

## ECONOMIC THEORY MEETS CLINICAL PRACTICE: “MORAL HAZARD”

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**Abstract:** Economic theory must be tested to prove that goals are achievable and reproducible. Unfortunately, economic theories related to health care are not always based on modern-day medical practice, which can result in misalignment of economic recommendations from real-life medicine. The theory of “moral hazard” assumes that patients will utilize more medical services if insurance pays for it. In this article, we will revisit the understanding of appropriate avoidance of medical services and incorporate no-show rate, avoidance of care, and nonadherence into the realities of health services utilization.

The primary goal of this interdisciplinary commentary is to bridge economic theory with clinical practice. It is written from the perspective of a clinical practitioner, who applies realities of everyday medicine to economic reasoning. The author hopes to extend the field of vision of healthcare economics.

Key words: moral hazard, expenditure, non-adherence, avoidance of care

### “Moral hazard” in a nutshell

“Moral hazard” theory relates to the economic principle that as price goes down people will buy more items and services. In health care, the principle is translated into people utilizing more healthcare services if insurance companies take on the burden of the expense, especially by providing full coverage.

The concept of “moral hazard” could be used as a justification against welfare or presented as a prediction for rising expenditures with universal coverage. Historically, it was called “moral” because of the implication that overusing medical services due to transferred financial burden is a deviation from ethical standards of behavior. However, Pauly MV (1968) argued that it is

rational economic behavior and has nothing to do with morality; individuals would use more medical services if the cost is distributed among a large group [1].

Later, Nyman JA (2003) introduced a different theory to the welfare economic. Many medical services are so expensive that without insurance they are not accessible to most people. Therefore, people would buy insurance not to avoid losses, but to gain wealth and the access to medical care [2,3]. If medical care is too expensive to afford, then we are not talking about protecting against uncertainty through insurance, but about gaining purchasing ability.

### “Moral hazard”: appropriate avoidance of care and effect on health

The classic RAND Study in the 1980s was designed to answer the question: does cost-sharing lead to less service utilization? The study compared five groups with various cost-sharing plans, from no cost-sharing, to 25%, 50%, and 95% sharing, and the fifth group was provided with a health

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managed organization plan that had no cost-sharing but had regulated allowances [4].

The study showed that participants in the cost-sharing plans initiated less medical care and spent less. But was this the right decision considering their healthcare needs?

To evaluate if avoidance of care was appropriate, the authors divided medical conditions into groups based on current therapeutic ability to deal with the ailments [5]. For example, if somebody had a disease that could be easily treated with over-the-counter medication or was self-limited, avoidance of care was deemed appropriate. If a medical provider could offer effective specialized treatment and the patient did not initiate care, such avoidance of care was considered inappropriate. The results showed that cost-sharing was associated with a reduction of both appropriate and inappropriate medical care. People utilized fewer medical services with cost-sharing, but not without consequences for their health because they sometimes avoided effective care. Better hypertension control, better vision, and better dental health, and fewer symptoms such as chest pain, shortness of breath with exercise, and bleeding were observed in the group with no cost sharing among the poorest patients.

It is unlikely that initiation of care for self-limited illnesses is completely preventable because it would imply that people without medical training or additional tests know all the time if their conditions can be treated with self-care. For example, should the patient seek the attention of a primary care physician if he has a cough? The RAND Study put this symptom in the category "over-the-counter or self-care effective," which makes seeking medical care inappropriate. Modern medical practitioners would likely categorize this symptom differently: it is a case-by-case situation. Imagine the patient who is a long-time smoker. This patient might want to see a primary physician for the cough. Even if the patient heard from a physician, "This is nothing." Cough evaluation would not be considered as a

waste of resources, because it would have reassured the patient. We disagree that reassurance is equal to "inappropriate care", because it is an innate and expected part of the medical evaluation. In medicine, outcome cannot commonly be predicted until the healthcare encounter has occurred.

The patient might have threatening symptoms but believe them to be unimportant. For this reason, practitioners utilize *Review of Systems*. *Review of Systems* enables the detection of clinically meaningful symptoms independently from the patient's chief complaint by systematically asking questions about health of different systems and organs. If *Review of System* fails to detect problems, it does not mean it was a waste, just as a yearly car inspection is not a waste when it is uneventful.

A prospective study on the diagnostic protocol for fever of unknown origin reported that 81% of potentially diagnostic clues collected during the physical evaluation were misleading, while 19% of the collected information contributed to a final diagnosis [6]. These findings are consistent with the typical evaluation of a complex medical problem.

Another medical procedure that helps to determine the appropriateness of initiating health service is triage. This is a highly individualized process, performed by medical practitioners capable of detecting serious, emergent, and preventable conditions, not by patients themselves. Triage can be very challenging and controversial to perform because it requires a prediction of outcome while navigating with limited resources [7-9].

In summary, appropriateness of initiating health care can only be known *post factum*, after diagnostic procedures and triage are done. Patients cannot be expected to substitute self-diagnosis and self-treatment for trained medical professionals. From the patient's perspective, even if the episode of health care revealed a self-

limited condition, reassurance can be highly beneficial.

#### **“Moral hazard” and quality of care**

Another classic study of how insurance can influence health is the Oregon Experiment of 2013 [10]. The study compared pre-insurance health with patients’ health approximately two years after enrollment in Medicaid. The Medicaid plan provided prescription drug benefits, no cost-sharing and had a small monthly premium. The results showed that insurance coverage increased healthcare utilization. Other outcomes included a decrease in positive screening for depression, an increase in diagnosis of diabetes and use of medications for diabetes, and better preventive coverage of Pap smear and mammography among women. The study reported no difference in the rest of the measured health parameters such as blood pressure medication usage, diabetes control or high cholesterol levels while obtaining insurance. One of the authors (Katherine Baicker, 2013) noted that the confidence intervals did not allow her to reject the null hypothesis that there was no effect of Medicaid on blood pressure, cholesterol, or glycated hemoglobin levels, but there was no proof that Medicaid improved or harmed the participants [11]. The same issue with confidence interval was brought up in a letter to the editor by Ross Boylan (2013) who thought that an honest summary would be that likely there were positive effects, even though it is possible that they were zero or negative [12].

But let’s hypothetically accept that higher utilization of medical care in the Oregon Experiment indeed did not improve the outcome of such important conditions as hypertension and diabetes after two years of Medicaid coverage. If this conclusion is correct, then we are in big trouble considering the presumed quality of medicine. No improvement in the management of hypertension and diabetes after two years of care should be taken seriously and prompt further research to evaluate if there should be a better strategy for the Medicaid group compared to other groups of insured. It should raise questions,

such as, were insured participants offered effective services? Was compliance with medical treatment the same for different groups of insured? Was there any contribution of lifestyle, education, or other socioeconomic factor? As a clinical practitioner, I was seeking to answer, “what was wrong with medicine?” not “what was wrong with Medicaid?”

Welfare economics treats patients’ health services utilization on the grounds of morality, customers’ behavior that results in buying more with lower pricing, or from the position of the transitory income that increases purchasing power. The studies show that welfare increases both adequate and inadequate utilization, and this fact might have nothing to do with the patient as a customer, but merely occurs because of how medicine works. It won’t be possible to establish ideal healthcare utilization dealing with highly personalized services and continuously evolving medical science. Modern medical evaluation and diagnostic procedures, triage, need for reassurance, and lack of knowledge of ideal care in some cases makes patients’ “inappropriate” utilization an integral part of the process.

#### **Under-utilization: not the service you choose.**

Health care is different from all other services or products. Health care offers consumers invasive and bloody procedures and manipulations, such as phlebotomy, colonoscopy, pulling teeth, and radiation exposure from computer tomography imaging. Health care delivers bad news to the customers and deals with side effects of medications, including rash, diarrhea, or renal injury. The presumption that very few people would choose to over-utilize these services merely because they are free should not be ignored. In fact, some people would agree to accept this kind of service only after substantial incentives, such as imminent risk of death, pain, or payment and punishment.

Section 4108 of the Affordable Care Act, “Incentives for prevention of chronic diseases in Medicaid,” introduced award grants to States for

successfully implementing research on the incentives that encourage healthy behavior [13]. As an example, New York State offered direct cash payments for participation in a program of smoking cessation counseling and attending primary care appointments, and lottery tickets for participation in the YMCA Diabetes Prevention Program. California proposed a \$20 incentive for a complete telephone counseling session and an additional \$10 for a relapse-prevention call. In Minnesota, eligible Medicaid participants with risk factors for diabetes were offered no-cost participation in a diabetes prevention program, and this could be accompanied by additional incentives such as a food scale and healthy cookbooks [14].

In 2009, Volpp KG *et al.* showed that the addition of financial incentives to a smoking cessation program significantly increased the number of people who quit smoking. In 2011, the authors reported that after one company attempted to implement an incentive program based on the study, nonsmoking employees complained that a person should not be paid for something that other people did without a reward, and the company replaced the reward with a penalty for smokers. Volpp KG and colleagues found that lessons from behavioral economics could improve the incentive-program design, but real-world challenges made implementation deviate substantially from the theoretically optimal design [15,16].

Data on Medicaid program research on incentives are limited, and to-date were best reviewed by Blumenthal KJ *et al.* and the Medicaid and CHIP Payment and Access Commission [17,18]. Incentive programs have been criticized from both sides; for providing public funds that could possibly be used to buy tobacco and alcohol as well as for offering incentives insufficient for the desired behavioral changes. Although discussions on the best method of delivery, the fairness of distribution, and the effectiveness of various incentives continues, the need for some sort of

encouragement to obtain necessary health service is evident.

Another unique property of medical services is that many services are finite and cannot be repeated whether they are free or not, for example, there is no need for another dose of vaccine after a successful vaccination, a second appendectomy, or an unnecessary invasive procedure. Increased utilization of health services would always be limited to some selective services, not the whole of medical care. Among services that could be overused are ambulatory care, hospitalizations, unnecessary blood and imaging testing, and in some instances intensive care during the last months of life [19-21]. Factitious disorder (Munchausen's syndrome) that prompts patients to falsify symptoms is very rare. Malingering, an intentional deceptive behavior to gain benefits, is best described in the settings when financial compensation, such as disability, is at stake, or as a part of other disorders, such as opioid dependence [22,23].

Evidence-based medicine can guide the appropriateness of interventions, although this would not exclude debate on the cost-effectiveness threshold, a threshold below which it is worth spending money, due to the subjectivity of such decisions and the lack of reliable data [21,24-26].

**Under-utilization: no-show rate, nonadherence, and avoidance of care**

Under-utilization of health care is very familiar to practitioners in terms of no-show rate (a percentage of appointments unattended by the patients), poor adherence to recommendations, and avoidance of care.

*No-show rate*

A systematic review of 105 articles reported an overall average no-show rate of 23% of all appointments [27]. In the US, reported no-show rates vary from 12.6% to 47% based on the type of medical services and the time-to-appointment [28,29]. In the report by an optometric clinic, the

no-show rate was the lowest among Medicare holders, 17.1%, while patients with Medicaid had a no-show rate up to 41.2%; that is higher than a no-show rate among self-pay patients, 36.7% [30]. Authors commented that their data showed that patients with greater financial need and poorer access to health care were more likely to miss appointments. Therefore, caution needs to be exercised extrapolating data on healthcare utilization from one group to the whole population. Different populations might have different challenges to healthcare access that are beyond economics, and other co-factors rather than cost-sharing alone might influence the outcome of the medical care.

#### *Nonadherence*

Nonadherence to medical recommendations is reported among 24.8% to 57.7% of cases and varies based on the disease, type of medication, and patients' population. According to the IMS Institute for Healthcare Informatics, \$68-146 billion of avoidable healthcare costs are lost to nonadherence every year [31]. Nonadherence is associated with poor outcomes and disability. For example, the reported prevalence of nonadherence to antibiotic regimens is 58%, and this facilitates the development of bacterial resistance to antibiotics, one of the major problems of medicine today [32-38].

The Centers for Disease Control and Prevention (CDC) reported for 2015, that only 57% of the people who received an HIV diagnosis continued with HIV care [39]. "Guidelines for the Use of Antiretroviral Agents in Adults and Adolescents Living with HIV" provides a section for recommendations on how to address adherence to avoid resistance, improve health, and prevent the spread of infection [40].

It is expected that with improved adherence to medications, the patient will buy more recommended drugs increasing utilization [41]. Better adherence to HIV therapy led to higher total medical cost for the only reason of high cost of anti-HIV medications. However, low prices of

the drugs resulted in cost-saving because adherence to therapy improves health [42].

#### *Avoidance of care.*

There are many examples of underutilization that result from avoidance of care. For example, consider obesity that according to CDC National Center for Health Statistics is affecting 39.8% of US adults and is associated with poor health and low compliance with preventive measurements. Increased body mass index is associated with delay or avoidance of health care due to stigmatization and bias [43-46].

Nearly 22% of patients 65 years or older reported avoidance of medical care because of reasons such as feeling uncomfortable being examined, fear of a serious illness, and thoughts of death [47]. Among resident physicians, 18% often avoided or delayed health care [48]. More than 31% of the adults, aged 20-44, leave dental caries untreated [49].

Avoidance of care is prevalent even without consideration of a well-known contributor to avoidance of care, that is, healthcare cost or "financial toxicity" [50-53].

Under-utilization will likely remain a problem in the system with full insurance coverage. This fact seems contradictory to the "moral hazard" theory, but if we consider health care to be a principally different entity from other services or products, it won't seem paradoxical.

#### **Conclusion**

The avoidance of medical care because of cost-sharing results in diminished adequate and inadequate healthcare utilization, and it is not harmless for the patients' health.

Increased healthcare utilization can be useful and purposeful when it improves access to care. Shared cost should not be used as a penalty to encourage patients to use medical care only when it is "appropriate," because a person without

medical training is not expected to self-diagnose or self-treat all the time.

Application of “moral hazard” theory to clinical practice is paradoxical, because medical services differ from other services and are commonly avoided for reasons other than cost. While policymakers are fighting increasing healthcare costs, clinical practitioners are struggling to encourage underserved patients to receive indicated medical care. No-show rate, nonadherence, and avoidance of care are widespread. Perhaps, patients’ utilization of medical services is the wrong place to look for cutting healthcare expenditures.

### References

1. Pauly MV. The economics of moral hazard: Comment. *Am Econ Rev* 1968; 58, 531-7.
2. Nyman JA. *The theory of demand for health insurance*. Redwood City, CA: Stanford University Press; 2003.
3. Nyman JA. The economics of moral hazard revisited. *J Health Econ* 1999; 18: 811-24.
4. Brook RH, Keeler EB, Lohr KN, *et al*. *The Health Insurance Experiment: A classic RAND study speaks to the current health care reform debate*. Santa Monica, CA: RAND Corp; 2006.
5. Lohr KN, Brook RH, Kamberg CJ, *et al*. Use of medical care in the RAND health insurance experiment. Diagnosis- and service-specific analysis in a randomized controlled trial. *Med Care* 1986; 24: S1-S87.
6. Bleeker-Rovers CP, Vos FJ, de Kleijn EM, *et al*. A prospective multicenter study on fever of unknown origin: the yield of a structured diagnostic protocol. *Medicine (Baltimore)* 2007; 86: 26-38.
7. Repine TB, Lisagor P, Cohen DJ. The dynamics and ethics of triage: Rationing care in hard times. *Mil Med* 2005; 170: 505-9.
8. Campbell JL, Fletcher E, Britten N, *et al*. The clinical effectiveness and cost-effectiveness of telephone triage for managing same-day consultation requests in general practice: A cluster randomized controlled trial comparing general practitioner-led and nurse-led management systems with usual care (the ESTEEM trial). *Health Technol Assess* 2015; 19:1-212.
9. Baimas-George M, Cunningham KW, Ross SW, *et al*. Filled to the brim: the characteristics of over-triage at a level I trauma center. *Am J Surg* 2019; S0002-9610(19)30344-7. doi: 10.1016/j.amjsurg.2019.08.017.
10. Baicker K, Taubman SL, Allen HL, *et al*. The Oregon experiment—effects of Medicaid on clinical outcomes. *N Engl J Med* 2013; 368: 1713-22.
11. Baicker K, Finkelstein AN. Effect of Medicaid on clinical outcomes. The authors reply. *N Engl J Med* 2013; 369: 583.
12. Boylan R. Effect of Medicaid on clinical outcomes. Letter to the editor. *N Engl J Med* 2013; 369: 582.
13. Center for Health Care Strategies, Inc. Section 4108 of the Affordable Care Act: Medicaid incentives for prevention of chronic disease. Updated August 2019. [Cited Oct 2019]; <https://innovation.cms.gov/initiatives/mipcd>.
14. Center for Medicare & Medicaid Services; Medicaid Incentives for the Prevention of Chronic Disease grant program for New York: [cited Nov 13, 2019] <https://innovation.cms.gov/Files/x/MIPCD-NY.pdf>; for California: <https://innovation.cms.gov/Files/x/MIPCD-CA.pdf>, for Minnesota: <https://innovation.cms.gov/Files/x/MIPCD-MN.pdf>.
15. Volpp KG, Troxel AB, Pauly MV, *et al*. A randomized, controlled trial of financial incentives for smoking cessation. *N Engl J Med* 2009; 360: 699-709.
16. Volpp KG, Asch DA, Galvin R, Loewenstein G. Redesigning employee health incentives—lessons from behavioral economics. *N Engl J Med* 2011; 365: 388-90.
17. Blumenthal KJ, Saulsgiver KA, Norton L, Troxel AB, *et al*. Medical incentive programs to encourage healthy behavior show mixed results to date and should be studied and improved. *Health Affairs* 2013; 32: 497-507.
18. Medicaid and CHIP Payment and Access Commission. The use of healthy behavior incentives in Medicaid. Issue Brief August 2016; [cited Nov 13, 2019] <https://www.macpac.gov/wp->

- content/uploads/2016/08/The-Use-of-Healthy-Behavior-Incentives-in-Medicaid.pdf.
19. Kale MS, Bishop TF, Federman AD, Keyhani S. "Top 5" Lists Top \$5 Billion. *Arch Intern Med* 2011; 20: 1856-8.
  20. Kale MS, Bishop TF, Federman AD, Keyhani S. Trends in the overuse of ambulatory health care services in the United States. *JAMA Intern Med* 2013; 173: 142-8.
  21. Wennberg JE, Fisher ES, Sharp SM, *et al.*, Center for the Evaluative of Clinical Sciences. The care of patients with severe chronic illness: an online report on Medicare Program by the Dartmouth Atlas Project 2006; [cited Nov 13, 2019] [http://archive.dartmouthatlas.org/downloads/atlas/ases/2006\\_Chronic\\_Care\\_Atlas.pdf](http://archive.dartmouthatlas.org/downloads/atlas/ases/2006_Chronic_Care_Atlas.pdf).
  22. Bass C, Halligan P. Factitious disorders and malingering: challenges for clinical assessment and management. *Lancet* 2014; 383: 1422-32.
  23. Longo LP, Parran T Jr, Johnson B, Kinsey W. Addiction: Part II. Identification and management of the drug-seeking patient. *Am Fam Physician* 2000; 61: 2401-8.
  24. Owens D. Interpretation of cost-effectiveness analysis. *J Gen Intern Med* 1998; 13: 716-7.
  25. Bertram MY, Lauer JA, Joncheere KD, *et al.* Cost-effectiveness thresholds: pros and cons. *Bull World Health Organ* 2016; [cited Nov 13, 2019] <https://www.who.int/bulletin/volumes/94/12/15-164418/en>
  26. Cameron D, Ubels J, Norstrom F. On what basis are medical cost-effectiveness thresholds set? Clashing opinions and an absence of data: a systematic review. *Glob Health Action* 2018; 11: 1447828.
  27. Dantas LF, Fleck JL, Cyrino Oliveira FL, Hamacher S. No-shows in appointment scheduling – a systematic literature review. *Health Policy* 2018; 122: 412-21.
  28. Kheirkhah P, Feng Q, Travis LM, Tavakoli-Tabasi S, Sharafkhaneh A. Prevalence, predictors and economic consequences of no-shows. *BMC Health Serv Res* 2016; 16:13.
  29. Drewek R, Mirea L, Adelson PD. Lead time to appointment and no-show rates for new and follow-up patients in an ambulatory clinic. *Health Care Manag (Frederick)* 2017; 36 :4-9.
  30. Gross S, Gable E. Evaluation of no-shows in an optometric education clinic. *Optometry Vision Sci* 2002; 79: 44.
  31. IMS Institute for Healthcare Informatics. Valkova S, Gorokhovich M, Sacks N, *et al.* Avoidable costs in U.S. healthcare: The \$200 billion opportunity from using medicines more reasonably 2013; [cited Nov 13, 2019] [http://offers.premierinc.com/rs/381-NBB-525/images/Avoidable\\_Costs\\_in%20US\\_Healthcare-IHII\\_AvoidableCosts\\_2013%5B1%5D.pdf](http://offers.premierinc.com/rs/381-NBB-525/images/Avoidable_Costs_in%20US_Healthcare-IHII_AvoidableCosts_2013%5B1%5D.pdf).
  32. DiMatteo MR. Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Med Care* 2004; 42: 200-9.
  33. Fischer MA, Stedman MR, Lii J, *et al.* Primary medication non-adherence: analysis of 195,930 electronic prescriptions. *J Gen Intern Med* 2010; 25: 284-90.
  34. Fernandes M, Leite A, Basto M, *et al.* Non-adherence to antibiotic therapy in patients visiting community pharmacies. *Int J Clin Pharm* 2014; 36: 86-91.
  35. Kardas P, Lewek P, Matyjaszczyk M. Determinants of patient adherence: a review of systematic reviews. *Front Pharmacol* 2013; 4:91. doi: 10.3389/fphar.2013.00091.
  36. Eells SJ, Nguyen M, Jung J, Macias-Gil R, May L, Miller LG. Relationship between adherence to oral antibiotics and post-discharge clinical outcomes among patients hospitalized with *Staphylococcus aureus* skin infection. *Antimicrob Agents Chemother* 2016; 60: 2941-8.
  37. Wahl LM, Nowak MA. Adherence and drug resistance: predictions for therapy outcome. *Proc Biol Sci* 2000; 267: 835-43.
  38. Cutler RL, Fernandez-Llimos F, Frommer M, Benrimoj C, Garcia-Cardenas V. Economic impact of medication non-adherence by disease groups: systematic review. *BMJ Open*. 2018; 8: e016982.
  39. Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data: United States and 6 dependent areas. HIV surveillance report. Supplemental report 2016; 23(4).[cited November 13, 2019] <https://www.cdc.gov/hiv/pdf/library/reports/sur>

- veillance/cdc-hiv-surveillance-supplemental-report-vol-23-4.pdf.
40. Panel on antiretroviral guidelines for adults and adolescents. Guidelines for the use of antiretroviral agents in adults and adolescents living with HIV. DHS. [cited November 13, 2019] <http://www.aidsinfo.nih.gov/ContentFiles/AdultandAdolescentGL.pdf>.
  41. Iuga AO, McGuire MJ. Adherence and health care cost. *Risk Manag Healthc Policy* 2014; 7: 35-44.
  42. Gardner EM, Maravi ME, Rietmeijer C, Davidson AJ, Burman WJ. The association of adherence to antiretroviral therapy with healthcare utilization and cost for medical care. *Appl Health Econ Health Policy* 2008; 6: 145-55.
  43. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity among adults and youth: United States, 2015-2016. National Center for Health Statistics Data Brief. No. 288. October 2017. [cited November 13, 2019] <https://www.cdc.gov/nchs/data/databriefs/db288.pdf>
  44. Drury CA, Louis M. Exploring the association between body weight, stigma of obesity, and health care avoidance. *J Am Acad Nurse Pract* 2002; 14: 554-61.
  45. McGuigan RD, Wilkinson JM. Obesity and healthcare avoidance: a systematic review. *AIMS Public Health* 2015; 2: 56-63.
  46. Phelan SM, Burgess DJ, Yeazel MW, Hellerstedt WL, Griffin JM, van Ryn M. Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obes Rev* 2015; 16: 319-26.
  47. Leyva B, Taber JM, Trivedi AN. Medical care avoidance among older adults. *J Appl Gerontol* 2017; Dec 1:733464817747415. doi: 10.1177/0733464817747415.
  48. Dunn LB, Green Hammond KA, Roberts LW. Delaying care, avoiding stigma: residents' attitudes toward obtaining personal health care. *Acad Med* 2009; 84: 242-50.
  49. CDC, National Center for Health Statistics. Table 60. Untreated dental caries, by selected characteristics: United States, selected years 1988-1994 through 2011-2014. [cited November 13, 2019] <https://www.cdc.gov/nchs/data/abus/2017/060.pdf>.
  50. Smith KT, Monti D, Mir N, Peters E, Tipirneni R, Politi MC. Access is necessary but not sufficient: factors influencing delay and avoidance of health care services. *MDM Policy Pract* 2018; 3: 2381468318760298. doi: 10.1177/2381468318760298.
  51. Federman AD, Vladeck BC, Siu AL. Avoidance of health care services because of cost: impact of the Medicare savings program. *Health Aff (Millwood)* 2005; 24: 263-70.
  52. Yarbrough C, Nasseh K, Vujicic M. Why adults forgo dental care: evidence from a new national survey. Research Brief. Health Policy Institute, American Dental Association 2014; [cited November 13, 2019] [https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief\\_1114\\_1.ashx](https://www.ada.org/~media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_1114_1.ashx).
  53. Kirzinger A, Munana C, Wu B, Brodie M. Data note: Americans' challenges with health care cost. Kaiser Family Foundation 2019. [cited November 13, 2019] <https://www.kff.org/health-costs/issue-brief/data-note-americans-challenges-health-care-costs>.