Understanding Costs Of Healthcare: Patient Perspectives And Beyond

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Understanding Costs of Healthcare: Patient Perspectives and Beyond

A Thesis Submitted to the Yale University School of Medicine
in Partial Fulfillment of the Requirements for the
Degree of Doctor of Medicine

by
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In collaboration with Dr. Arjun Venkatesh
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Healthcare Spending in the US

US healthcare spending has long been a concern given high expenditures [1], mediocre performance on quality proxy measures, and significant year-over-year spending increases. In recent years, the US has ranked twenty-sixth for life expectancy and otherwise seen poor performance on quality metrics, despite per capita spending 50-200% greater than that of other developed countries. [2,3] According to the Center for Medicare and Medicaid Services (CMS), 2018 saw an increase in overall US health spending by 4.6% to reach $3.6 trillion dollars, or $11,172 per person. This represented a faster growth than 2017 (4.2%), commonly attributed to faster growth in the net cost of health insurance (13.2% in 2018 vs 4.3% in 2017) due to the reinstatement of the health insurance tax in 2018. The number of uninsured Americans correspondingly increased by 1 million to 30.7 million in 2018. [4]

The largest component of recorded health spending is for hospital care (33%), followed by physician and clinical services (20%), and retail prescription drugs (9%). While non-price factors have seen slower growth and retail prescription drug prices have declined slightly, both hospital and practice prices have increased in a fashion outpacing overall spending growth. [4,5]

Spending can also be broken down by funding source. Most patients have bills handled by insurance, with 34% of healthcare dollars paid by private health insurance, 21% by Medicare, 16% by Medicaid. The remaining 10% is paid by patients directly out-of-pocket. Within these segments, spending increases were most pronounced for private
insurance (5.8%) and Medicare (6.4%), with lesser increases in Medicaid (3%) and out-of-pocket (2.8%) spending. [4]

**Common Terms and Definitions**

**Cost**

Cost in health care is a complicated concept often conflated with terms such as price and payment. Assessment of costs is also based on the frame of reference within an encounter; costs from the perspective of a patient are distinct from those of insurers (spending per beneficiary) or hospital (service cost). To insurers, cost is the amount paid to providers for services in care. To the provider, it is the expense required to deliver care, including personnel and overhead costs (equipment, facilities) not directly related to the encounter. To patients, cost often simply means the amount they have to pay out-of-pocket for care. [6]

**Billed Charge/Price**

A billed charge is the amount asked by a provider for a health care good or service, as appears on a medical bill. Hospital billed charges are uniform for every payer but may only cover hospital charges and not professional fees from an outsourced service. [6-8]

Billed charges associated with medical procedures, lab tests, supplies, medications, and other goods and services offered at a health facility or hospital are typically itemized in a ledger known as a chargemaster or Charge Description Master.
(CDM). These lists are often not made public, but must be submitted to CMS by law as a prerequisite for Medicare/Medicaid reimbursement. [9]

**Contractual Adjustments**

Hospital billed charges rarely reflect the amount collected; payment given is often significantly below the chargemaster price. Commercial insurers typically negotiate discounts off billed charges, with the difference between billed price and payment deemed a contractual adjustment. [6-8]

Insurer negotiations often occur independent of each other; one may for instance agree to pay 75% of chargemaster prices (e.g. $7,500 on a bill of $10,000) while another pays 60% (e.g. $6,000 on the $10,000 bill), resulting in correspondingly different contractual adjustments ($2,500 off compared to $4,000). Bargaining power of negotiating parties may be influenced by any number of factors, including local predominance of coverage/care, population demographics, and federal, state, and local regulations. As extreme cases, Medicare and Medicaid are both government-run federal programs which act as primary payers for most hospitals. Due to their outsize influence, both programs are able to set payment rates for each good and service they pay for as a condition of participation. These rates represent a maximum on payment regardless of hospital billed charges; if a service is billed for $10,000 but the maximum allowed amount is $5,000, Medicare will only pay $5,000 with the remainder deemed a contractual adjustment.
As contractual adjustments are only done following advance negotiations, uninsured payments and payers often bear a far higher price for hospital care. In recognition of this, some states now require that self-paying patients pay no more than the average commercial payer. Some hospitals and care centers may voluntarily offer a discount to uninsured patients, particularly ones of low income. Under Section 501(r)(4) of the Internal Revenue Code, the IRS now also requires tax-exempt hospital organizations to establish written financial assistance policies detailing the assistance available and the means by which patients may apply. [10]

Patient Payment

Patient payment structures vary widely by insurance coverage. Uninsured patients incur billed charges minus any automatically applied discounts; availability of payment plan, reduced-fee, and free or charity care programs is variable and such programs typically require the patient or patient representative to apply for consideration. Insured patients also often must share in the cost of their healthcare via at least one of the following methods:

- Copayments require the patient to pay a set amount per visit, encounter, prescription, etc. (e.g. $20 per primary care visit)
- Coinsurance requires that a patient pay a certain percentage of their medical expenses (e.g. 30% of emergency department bill amounts)
A deductible requires a patient to pay a certain amount toward medical expenses before insurance coverage begins during each coverage period (e.g. the first $1,000 of care in a given year.

Insurance maximums dictate dollar or usage limits per patient or per encounter coverable under the policy (e.g. 60 days of hospital stay).

Among policies requiring cost sharing, there may be subdivisions within the policy for different services (e.g. different copayments required for primary and specialist care appointments). [6-8]

Certain plans may require cost-sharing in multiple ways; for example, Medicare Part A (basic hospital insurance) has a deductible of $1,408 per benefit period - from inpatient admission to a hospital or skilled nursing facility until such time that the patient has not received care at either such facility for 60 days – and will cover the remainder of care costs up to 60 hospital days. [11] However, if that same patient is not admitted following emergency room care or considered to be under observation, he or she may be deemed an outpatient and liable for coinsurance up to 20% of the total charges. [12]

Medicare patients who require care beyond the 60 day cap and lack other coverage similarly must draw upon their own assets to pay out of pocket until meeting criteria for other federal programs such as Medicaid.

Cost-to-Charge Ratios and Hospital Cost

Just as hospital billed charges tend not to reflect payments received, charges have historically been a poor proxy for costs incurred. Many hospitals compare their total
charges to their cost by determining a cost to charge ratio (total expenses divided by total charges). The closer this ratio is to 1, the lower the difference between costs incurred and hospital charges. To the extent the ratios are available, one may also multiply each hospital’s overall cost-to-charge ratio by total charges to achieve an estimate of hospital costs. Similar calculations are often still used to estimate costs for specific procedures or to compare hospital costs between different facilities both locally and cross-country. [8]

In recent years, hospitals and health systems have devoted increasing attention and resources to more precisely calculating the cost of care. [13] At the most basic level, cost is more regularly assessed at a more granular level in key areas; as an example, UPMC recently used such assessment to identify 3% increased nursing cost per case over budget due to higher expenses and lower volume, offset by 2% under budget drug costs. Such identification has led to organizational and infrastructural changes which reduce costs and increase productivity; UPMC has seen a 3% decrease in cost per surgery driven by closure of two outpatient surgical centers with consolidation of cases within existing facilities.

Other health centers have implemented even more detailed cost accounting strategies. Time-Driven Activity Based Costing (TDABC) is a strategy whereby, for a given condition(s), the team identifies the care delivery chain (all key care activities), incorporates each step into a process map including all resource suppliers, and estimates the time required for each step of care. By doing so, it is not only possible to better attribute personnel and other fixed costs, but efficiency teams can also better identify bottleneck points of high cost, time, or variability. Studies at multiple centers in the US
and internationally have demonstrated process improvements, reduced wait times, and reduced cost with application of TDABC. Care pathways such as surgical procedures with consistent process steps and relatively easy recording or monitoring have presented as particularly attractive targets. [14-16] While highly variable care delivery scenarios like emergency departments may have difficulty with the regimented process maps of TDABC, the strategy’s successes may indicate value in other bottom-up cost approaches. More generally, considerations of cost reductions as well as quality improvement have presented as an important driver of increasing value in healthcare.

Relationship Between Cost and Quality

As previously noted, the United States has historically seen mediocre healthcare outcomes despite spending 50-200% more per capita than other OECD nations. This longstanding trend has led researchers to search for specific sources of waste. A large part of the research has focused on regional variations in spending patterns within the United States; Medicare spending is specifically highlighted due to wider data availability.

Early studies quickly found that regional variation in spending was generally not tied to patient outcomes. [17,18] In a landmark study from the Dartmouth Institute for Health Policy, patients hospitalized from 1993 to 1995 for hip fracture, colorectal cancer, or acute myocardial infarction were divided into cohorts along with a representative sample of Medicare enrollees in their last 6 years of life. Each cohort was assessed for exposure to different levels of spending on end of life care, revealing significant variation
in healthcare spending and quality across the geographic United States. Beneficiaries in high-spending areas received about 60% more services than those in low spending areas but expenditures were not explained by increased illness rates and utilization was not associated with higher life expectancy. For individual care, beneficiaries in high spending areas were no more likely to receive recommended treatment for routine health maintenance or following a myocardial infarction. However, the regions in the highest quintile of Medicare spending had 65% more medical specialists and 26% fewer general practitioners per capita.

More recent studies, however, describe a nuanced relationship between care intensity and patient outcomes. A 2012 study in New York used Medicare data to compare care at the various city hospitals following quasi-random assignment by ambulances responding to calls for acute care; researchers noted that hospitals adopting new technologies had better outcomes and that increased hospital procedural intensity was associated with lower mortality one year after hospitalization, though hospital spending and treatment intensity saw diminishing returns. [19] Silber et al similarly found an association between greater care intensity and lower 30-day mortality among patients receiving general, orthopedic, and vascular surgery, with complication-related mortality decreased with high-intensity management. Beyond 30 days from admission, however, Silber et al found no difference in in mortality between patients treated in low- and high-intensity hospitals, with aggressively treated patients returning to an identical baseline survival. [20]
Collectively, these results have broadly been interpreted to mean that the increased costs of high-intensity, “advanced” care may improve individual safety following hospitalization, but fails to improve population health metrics. Within the US, the current systems of care have predominately focused on specialty expertise in intensive treatments, perhaps at the expense of low-intensity, low-cost public health approaches such as vaccinations and routine health maintenance. As such, while we can still be said to be deriving value from their spending, our focus on treating acute problems and broader societal patterns of health investment has led to patients facing higher out-of-pocket costs concentrated at times of most dire need.

**Explaining the Disconnect Between Cost and Quality**

Several factors have been proposed to help explain ballooning costs which fail to produce substantive improvements in care quality. First, as noted earlier, prices for a given healthcare good or service can vary widely. As previously noted, hospitals commonly negotiate differing rates with different private insurers based primarily on bargaining power rather than quality of services provided. Similarly, Medicare payments to providers are based on a central price and have historically adjusted for geographic region, medical education, and a hospital’s disproportionate share (meant to reflect and reward care for indigent patients), but not quality directly. [21] More recently, federal programs have begun to penalize hospitals with fines or reduced pay for poor quality benchmarks, though these restrictions may be undercut by broad-based application.

Beyond payment factors, high costs may be in part driven by standards for treatment approval. In the US, the Food and Drug Administration (FDA) is responsible
for approving drugs and devices as safe and effective. In approving medications, the FDA often relies on trials comparing a new treatment with an existing treatment (non-inferiority) or a placebo (benefit). Medical devices have an even lower barrier to entry; under the 510(k) provision, they only need to prove substantial similarity to an existing marketable device. [22] In both cases, there is no requirement for applications to demonstrate greater efficacy or improved cost-efficiency compared to available options; following FDA approval, federal insurance programs and other large payers similarly accept and reimburse for the new therapies without any consideration for cost or effectiveness.

Within such a structure, expensive new drugs are quickly adopted and there exists strong incentive both to produce therapies regardless of societal need and subsequently market them at the highest price the market can possibly bear. Recent decades have notably produced cancer drugs costing tens of thousands of dollars while perhaps only extending life a month. [23,24] Even treatments which may be cost-effective in select indicated cases may routinely be overused on patients with little to no benefit; Tu et al. have demonstrated that usage of coronary angiography, angioplasty, and bypass surgery following myocardial infarction in the US is 5 to 10 times that of Canada despite similar survival outcomes. Accompanied by low price transparency, these adverse incentives have driven substantial year-over-year spending increases.

**Reducing Waste in Healthcare Spending**

As the issues of high healthcare costs and patient burden gain greater recognition, efforts to reduce health spending have been varied. While sustained societal change in
attitudes and investment is a worthy ideal goal, such change has been difficult to plan for or evaluate, much less achieve. Many efforts to combat rising costs and in turn prices and out-of-pocket spending have focused on addressing waste, a significant portion of overall US healthcare expenses.

In their 2019 review, Shrank et al. estimate the cost of waste ranges from $760 billion to $935 billion, or about 25% of total health spending; this wasteful spending was subdivided into six primary domains: overtreatment or low value care ($12.8 billion to 28.6 billion), failure of care coordination ($27.2 to 78.2 billion), fraud and abuse ($58.5 to 83.9 billion), failure of care delivery ($102.4 to 165.7 billion), pricing failure ($230.7 to 240.5 billion), and administrative complexity ($265.6 billion). [25] In the 54 publications, government reports, and other reports reviewed, interventions proposed to address waste could potentially save $191 billion to $282 billion, a potential 25% reduction in total waste.

The provided breakdown of sources of waste suggests current cost control efforts may be somewhat misdirected. In a October 2019 letter addressing this topic in healthcare spending, the administrator overseeing CMS, Seema Verma, predominately pledged new efforts to curb fraud and abuse despite that domain representing a small proportion of overall waste; there was no significant mention of any other domain. [26] While there is increasing societal and lawmaker attention on the drug pricing segment of the pricing segment domain, interventions remain limited and are undercut by a continued system of adverse incentives. Meanwhile, the largest waste domain of administrative complexity as a whole is minimally addressed; of all the sources in Shrank
et al.’s review, none focused on interventions targeting administrative complexity. Health economists have since made further recommendations on waste reduction, grouped into supply-side and demand-side reforms. [27]

Supply-side reforms

Supply-side reforms aim to stem wasteful practices from care providers. Many such efforts center on alterations to the current fee-for-service payment system in favor of alternative, value-based payment methods. Some such methods have been in use in areas of the country for many years. Bundled payments, for instance, serve as a single payment to providers, hospitals, or both for treatment of a given condition or health episode; this serves to expose providers and hospitals to some financial risk for both the cost of services and treatment of complications. Utilization of bundled payments was associated with reductions in per-episode cost for Blue Cross and Blue Shield of North Carolina, reduced readmissions, length of stay, and hospital charges following bypass surgery at Geisinger Health system, and substantial cost savings for bypass procedures paid for by Medicare. While many bundled payments today are still made retrospectively (i.e. paid after the episode is over), a gradual shift to prospective payments of this form may additionally cut underlying financial incentives to over-treat present in the current model. [28]

By the same token, Accountable Care Organizations (ACOs) are groups of hospitals and providers who provide individuals coordinated care for a negotiated prepaid budget; this model similarly encourages lower-cost, high-value healthcare by shifting financial liability for waste toward suppliers of care. [29] An analogous system has been
implemented by Blue Cross Blue Shield of Massachusetts since 2009 with their Alternative Quality Contract (AQC) in 2009. Under this two-sided contract, organizations manage a risk-adjusted annual AQC budget for prospectively attributed enrollees and share both in savings for spending under budget and risk for spending exceeding budgets. Additional quality bonuses are given based on 64 measures encompassing process, outcomes, and patient experience data. [30] Results from implementation have historically proven quite positive; the most recent study assessing the first 8 years of AQC enrollment found an 11.7% relative savings on claims compared to spending in control states, accompanied by unadjusted quality metrics similar to or higher than regional and national averages. Savings were observed year-over year even with plateauing of AQC enrollment rates. [31] While supply-side interventions are classically most likely to help control costs for chronic conditions and preventative care rather than acute events, these data suggest broadening arrangements to encompass all of a patient’s or group’s care may gradually drive down care costs across the board.

Further supply-side reform beyond piecemeal implementation may be found modeled in other countries with centralized single-payer health networks. Such models carry an additional advantage in reducing waste from administrative costs beyond acting as a strong supply driver to improve healthcare utilization, patient education, care coordination, and overall value of delivered health services. However, such a shift would represent a dramatic change from current US healthcare and may face difficulty with passage and implementation in the current sociopolitical climate.
**Demand-side Reforms**

Demand-side reforms seek to reduce waste by making the general populace more efficient consumers of healthcare. One major method of doing so has been to implement greater patient cost-sharing, thereby inducing patient price-sensitivity in seeking care. In recent years, there has been a substantial increase in the number of plans sold with high deductibles, co-insurance, or both. With the institution of the Affordable Care Act (ACA), insurance policies nationwide gained new requirements including expanded breadth of coverage, coverage of pre-existing conditions, and limitations on coverage caps. Within established marketplaces, plans segregated into metallic levels (i.e. bronze, silver, gold, platinum) by actuarial value and, given new criteria, primarily differentiated by level of patient-cost sharing. “Silver” plans have been particularly notable as the best option for individuals qualifying for out-of-pocket cost assistance (those with income under 250% of the federal poverty level); these plans require enrollees to share at least 30% of healthcare costs up to a specified limit. [32]

Unfortunately, increased patient cost-sharing is not without concerns – there is reason to believe increased price sensitivity may lead some patients to avoid seeking necessary care. The 1982 Health Insurance Experiment (HIE) from the nonprofit RAND corporation remains the only long-term, experimental study of the effects of cost-sharing on health, care quality, and service usage. Comparing cost-sharing patients with a group provided free care, the HIE noted cost-sharing did not significantly affect the quality of care received, but reduced usage of both highly effective and less effective services in approximately equal proportion. Furthermore, while cost-sharing generally did not
adversely affect participant health, free care led to improved hypertension, dental health, vision, and selected serious symptoms, especially in the sickest and poorest patients. [33]

To help address this potential issue, some adaptations and tools are being developed. CMS is now testing a Medicare Advantage (supplement) plan with a value-based insurance design, whereby cost-sharing is reduced for highly effective clinical services. [34] Newer technologies like Castlight Health’s healthcare navigator platform also assisting consumers in making better informed decisions by providing data on quality and increasing local price transparency.

**Price Transparency**

As noted previously, the current healthcare environment maintains very low price visibility with hidden billable charges, high local variability in charges for any given service, undisclosed negotiations and discountable percentages, and increasingly complex cost-sharing arrangements. Lack of communication or consideration for cost issues during care encounters may exacerbate these issues, as seen with the significant number of patients receiving large, unexpected bills for services purportedly rendered outside their insurance network; in many such cases, patients have reported out-of-network bills from in-network hospitals utilizing contracted non-network providers, despite patients’ inability to select their physician. [36,37]

Media outlets are also increasingly reporting on cases of outlandish medical bills: a hidden $2,170 facility charge, a $41,212 bill for an appendectomy despite full payment of the patient’s deductible, an insurer payment of $25,865 for an outpatient head cold and
throat swab, and so on. [38-40] Some popular news sources have written articles detailing strategies for lay people to challenge “exorbitant” charges, such as repeated calling, direct challenges to coded charges, requesting prompt-pay discounts, going to the media. [41] This uptick in attention is reflective of broader consumer worries; a 2018 Kaiser poll of nearly 1,200 adult patients found 58% of consumers were concerned about general increases in out-of-pocket costs, particularly the prospect surprise medical bills. [42]

Increased patient cost-sharing, news reports, and general societal concern have applied further pressure on lawmakers, hospitals, and providers to make prices more transparent. Following Stephen Brill’s 2013 expose on health care costs, then-Secretary of the Department of Health and Human Services, Kathleen Sebelius, made public the 2011 chargemaster prices of the 100 most common inpatient treatment services for all hospitals treating Medicare patients. [43] With that unprecedented release of data and other releases made since, patients have been able to compare procedural prices between local hospitals and researchers have newly confirmed wide variation of prices and procedures both nationally and locally. [44] Fairhealth.org, a database of doctors’ fees contributed by payers nationwide, has similarly grown out of a New York legal investigation into insurance company settlements for out-of-network services. [45]

Efforts to improve price transparency have additionally expanded to include providers in some supply-side reform initiatives. Recent studies have found that usage of the electronic health record (EHR) to display prices of goods and services is associated with more cost-effective prescribing practices. A 2015 study from Emory found indication of relative costs of antibiotics using dollar signs akin to Yelp (i.e. $-$$$$) on
culture and susceptibility reports significantly decreased prescriptions of high cost antibiotics. [46] Similarly, a Johns Hopkins study displaying Medicare allowable rates for lab tests on order sets resulted in substantial decreases in high-cost lab tests ordered and a net cost reduction in excess of $400,000 over the six-month trial period. [47]

**Patient Costs and Impacts**

High overall healthcare costs have manifested as a substantial and increasing burden to many patients. A 2018 Gallup survey notes a quarter of US adults reporting cost as the leading national healthcare issue, 61% stating that higher premiums or medical expenses are a major concern, and roughly half of adults worrying that they will be unable to afford care. [48]

Recent decades have seen middle-income household spending on healthcare increase by 51% - double the growth in average income and more than triple the rate of increases for all other goods and services. [49] The Kaiser Family Foundation estimates the typical non-elderly US family now spends $8,200 per year, or 11% of their income, on healthcare without including any employer contributions. This amount can vary substantially by income, type of insurance, and health status, with patients without insurance or with high-cost sharing plans and those in overall poor health often seeing larger proportions of income spent and greater impacts on financial stability. [50]

Patients with employer sponsored insurance (ESI), while broadly happy with their coverage, are not spared from high and increasing costs. Nationally, the ESI cost burden, as measured by the share of household income devoted to premium payments, has grown
to 30% in 2016 from 28% in 2010. The rising cost burden may be attributable to stagnating income, rising premiums, or a combination of the two. Notably, however, national growth in family ESI premiums (27.7%) broadly outpaced that of median household income (19.8%) and large variations are seen in these levels between states.

Aside from increasing premiums, ESI plans are also seeing increased usage of deductibles. Between 2010 and 2016, the percentage of employees enrolled in a deductible plan increased from 77.5 to 84.5 percent, and the average annual deductible increased from $1,975 to $3,069. While these new deductibles are often used on an individual level to reduce premiums, a state level analysis showed no association between deductibles and average premiums. [49,51] This rise in deductibles and out-of-pocket payments has led to a net increase in underinsured Americans. In line with findings of the 1982 HIE, a recent study found women switched from low to high deductible plans were more likely to delay breast cancer diagnosis and treatment. [52] Given this, lawmakers have been pushed to promote increased usage of tax-advantaged health savings accounts or health reimbursement accounts to cover out-of-pocket expenses, particularly in the highest-deductible states.

For many, increases in patient healthcare costs are unfortunately coinciding with tenuous baseline financial circumstances. A 2018 report issued by the federal reserve has suggested 4 in 10 Americans would be wholly unable to afford an unexpected $400 expense. [53] A 2019 Bankrate survey suggests only 40% of Americans would pay an unexpected $1,000 expense from savings; over a third would need to borrow the money,
14% would reduce other spending, and 10% did not have any definite plan. [54] A 2019 study found a full two-thirds of declared bankruptcies were tied to medical issues and bills. [55] And in 2018, a survey from the University of Chicago found that 40% of Americans have forgone a recommended test or treatment in the past year due to costs, 32% could not fill a prescription or received only a partial fill, and another 30% struggled to pay for basic necessities such as food, heat, and housing due to their medical costs. [56]

**Emergency Department Prices, Payments and Costs**

For many of the reasons discussed in this introduction, emergency rooms have historically seen very high prices, even with measures in place to control excessive testing, specialist consults, and inconsistencies in addressing routine problems across the US. Simply by merit of the high acuity and variable usage rates, increased personnel and materials are required, bringing with them higher baseline prices for goods and services provided. Given high costs, heightened hospital disincentives to report true costs, and several laws stating hospitals need not provide estimates for emergency services, it should perhaps come as no surprise that small-scale studies suggest both patients and treating physicians often have poor understanding of expected charges despite all parties agreeing on the importance of cost considerations. [57] Indeed, media reports suggest the problem of surprise billing presents specially often in emergency room bills. [58]

Despite high and variable pricing, emergency room care continues to be highly utilized for nonurgent conditions rather than primary care and other ambulatory alternatives. Reviews assessing this issue have been limited by heterogenous studies in
the literature but overall suggest younger age, convenience of the emergency department compared with alternatives, referral to the emergency department by a physician, and negative perceptions of alternatives all play a role in driving nonurgent ED usage. [59] Patients of low socioeconomic status overall have higher un(der)insurance rates and thus greater financial risk but may be particularly likely to perceive acute hospital care as less expensive, more accessible, and of higher quality than ambulatory care. [60] However, to date, no study to our knowledge has assessed patient-reported knowledge or perceptions of total or out-of-pocket costs.

**STUDY PURPOSE**

This study seeks to offer a comprehensive description and analysis of patients’ cost consciousness when seeking emergency care. Using a survey tool to assess patient estimates for cost of care, consideration of alternatives, and notable demographics, we hope to identify drivers for, and hopefully solutions to, patient misperceptions of emergency care cost.

**SPECIFIC AIMS**

*Aim 1: Assess the degree of patient misperception of emergency room costs*

*Aim 2: Assess association between level of misperception and factors of interest:*

- Price consideration before coming to emergency department
- Referring party
- Consideration of alternative care options
- Insurance status and, if applicable, deductible/co-pay
- Educational attainment
• Employment status
• English proficiency
• Age

Aim 3: Identify potential interventions to reduce future patient misinformation and unnecessary usage of emergency services

HYPOTHESIS

We hypothesize that patients will have overall poor understanding of incurred emergency room costs, with degree of misperception associated with demographic proxies for lower socioeconomic status.

MATERIALS AND METHODS

Subject Selection

Surveyed patients were selected from patients cared for in the Adult emergency department (aged 18+) for unscheduled care of acute injury or illness who went on to be discharged directly from the department. Patients must give affirmative consent to be enrolled in the study. Any patients incarcerated or pregnant at the time of presentation, under 18 years of age, only fluent in a language other than English or Spanish, not a US citizen, enrolled in a conflicting emergency department research project, or subsequently admitted to the hospital were considered ineligible for the study. A second arm of the study is currently ongoing, with a final goal of enrolling 1000 patients.

Consent

Potential subjects were approached at the bedside in the Emergency department prior to discharge. Trained staff read them a short introduction to the study as listed on the verbal
consent sheet and asked participants to repeat key aspects of the study prior to asking for patient consent to be surveyed and enrolled in the study. Patients capable of repeating the information back were considered capable of providing consent. For patients incapable of consent, consenting family members or other patient proxies were offered the opportunity to respond on the patient’s behalf. Pediatric patients were excluded from the study.

**Data Collection**

Data was collected by residents and medical students administering the project survey. Surveying researchers were to ensure the timing of the survey does not interfere with the patient’s usual care. Information was collected about patient age, patient gender, pre-arrival considerations, referring party, estimates of cost of visit, educational attainment, employment status, language preference, and discharge diagnosis. Surveys only recorded patient medical record numbers for subsequent collection of information on total charges, total payments, professional charges, professional co-pay charge, facility charges, facility co-pay, inpatient vs outpatient billing, and reference identification. All data was stored on a secure restricted server. Patient identifiers were stripped before any analysis and collected information will be destroyed upon study completion.

**Analysis**

Analysis was limited by lack of billing data at time of writing. Associations between cost-sharing status, age, educational attainment, employment, English fluency, and considerations between costs & alternatives was evaluated by Cochran’s Q tests.
RESULTS

Demographics

577 patients have been approached for the study, of which 74 patients declined and 10 were unavailable/not consentable, leaving a total of 493 included patients. Patients declining with a reason primarily did so due to ongoing discomfort or general dislike of surveys/studies. Of approached patients, 492 (418 included, 66 declined, 8 unavailable) were seen at St. Raphael’s Hospital and 85 (75 included, 8 declined, 2 unavailable) were seen at Shoreline emergency department.

For included respondents, average age was approximately 48.2, with a standard deviation of 19.6. 22.58% of respondents were senior citizens of age 65 or greater. 14 patients were noted as being of age over 90 and did not have their specific ages marked for privacy reasons; these individuals were coded as age 91 for the purposes of analysis.

92% (454/493) of respondents were English fluent. 47.8% (229/479) had some advanced education beyond high school. 55.9% (246/440) indicated they were employed full-time or retired at the time of the visit. 30.7% (136/443) noted known cost sharing insurance – defined as insurance with some deductible or copayment required – with another 8.1% (36/443) who were wholly unfamiliar with their insurance coverage terms or refused to share details of their policy.

Influences on Patients’ Care Decision Making

Various demographic factors were of relevance to whether patients considered prices, alternatives, and outside opinions prior to arrival at the emergency room. Patients
with higher educational attainment, defined as schooling past high school, were significantly more likely to seek referrals or others’ opinions prior to emergency room care, but were less likely to consider alternatives. Senior citizens overall were significantly more likely to arrive for care at the request of others and less likely to opt for emergency care on their own. Individuals employed full-time or retired at the time of the encounter were more likely to arrive for care at the request of others and less likely to consider alternative treatment options. Patients with some cost sharing associated with their insurance policies were similarly more likely to arrive for care at the request of others and less likely to consider alternative treatment options. English fluency was not found to have a significant impact on considerations of costs, alternatives, or outside opinions. See Table 1.

**Patient Estimates of Healthcare Costs**

Patients asked to estimate the total bill prior to any insurance payment responded with responses ranging from $50-$50,000; the average estimate was $4453.94 with a standard deviation of $6384.81. Other than the 368 estimates of total cost, 119 respondents did not provide a numerical estimate citing an inability to do so (e.g. “don’t know”, “no idea”) or simply stating expectation of a large figure (“thousands”, “a lot”). When asked for an estimate of their own final out-of-pocket cost, patients similarly responded with a large variety of figures ranging from $0 to $6,000; the average estimate was $287.73 with a standard deviation of $804.86. Of note, many patients surveyed stated they were on state or federal insurance without a patient contribution and 234
<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
<th>Probability with independent Variable</th>
<th>Probability without independent Variable</th>
<th>Pvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Citizen</td>
<td>Considered Price</td>
<td>0.257142857</td>
<td>0.230555556</td>
<td>0.58232</td>
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<tr>
<td>Senior Citizen</td>
<td>Came on Own</td>
<td>0.476190476</td>
<td>0.594444444</td>
<td>0.03318</td>
</tr>
<tr>
<td>Senior Citizen</td>
<td>Referred by Doctor, Family, Friend, or Other</td>
<td>0.685714286</td>
<td>0.475</td>
<td>0.00008</td>
</tr>
<tr>
<td>Senior Citizen</td>
<td>Considered Alternatives</td>
<td>0.333333333</td>
<td>0.375</td>
<td>0.42952</td>
</tr>
<tr>
<td></td>
<td>n=360</td>
<td>n=105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed Full-time or Retired</td>
<td>Considered Price</td>
<td>0.231707317</td>
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<td>0.99202</td>
</tr>
<tr>
<td>Employed Full-time or Retired</td>
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<td>0.548780488</td>
<td>0.603092784</td>
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<tr>
<td>Employed Full-time or Retired</td>
<td>Referred by Doctor, Family, Friend, or Other</td>
<td>0.569105691</td>
<td>0.453608247</td>
<td>0.01596</td>
</tr>
<tr>
<td>Employed Full-time or Retired</td>
<td>Considered Alternatives</td>
<td>0.308943089</td>
<td>0.448453608</td>
<td>0.00262</td>
</tr>
<tr>
<td></td>
<td>n=246</td>
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<td></td>
</tr>
<tr>
<td>Fluent in English</td>
<td>Considered Price</td>
<td>0.244493392</td>
<td>0.28</td>
<td>0.68916</td>
</tr>
<tr>
<td>Fluent in English</td>
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<td>0.561674009</td>
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<td>0.70394</td>
</tr>
<tr>
<td>Fluent in English</td>
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<td>0.530837004</td>
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<td>0.37346</td>
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<tr>
<td>Fluent in English</td>
<td>Considered Alternatives</td>
<td>0.359030837</td>
<td>0.44</td>
<td>0.41222</td>
</tr>
<tr>
<td></td>
<td>n=454</td>
<td>n=25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has Post-High School Education</td>
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<td>0.270742358</td>
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<td>0.23404</td>
</tr>
<tr>
<td>Has Post-High School Education</td>
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<td>0.524017467</td>
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<td>0.09492</td>
</tr>
<tr>
<td>Has Post-High School Education</td>
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<td>Has Post-High School Education</td>
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</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>Cost-Sharing insurance</td>
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<td>0.18684</td>
</tr>
<tr>
<td>Cost-Sharing insurance</td>
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<td>0.647058824</td>
<td>0.465798046</td>
<td>0.00044</td>
</tr>
<tr>
<td>Cost-Sharing insurance</td>
<td>Considered Alternatives</td>
<td>0.301470588</td>
<td>0.400651466</td>
<td>0.0466</td>
</tr>
</tbody>
</table>

Table 1: Influences on patients’ decision to pursue emergency care
patients expected to pay nothing for their care. 10 patients gave non-numerical estimates, mostly expressing expectation of a large unknown bill (e.g. “too much”).

Among surveyed patients, 303 provided numerical responses to both prompts for cost estimates. For these patients, estimates of total costs had minimal relationship with estimates of personal payment required; a linear regression has $R^2$ of 0.0122. Removing responses from the bulk of patients who expect all health services to be covered (i.e. $0 personal contribution), $R^2$ remains at 0.0488

*Figure 1: Patient estimates for total out-of-pocket payment vs total cost without insurance*
DISCUSSION

In reviewing the data, we see it may prove remarkably difficult for out-of-pocket costs to influence emergency care seeking behavior. Measures which may reasonably serve as indirect proxies for broader exposure to relevant information – English fluency and post-secondary education, for instance – appears to be limited in impact on patient decisions to seek emergency care. Markers associated with adequate insurance coverage – seniors covered by Medicare, full-time employees and retirees – were associated with greater reliance on family, friends, and other physicians and perhaps may represent stronger social networks and health access; nonetheless, these individuals did not ascribe greater value to health costs and were less likely to consider alternatives to the emergency room after deciding to seek acute care.

No measure assessed in the survey appeared to significantly affect the probability of a patient considering emergency visit pricing prior to arrival, including self-identified cost-sharing. Indeed, many patients asked about the prospect of considering cost seemed to think it strange, if not absurd, to consider cost when otherwise concerned about one’s health. We may also note the measures associated with higher socioeconomic status (post-secondary education, full-time employment or retirement, and private cost-sharing plans) are all tied to patients taking more stock in others’ recommendations to seek care and less hesitation or consideration of lower-acuity alternatives once the decision to seek care is made. Along the same vein, public media outlets often publish anecdotes of extreme medical bills or circumstances but rarely discuss day-to-day costs, bills, and
expenditures. These phenomena may speak to broader public attitudes seeking an idealized vision of health without much attention to cost or value of services.

Any effects from societal forces appear to be compounded by a general lack of awareness of healthcare prices and a total disconnect between true costs and patient payments. As evidenced by massive standard deviations on estimates of both total costs and personal payments, this information does not appear readily available to the public. The vast majority of patients encountered during this study arrived with excellent insurance or eligibility for programs covering most or all of the cost of care. Even indigent patients were typically covered under Husky, the Connecticut Medicaid variant with no deductible or emergency department copays. As such, most of the surveyed patients faced relatively little financial burden or disincentive to pursuing emergency care and further study is warranted in areas and centers seeing higher rates of high deductible or significant coinsurance plans. However, given concerns about patients avoiding or deferring necessary care, any broad shifts toward patient contribution should be made with caution and in conjunction with supply side adjustments.

**Limitations**

Limitations include selection of participants via convenience sampling and restriction to a single hospital system. Due to the distribution of surveying at time of writing, there is also a skew toward publically-insured patients and a relative lack of both privately insured and uninsured individuals. Additionally, the study was limited to low-acuity patients dischargable from the emergency department and may not capture the range of concerns, considerations, and costs associated with higher-acuity cases. Finally,
the survey tool, while locally revised and optimized, was not an independently validated metric and may be prone to biases in administration.
References


health-care-costs-america. Published 2018.


Appendix: Project Survey

Price Project

Start of Block: Default Question Block

FOR SURVEYOR: Where is this survey being conducted?

- York Street (1)
- Saint Raphael (2)
- Shoreline (3)
- Other (Specify) (4) ________________________________________________

Hi, my name is *** and we are conducting a patient survey to get a better understanding of the care issues regarding the affordability and costs of emergency care. This is a part of an ongoing quality improvement initiative in the ER. This survey will not be shared with anyone in the ER or hospital administrative staff or billing office. The purpose of this survey is only to learn more about current patient perception. The survey itself should take less than 10 minutes to complete. Would you be willing to participate in this survey?

- Yes (1)
- Refused (you can provide a reason if any is given) (2)
- Unable to take the survey (you can provide a reason if any is given) (3)

Hi, my name is *** and we are conducting a patient survey to get a better understanding of the care issues regarding the affordability and costs of emergency care. This is a part of an ongoing quality improvement initiative in the ER. This survey will not be shared with anyone in the ER or hospital administrative staff or billing office. The purpose of this survey is only to learn more about current patient perception. The survey itself should take less than 10 minutes to complete. Would you be willing to participate in this survey?

- Yes (1)
- Refused (you can provide a reason if any is given) (2)
- Unable to take the survey (you can provide a reason if any is given) (3)

Skip To: End of Survey If Hi, my name is *** and we are conducting a patient survey to get a better understanding of the care issues regarding the affordability and costs of emergency care. This is a part of an ongoing quality improvement initiative in the ER. This survey will not be shared with anyone in the ER or hospital administrative staff or billing office. The purpose of this survey is only to learn more about current patient perception. The survey itself should take less than 10 minutes to complete. Would you be willing to participate in this survey?

- Yes (1)
- Refused (you can provide a reason if any is given) (2)
- Unable to take the survey (you can provide a reason if any is given) (3)
Hi, my name is *** and we are conducting a patient survey to get a better understanding of the care you received. = Unable to take the survey (you can provide a reason if any is given)

FOR SURVEYOR, NOT FOR RESPONDENT: who is responding to the questions?

- Patient (1)
- Patient and family member/ other (2)
- Family member/ other (3)

Patient MRN

Age. If patient is greater than 89y of age, put “>90”.

Date of Visit (mm/dd/yyyy)
Did you consider the price of this visit before coming to the emergency department?

- Yes (1)
- Kind of/ maybe/ ambiguous (2)
- No (3)
- Refused to answer (4)

Notes

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How did you decide to come to the Emergency Department? 
(For example, did you make the decision to come yourself, were you referred, or were you told by family/friend to come?)

- [ ] I knew I needed to come/ made the decision myself (1)
- [ ] Family member/ friend/ other suggested I come (2)
- [ ] Referred by doctor (3)
- [ ] Other (4) ____________________________
- [ ] Refused to answer (5)

Notes
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Page Break
Did you consider (or receive) any alternative care options prior to coming to the emergency department?

- Yes (1)
- No (2)

Display This Question:

If Did you consider (or receive) any alternative care options prior to coming to the emergency department? = Yes

Did you consider (or receive) any of the following alternative care options prior to coming to the emergency department? (read each option to the respondent)

<table>
<thead>
<tr>
<th>Options</th>
<th>Considered (1)</th>
<th>Received Care (2)</th>
<th>Neither (3)</th>
<th>(Blank/ did not answer) (4)</th>
<th>Refused to answer (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent Care (1)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Telemedicine (2)</td>
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<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Freestanding Emergency Department (3)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Primary Care (4)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Specialist (5)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other (6)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Display This Question:

If Did you consider the price of this visit before coming to the emergency department? = Yes

Notes

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Page Break
Display This Question:

If Did you consider (or receive) any of the following alternative care options prior to coming to th... :
Click to write Column 1 [Received Care] (Count) > 0

How long ago did you receive care?

- Today (1)
- In the last 1-3 days (2)
- More than 3 days ago (enter number or estimate) (3)
- Refused to answer (4)

Notes

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________________________________________________________________________________________
Did you try to find out the price of this ED visit prior to arrival?

- Yes (1)
- No (2)
- No, I already knew the price (3)
- Refused to answer (4)

Notes:

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Page Break
Display This Question:
If Did you try to find out the price of this ED visit prior to arrival? = Yes

Where did you look for price information?

- Searched online (1)
- Called insurer (2)
- Called doctor (3)
- Other (4) ________________________________________________________________
- Refused to answer (5)

Display This Question:
If Did you try to find out the price of this ED visit prior to arrival? = Yes

Notes

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Page Break
How much do you think the total bill for your ED visit will be? This is before insurance kicks in, including doctor and hospital fees. (if patient refused to answer, write 'refused')

________________________________________________________________

Notes

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Page Break
How much do you think you will have to pay out of pocket in total for this ED visit? (including doctor and hospital fees)

- Estimate (enter a number, range of numbers, or text) (5)
- I Don't Know (4)
- Refused to answer (8)

Notes

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Do you have a co-pay for this ED visit?

- Yes (1)
- No (2)
- I don't know (3)
- Refused to answer (4)

Notes

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Page Break
Display This Question:

If Do you have a co-pay for this ED visit? = Yes

How much is your co-pay for this visit? Leave this blank if you are unsure. You can enter a number, a range of numbers, or text here. (if patient refused to answer, write 'refused')

________________________________________________________________

Display This Question:

If Do you have a co-pay for this ED visit? = Yes

Notes

________________________________________________________________

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Page Break
How much is your annual deductible?

- $ (1) ________________________________
- I don't know (3)
- Refuse to answer (4)

Notes

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Page Break
Have you been to an ED before? (to obtain medical attention for yourself or a family member?)

- [ ] Yes (1)
- [ ] No (2)
- [ ] Refused to answer (3)

Notes

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Display This Question:

If Have you been to an ED before? (to obtain medical attention for yourself or a family member?) = Yes

In prior visits to the ED, do you remember getting:

- One bill (1)
- Different bills (2)
- No Bills (5)
- I don't remember (4)
- Refused to answer (6)

Display This Question:

If Have you been to an ED before? (to obtain medical attention for yourself or a family member?) = Yes

Notes

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Page Break
Display This Question:

If Have you been to an ED before? (to obtain medical attention for yourself or a family member?) = No

Do you expect to get one bill for the entire visit, two or more different bills, or are you unsure?

○ One bill for the entire visit (1)
○ Two or more different bills (2)
○ I don't know (3)
○ Refused to answer (4)

Display This Question:

If Have you been to an ED before? (to obtain medical attention for yourself or a family member?) = No

Notes
_________________________________________________________________________________________________________
_________________________________________________________________________________________________________
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_________________________________________________________________________________________________________
_________________________________________________________________________________________________________
_________________________________________________________________________________________________________
Usually in the ED, most patients get 2 bills- one from the hospital to pay for the room, lights, nurse, and medications, and another from the doctors for their evaluation and care.
Display This Question:
If FOR SURVEYOR, NOT FOR RESPONDENT: who is responding to the questions? = Patient

What is your highest level of education? (This question is for the patient. If a family member/friend is helping answer questions, you can report this person’s level of education in the next section)

- Elementary School (9)
- Middle School (4)
- High School (5)
- Trade School (10)
- Associate's Degree (11)
- Undergraduate/ Bachelor's Degree (6)
- Graduate School (7)
- Refuse to Answer (8)

Display This Question:
If FOR SURVEYOR, NOT FOR RESPONDENT: who is responding to the questions? = Patient

Notes
________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
What is your highest level of education? (If someone is helping the patient answer questions, this question is for them. If the patient is answering all questions, leave this question blank)

- Elementary School (9)
- Middle School (4)
- High School (5)
- Trade School (10)
- Associate's Degree (11)
- Undergraduate/ Bachelor's Degree (6)
- Graduate School (7)
- Refuse to Answer (8)
If FOR SURVEYOR, NOT FOR RESPONDENT: who is responding to the questions? = Patient and family member/ other

Or FOR SURVEYOR, NOT FOR RESPONDENT: who is responding to the questions? = Patient

Are you currently working and/or going to school? (This question is for the patient. If a family member/ friend is help answer questions, you can report this person’s level of education in the next section)

- Employed full time  (1)
- Employed part time  (2)
- Student and employed  (9)
- Student, not employed  (3)
- No, retired  (6)
- No  (4)
- Refuse to answer  (5)

Notes

_________________________________________________________________________________________

_________________________________________________________________________________________

_________________________________________________________________________________________

_________________________________________________________________________________________
Are you currently working and/or going to school? (If someone is helping the patient answer questions, this question is for them. If the patient is answering all questions, leave this question blank)

- Employed full time (1)
- Employed part time (2)
- Student and employed (9)
- Student, not employed (3)
- No, retired (6)
- No (4)
- Refuse to answer (5)
Was the patient fluent in english?

- Yes (1)
- Partially (2)
- Partially, iPole was used (3)
- No, iPole was used (4)

Where was this survey conducted?

- SRC (1)
- YSC (2)

Notes

________________________________________________________________________
________________________________________________________________________
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End of Block: Default Question Block