Lateral Sclerosis (ALS) are exempt from the wait time, even though there are a plethora of similar clinical diseases, or situations that are appropriate justification to reduce wait times for Medicare. [23]

Other laws are too broad and cause unintended consequences. The CMS anti-kickback statute is necessary to avoid abuse of health insurance coverage, but the statue was written so broadly that Congress and CMS had to create a variety of safe harbor rules to reign in a statute that has harmed patients and continues to confuse administrators. [14,24,25]

Unintended consequences

New rules may uncover complexities that were not obvious and cause downstream unwanted effects.

In the 1980s, significant reductions in federal and state funding for medical care along with the introduction of diagnosis-related groups (DRGs) limited the ability of hospitals to subsidize unreimbursed care. To control costs "patient dumping" of primarily uninsured patients to public hospitals increased significantly with considerable morbidity and mortality. [26] A prospective study in the Illinois Department of Public Aid found that 87% of these patients lacked insurance and 89% were black or Hispanic. [26] Caught off guard by the unintended consequences of cost-control and to protect severely ill ER patients from being transferred, Congress enacted the 1986 EMTALA law. [27]

Drug prices have always been a problem for public payers. In 1990, Congress created the Medicaid Drug Rebate Program through the Omnibus Budget Reconciliation Act (OBRA), to assure that Medicaid received the best prices for its services. Prices expectedly decreased, but public hospitals had received high rebates before and those became a liability and as a consequence public hospital drug prices increased. Congress rectified the problem by adding the 340b program in 1992 to guarantee eligible hospitals reduced prices. [28]

In 2023, Medicare ended a policy that had limited immunosuppression coverage after kidney transplantation to 36 months for certain Medicare enrollees. The policy led to organ loss due to rejection in patients who could not afford the immunosuppressants. [23] The shortsighted savings of not covering these patients' medications ultimately led to millions of dollars of labor, overhead, and treatment costs.

Overly simple solutions

Sometimes administratively simple solutions lead to unintended further consequences. Congress created the Medicare Part D Drug Benefits program in 2003. They delineated drug benefits based on two national compendia (the American Hospital Formulary Service (AFHS) and the DRUGDEX Information System) to find a simple and generous solution without a new bureaucracy. However, the databases are deficient, in that they lack up to date information on many conditions – as a consequence, patients with these conditions have no approvable treatment under Medicare. This became obvious quickly for oncology – and a patch was created, but there was no patch for rheumatology, transplantation medicine or dermatology. A dermatology cross-sectional study found that of 238 treatments, only 73 were found in either compendia and >50% of individual diseases only had one or fewer treatment listed. [29]

Physicians

A combination of individualized contractual agreements, and lack of transparency of American healthcare makes it virtually impossible for physicians to anticipate the costs of treatment for the patients . An infinite variety of cost-sharing models, with differing deductibles, co-pays, co-insurance and premiums, along with the complexities outlined below, reduces clarity for physicians and their patients.

Prior Authorization (PA) and Documentation

Prior authorization (PA) is a cost-saving and needed measure used by insurance companies to avoid unnecessary procedures, or expensive medications. However, this comes at the cost of treatment delays and significant administrative burden to physicians and clinical staff. As a consequence of the variety of medication formularies, it is often practically unpredictable whether a medication can reach a patient. A 2006 paper estimates that the healthcare team, including physicians, nursing staff, and administrative personnel spend about 20 hours a week fulfilling PA requirements. [30] Specific documentation requirements before starting a medication are often stringent, time consuming and vary over time and between insurances. Online formularies, such as Medicaid Preferred Drug Lists, frequently omit dosage information, or details of the drug. One study reported that patients with complex dermatologic conditions had a median delay of 12 days in accessing treatment due to PA. [30]

Formularies

As mentioned above, physicians frequently cannot know which treatment does not need prior authorization. The choice of preferred super potent topical steroids which are used to avoid systemic treatment, particularly in the elderly, vary between Medicare preferred provider organizations. [31] As a consequence prescribing the right drug becomes a guessing game, the three main drugs cannot be prescribed simultaneously to assure that the covered drug is available for the patient at the pharmacy.

Biologics are a specific treatment that need prior authorization and have to be prescribed only through specialty pharmacies. Even when the hurdles for documentation, the preferred specialty pharmacy of the insurer and the choice of the drug have been cleared, it is difficult to simply order them through the electronic health record. Even ordering the medications that have been approved for a specific form is not without problems. One hospital has 32 versions of adalimumab available to orders, but the preferred and approved drug can only be found under its brand name Humira which has another 14 options to choose from that do not come up on the adalimumab list. [14] The pharmacists use National Drug Codes to clearly identify the drug, the orders for physicians are variably named as kits and thus the simple ordering process becomes a game of trial and error.

Laboratory Testing

Each insurance network has different "preferred" laboratories which the patients should use to to minimize their costs. **(Table 1)** However, the same insurance carrier may prefer different laboratories for different tests, such as pathology and blood chemistry. In addition, each insurer or payor carries dozens of patient insurance plans each with unique preferred laboratories. Sending samples to non-preferred laboratories can result in denied claims or higher out-of-pocket costs for patients, which are unclear to both patients and physicians. Physicians may presume that patients can assist in identifying their preferred labs, but increasingly this is not the case. **(Table 1)** below lists the laboratories available for different health plans for a major health system. Even with the correct laboratory identified, it highlights that for many plans, such as General Plan #4, providers are instructed to call in advance of specimen collection to clarify potential prior authorization requirements. Ultimately, the numerous combinations of insurance plans and preferred laboratories adds an additional level of complexity physicians must navigate and generates errors, delays and costs.

Hospitals

Audit systems

While audit processes are complex, costly, and need specialized personnel, they are in theory transparent, though occasionally practically incomprehensible – ie not understood by the staff hired to manage them.

A reliable quality of healthcare, avoidance of errors, and compliance with national and local regulation serves as the basis for trust of any healthcare system. The Joint Commission is the pivotal accreditation agency focusing this effort. It is a non-profit organization that is the premier source of government and private accreditation for healthcare systems. It serves as the key- metric of quality assurance for hospital and private networks. Through surveys at the minimum of every

thirty-six months, and quality checks through data submission every three months, the Joint Commission aims to monitor and bolster patient safety and quality of care. Currently, the accreditation standards number more than 250, but there are concerns that new standards were added yearly without any clinical merit or regulatory source. [32,33] The Joint Commission it is a non-profit organization, with a staff of around ~1000 that it employs. It seems that the Joint Commission created new standards that can be monitored, but many of them have no obvious clinical merit or regulatory or scientific source. [33] The Commission itself acknowledged this issue when it removed 168 accreditation standards beyond the scope of CMS regulations, and vouched to continue to thin out its sprawling set of rules. [32] How many more regulations could be safely removed is disputed. [33]

DSH payments and lack of guidance

Disproportionate Share Hospitals (DSH) are those which service large numbers of Medicare and uninsured patients. DSH adjustment payments were created to offset reduced income in these populations. [34] Which hospitals qualify for these adjustments is not clear. There are two different formulas for assessing DSH adjustment eligibility, based on the total social security income (SSI) patient days, Medicare patient days, and non-Medicare patient days. Another formula must be used to calculate how much of an adjustment an eligible DSH is entitled to. [34] These obscure rules have led to several legal battles between hospital systems and the U.S. government, over how much money they are entitled to. In 2014, the Department of Health and Human Services (HHS) implemented DSH payment cuts which reduced payments to hospitals by $4 billion dollars. The hospitals sued until it reached the Supreme Court. The Supreme Court ultimately sided (7-1) against the HSS in 2018. [35] In 2021 the hospitals learned about a the fate of payment cuts that had been made 10 years earlier than those which were reversed. In this case the Supreme court (5-4) let the HHS 2004 cuts stand in a 2021 ruling. [36] This combination of delays and unpredictable rules about essential payments further destabilizes hospitals that are already struggling.

Billing and errors

A physician's primarily role is to deliver care to patients, largely through evaluation and management (E/M services)–though some exceptions exist (i.e. pathology and diagnostic radiology). Yet physicians are also tasked with proper documentation and billing, which severely hinder productivity and efficiency. Physicians must enter the correct billing codes for the services they provide, or they lose out or overcharge for the services provided.

In the 2017, the HHS reported an excessive cost of $9.9 billion for physicians overcharging for their E/M services, [37] but physicians under bill as well. An analysis of E/M codes for family medicine residency programs put the billing loss at $2600 per faculty member over 6 months.(38) One conclusion of this problem is that correct billing is difficult.

CONCLUSIONS

The paper summarizes a variety of situations in which complexity hinders the practice of medicine with the goal to draw attention to the problem of complexity as an issue, but it cannot solve the problem. The solution to this complexity is not simplicity. Over generalized laws are limiting, dangerous, and not equitable as they cannot account for special circumstances, overly generous health plans may put healthcare out of the reach of more Americans. However, complexity and individualization can be managed by establishing uniformity where possible. If complexity is recognized as a problem in itself, it can be addressed and simplification as a goal can be weighted against forces that increase complexity.

Table 1

De-identified Health System
Managed Care and Payor Relations
Outpatient Laboratory Capitation Grid

Plan	HOME INSTITUTIO N LAB	Lab #2	Lab #3	ALTERNATE AFFILIATE LAB	PHONE	NOTES
HMO Plan #1	YES		YES	YES - calling **** Option # *****	****	HMO member's capped to *** can go to any **** entity. Approved Leakage - If member is not capped to **** can still be seen at **** with approval.
General Plan #1	YES	YES			****	
HMO Plan #2	YES				****	
General Plan #2	YES		YES		****	
General Plan #3	YES				****	
Local Plan #1	YES				****	
Public Plan #1	YES-If PCP is capped to	YES		YES - with	****	
HMO Plan #3	YES	YES			****	
General Plan #4	YES (see note #1)		YES	YES (See note #2)	**NOTE #1:** PPO members can access **** labs without approval, however, verify benefits to determine if any prior auth requirements are needed for services. HMO/POS: Use capitated lab. For members not capped to ****, an approval is required. We have an expedited	

					review process applicable to transplant, cancer treatment, and second opinion.	
					NOTE #2 - STAT tests listed on ****** attachment ******* can be done at any ***** lab, including members not capped to ****, no referral or precertification required.	
					Additional Details for Notes #1 and #2: See affiliate website for more details.	
General Plan #4a (subset)	YES (see note #1)		YES	YES (see note	****	
General Plan #4b (subset)	YES (see note #1)		YES	YES (see note	****	
HMO Plan #4	YES (see note #1)		YES	YES (see note	****	
Public Plan #2	YES-If PCP is capped to		YES	YES (see note	****	
Public Plan #3	Use Lab #2		YES		****	
General Plan #5	YES				****	
General Plan #6	YES	YES			****	
Public Plan #4	YES				****	
General Plan #6	YES		YES		****	
Public Plan #5	YES		YES		****	
NOTE: A member may have a higher OOP expense when using ** Labs and when using hospital versus free-standing. Verify OOP expenses and capitation site by calling the number on the back of the member's ID card or plan's website. Medicare products follow the same guidelines as HMO/PPO.**						

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