The impact of out-of-pocket payments on prevention and health-related lifestyle: a systematic literature review

Reza Rezayatmand1,2, Milena Pavlova1, Wim Groot1,3

1 Department of Health Services Research, CAPRI, Maastricht University Medical Center, Faculty of Health, Medicine and Life Sciences, Maastricht University, The Netherlands
2 Isfahan University of Medical Sciences, Isfahan, Iran
3 Top Institute for Evidence-Based Education Research (TIER), Maastricht University, The Netherlands

Correspondence: Reza Rezayatmand, Department of Health Services Research, P.O. Box 616, 6200MD Maastricht, The Netherlands, tel: +31 43 3881723, fax: +31 43 3884162, e-mail: mr.rezayatmand@maastrichtuniversity.nl

Background: Out-of-pocket payments can have a large impact on the demand for healthcare. They can be essential not only to decrease unnecessary service use, but also to encourage the use of particular preventive services provided free of charge or at a lower price. Moreover, out-of-pocket payments may increase the costs of unhealthy behaviour and provide incentives for a healthier lifestyle. Method: This study systematically reviews empirical evidence on the effects of out-of-pocket payments on the use of preventive services and health-related lifestyle. All possible combinations of three key words ‘prevention’, ‘patient payment’ and ‘health-related behaviour’ were searched in PUBMED, ECONLITH, ECONPAPER and EMBASE. In total, 47 relevant publications were identified. Results: The results suggest that out-of-pocket payments can create a financial barrier and can decrease the use of preventive services and the uptake of preventive medications. A few studies (with contradicting empirical evidence) address the impact of cost sharing and reduced insurance coverage on a healthier lifestyle. Conclusion: Although the great diversity of study designs (various indicators of out-of-pocket payments and preventive/health-related behaviour) makes it difficult to offer robust policy recommendations, our findings support calls to reconsider how preventive services should be financed. More research is needed to explore the actual impact of cost sharing on different aspects of health-related lifestyles, as well as to explain the role of other relevant determinants that could impact this relationship.

Introduction

Out-of-pocket payments have received a lot of attention in recent years due to their effect on patient behaviour. They can have an impact on the quantity of health care demanded. Patient payments can decrease unnecessary service utilization, but also encourage the use of specific preventive services. Moreover, out-of-pocket payments for curative care can increase the costs of unhealthy behaviour for patients and may provide incentives for prevention (including vaccination, screening) and a healthier lifestyle.

Prevention is an ex-ante activity aimed at self-protection and self-insurance, and includes primary and secondary prevention. Primary prevention reduces the probability of illness by adapting patients’ health-related behaviour (e.g. health promotion or ‘wellness’ activities), and by providing health-care services that might decrease the future incidence of illness (e.g. vaccination). Secondary prevention decreases the vulnerability to an illness by means of medical interventions, i.e. examination and/or medication, as well as diagnostic screening (e.g. scanning and mammography).

In the insurance model, it is argued that primary prevention and care are substitutes and thus, the increase in the price of curative medical care leads to an increase in the demand for primary prevention. This situation is related to ex-ante moral hazard, which is defined as the possibility that the insurance for curative care discourages primary prevention. Incomplete health insurance coverage by induced cost sharing is one of the solutions. At the same time, it is suggested that insurance coverage for curative care may encourage the use of secondary preventive services designed for early detection of a disease. Thus, secondary prevention and care may be complements rather than substitutes because early detection is valuable only if it can be followed by curative care. Despite much theoretical discussion, little is known about the applicability of the model in reality and how out-of-pocket payment can impact prevention and health-related lifestyle.

The aim of this study is to systematically review existing empirical evidence on the effects of out-of-pocket payments on the use of preventive services and health-related lifestyle. This study focuses on out-of-pocket payments that result from direct payments and cost sharing arrangements.

Methods

Three key words were selected for systematic literature review namely ‘prevention’, ‘health-related behaviour’ and ‘patient payment’. By patient payment we mean a direct payment for healthcare goods or services that are not covered by any form of pre-payment scheme or a payment resulting from cost sharing arrangements that require patients to pay part of their healthcare costs.

Possible synonyms of all terms were also included, as well as their different spellings. As a result, several chains of keywords were used for the literature search (Box 1). Using these chains of key words presented in Box 1, the following databases were searched: PUBMED, ECONLITH, ECONPAPER and EMBASE. To keep the search feasible, only the titles and the abstracts of the publications were searched. In fact, if the text of the publication was also included in the search, then, the list of publications would contain a huge number of irrelevant publications. There was no limitation to the year of publication and geographical region. However, only English
language publications were included. This way, the initial list of publications was obtained.

After excluding duplicate publications, the list was reduced by applying relevance criteria, namely that the publication should present an empirical analysis that directly or indirectly indicated the effect of out-of-pocket payments on the use of preventive services and/or health-related lifestyle. In order to identify relevant articles, first, all abstracts were reviewed. If the relevance of the publication was uncertain, the full text was reviewed. The reference lists of the publications were also reviewed. This way, the final list of relevant publications was obtained. Publications selected as relevant were reviewed to extract empirical evidence about the relationship between out-of-pocket payments and prevention/health-related lifestyle. Evidence was categorized in the form of tables and figures, and was analysed qualitatively in line with the aim of the study.

Result

In total, 188 articles were initially identified, of which 47 met the relevance criteria. A list with all publications reviewed can be found in Appendix A, and a detailed description of findings per publication can be found in Appendix B (see online Supplementary Data).

Overall characteristics of publications

Most studies, 31 out of 47 publications, originate from the USA, and only two studies originate from Europe (one from Germany and one from the UK). Most studies (90%) were published in peer-reviewed journals, although working papers and briefs are also included. While 82% of publications were published in the past decade (since 2000), 51% were published during the last 6 years. The majority of publications are based on existing data (e.g. claim and administrative data) and secondary data analysis, and/or simulation and econometric modelling. Only six studies collected their own data through surveys and three studies produced data by experiments. The internal validity of five studies is not clear because they do not discuss this issue and do not provide sufficient details to judge the internal validity. The external validity of only six studies is clear (mostly only at national level) due to the fact that the most of studies either do not discuss the generalizability of their results or express some doubts about it.

With regard to the type of prevention, 37 out of 47 publications aim at an analysis of secondary prevention. Most of these studies investigate the impact of prescription drugs cost sharing on drug compliance and adherence. Among the most frequently addressed diseases are heart disorders (mostly coronary artery disease), hypertension, HIV infection and diabetes mellitus. Only six studies focus on the impact of cost sharing on the demand for recommended preventive services, such as periodic comprehensive examination, cancer screening (mostly breast and cervical cancer), as well as blood pressure and cholesterol level screening. Only 13 publications focus on primary prevention and healthy behaviour.

The impact of out-of-pocket payments on healthy behaviour and primary prevention

Figure 1 illustrates the results of publications that study the impact of out-of-pocket payments on the use of preventive services and health-related activities.

As illustrated in figure 1, co-payments have a negative impact on the number of patients with unhealthy behaviour who are referred to intensive counselling.6 When patients are required to pay for counseling, the referral level declines by 97%. The type of health insurance plan is also found to influence health-related behaviour. For example, individuals who are enrolled in Consumer-Driven Health Plans (e.g. a Health Saving Account which can be used to pay for health-care expenses) and High Deductible Health Plans, are more cost-conscious about healthcare expenditure and are more likely to exhibit healthy behaviour (more likely to exercise, less likely to smoke and less likely to be obese) than those with a traditional insurance coverage. This is because such plans bring an aspect of consumer engagement into the payment for health care.

One study,2 which examines whether purchasing private health insurance modifies the probability to exercise and smoke, finds that privately insured people tend to practice sports more often and smoke less than those who do not have a supplementary private health insurance. The study controls for socio-economic (age, gender, education and income) and health condition variables. In addition, this study uses an instrumental variable technique to rule out the effect of a potentially important unobserved variable namely ‘risk aversion’. Finally, it concludes that a healthcare market with widespread insurance coverage may lead to more (rather than less) prevention than a market with low insurance coverage. Another study,6 in contrast, shows that not having any type of insurance (supplementary and private insurance besides socio-economic variables included as co-variates), is positively associated with the probability of quitting smoking. In addition, there is no significant evidence indicating that health insurance coverage for smoking cessation medicines encourages the insured to quit smoking.

With regard to primary prevention, one study10 shows that a co-payment of $5 for an office visit does not have any significant impact on childhood immunization. A Health Insurance Experiment study (HIE)11 that included significant numbers of low-income persons, by contrast, indicates that a cost sharing insurance plan versus a free-of-charge insurance plan significantly decreases the percentage of children between 0 and 6 years who received any kind of immunization. In addition, some studies provide evidence indicating that the demand for preventive health products is highly price sensitive.12,13

The impact of out-of-pocket payments on secondary prevention

In order to investigate the impact of cost sharing on secondary prevention, the various outcome variables, addressed in the publications reviewed, are classified into two main groups—medication adherence and preventive services use.

As depicted in figure 2, there is strong evidence that prescription drug cost sharing in terms of co-payments or co-insurance, as well as
**Figure 1** The impact of out-of-pocket payments on health-related behaviour and primary prevention

**Figure 2** The impact of out-of-pocket payments on secondary prevention
different types of health insurance plans, negatively affect medication adherence, which might have adverse health consequences. Only three out of 31 studies contradict these findings. In particular, one study reports that introducing a 25% co-insurance (by an annual ceiling based on personal income) does not change the prescription of essential cardiac medications and does not have consequences for care related to an acute myocardial infarction among elderly patients. Another study describes that a small change in co-payment and co-insurance does not appear to substantially affect the outcome, while emphasizing that the impact of a large change in the co-payment needs further examination. One of the publications that studied the impact of a $5 co-payment for office visits shows a 4% decrease in prescriptions for cardiovascular drugs, but this effect is not statistically significant.

There is also evidence that patient cost sharing has a negative effect on the utilization of recommended preventive services (i.e. counselling, blood pressure screening, Pap smear and mammogram). One study also finds that a deductible and co-insurance have a greater negative effect than a co-payment. Lack of health insurance coverage reduces the use of some preventive services as well. The type of health plan can significantly affect cancer screening and blood pressure, as well as cholesterol level screening. Although an office visit co-payment has a significant negative impact on comprehensive examinations, it has no impact on the demand for cancer screening tests. In contrast, an HIE study finds a significant negative effect of cost sharing on the rates of Pap smears received by women aged 45–65 years. It is argued that this effect might be significant only for low-income women. Online supplementary materials (Appendix B) provide more detailed information about publications such as the origin of the data, type of publication, study design and predictor variables, their internal and external validity as well as their conclusions and policy recommendations.

**Discussion**

The results indicate that despite the increased attention to the impact of cost sharing on health-related behaviour and prevention during the last decade, empirical evidence of a causal relation between out-of-pocket payments and prevention is still lacking. Most studies originate from the USA and only a few publications in English are from Europe. The variety of health-care plans in the US healthcare system, which is largely served by the private sector, makes cost sharing one of the key regulatory mechanisms of cost controlling and a source of contribution by the insured. This explains the high interest in cost sharing and the need for studies that assess the impact of cost sharing. At the same time, health policies in most European countries whose health-care systems are more often publicly financed rather than privately financed focuses more on supply-side restrictions like implementing budget caps rather than demand-side restrictions like cost sharing. Therefore, cost sharing is limited in Europe.

Our results show that despite the presence of studies that focus on the relationship between cost sharing and prevention, the data used are not always collected with the primary objective to test this relationship. Most studies are based on claims and administrative data that can only provide information on the scope of related payments and not necessarily on the reason of such payment. This leads to a lack of construct validity of the results in general, even if the study design is clear enough in terms of internal validity as suggested by our review. Additionally, the majority of publications fail to provide evidence of the generalizability (external validity) of their results. Therefore, it is not always possible to interpret or analyse patient behaviour in relation to payments. Moreover, there is a lack of experimental studies, partly because real experiments on this topic are not always possible for ethical reasons. Studies have investigated the impact of very different levels of cost sharing or out-of-pocket payments. Some studies have observed the impact of not having any insurance plan or having supplementary or private insurance on patient behaviour. Others have focused on different levels of insurance coverage, for instance, having a full coverage plan for pharmaceutical costs or different levels of insurance coverage for preventive services. These variables imply cost sharing indirectly. Still others have examined different levels of co-payments, co-insurance or a deductible. Such arrangements directly affect the amount of money those patients pay at the point of services use. In addition, the effect of price of services regardless of the role of insurance is examined in some publications.

The measures of preventive behaviour and use of preventive services also vary across studies, including the probability of healthy behaviour, the proportion of people who engage in activities or receive some services, the quantity of prescribed drug purchased and/or health products purchasing, as well as health outcomes, i.e. mortality rate or hospitalization rate. The great diversity in indicators of cost sharing and preventive behaviour, discussed above, makes it difficult to infer causal relationships between these variables. Moreover, most studies reviewed use a revealed preference method. Such ex-post evaluation of patient behaviour could potentially be biased by other factors, such as quality or provider characteristics. In order to avoid this problem; future research could use a combination of revealed and stated preference methods.

**The impact of out-of-pocket payments on healthy behaviour**

In theory, higher levels of insurance coverage lower the incentive for healthy behaviour, if the insurer is not able to observe patient behaviour or to infer the level of prevention from the loss. Hence, incomplete health insurance coverage due to cost sharing is considered a solution to the ex-ante moral hazard problem. The few studies that address this theory and test the impact of insurance on healthy behaviour come to different conclusions. Thus, even though healthy behaviour can be promoted by different incentives, the role of health insurance coverage and out of pocket payments are still not empirically established. Moreover, for some unhealthy behaviours like smoking which have the propensity to be addictive, individual addiction and societal tolerance can have an important role as well.

**The impact of out-of-pocket payments on preventive services utilization**

Few studies address the impact of out-of-pocket payments on the utilization of preventive services particularly with regard to the existence or absence of ex-ante moral hazard in the health-care system. If it is assumed that consumers view prevention and cure as complements rather than as substitutes, it would mean that insurance coverage for curative care may encourage the use of preventive services designed for an early detection of disease. This is mainly because early detection is valuable only if it can be followed by curative care. In order to demonstrate this argument, one must show that the insurance coverage for curative care would increase the utilization of preventive services even if they are not covered. However, currently, there are no studies that examine this claim. Existing publications only examine the relationship between cost sharing for preventive services and their utilization. They mostly conclude that out of pocket payments decrease the utilization of preventive services because they make them more costly. However, the question of whether out-of-pocket payments for curative care can prompt healthy behaviour or encourage people to use preventive services even when they are not insured still remains unanswered.

Our results strongly support the concept that cost sharing, as a financial barrier, decreases both medication adherence and the use of preventive services, which negatively affects secondary prevention.
Similar conclusions may apply to immunization and utilization of some health products that are necessary for primary prevention. Moreover, preventive measures like vaccination generate positive externalities which imply that they should—at least partly—be publicly funded.\textsuperscript{12,31} Although it is argued that cost sharing for commodities that require intensive use (adherence) might lead to a greater or more intensive use among owners, it still needs to be empirically proven.\textsuperscript{12,31}

In conclusion, the variety in study designs of the publications reviewed here makes it difficult to interpret the results and make comparisons. In addition, the cost sharing arrangements considered in the publications have not been related to patients’ actual income. Thus, it is difficult to give robust policy recommendations about out-of-pocket payments with regard to health-related and preventive behaviour.

Nevertheless, our findings support calls to reconsider how preventive services should be financed. Decision-makers should plan and design a patient payment scheme based on lower patient cost sharing for services that aside from patients could more generally benefit society. Although introducing cost sharing is a prevailing cost-containment approach, it should be considered that adherence to preventive services actually reduces costs for health care.\textsuperscript{38} Thus, increasing the adherence to preventive services as well as encouraging people to pursue a healthier lifestyle could be the effective cost-containment approach that should be regarded by decision-makers.

Further research is required to answer the question of adequate levels of cost sharing for a country or for an insurance scheme. In addition, more research is needed to explore the actual impact of cost sharing on health-related lifestyles, as well as to explain the role of other relevant determinants (e.g., income, education) that could impact this relationship.

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**Key points**

- Despite much theoretical discussion, sound empirical evidence on the relation between out-of-pocket payments and primary prevention and health-related behaviour is still lacking.
- Few studies address the impact of cost sharing obligations and reduced insurance coverage on health-related lifestyle and moreover, their results are contradictory.
- There is strong evidence that in case of secondary prevention, out-of-pocket payments present a financial barrier by decreasing adherence to medication and preventive services.
- Although the diversity of the study designs makes it difficult to offer robust policy recommendations, our results indicate that reconstruction of the way preventive services are financed is in great demand.

**References**


John Last defined public health as "an organized activity of society to promote, protect, improve and when necessary, restore the health of individuals, specified groups or the entire population. It encompasses a wide range of services, institutions, professional groups, trades and unskilled professions". The World Health Organization interprets these efforts very broadly to include the alteration of living arrangements and lifestyles, social supports and transportation, as well as the more traditional public health functions such as infectious disease control and the improvement of safety. In consort with this definition, literature reviews on cost-effectiveness and best practices in public health encompass a wide range of interventions, extending well beyond the traditional boundaries of health departments. Although there is now information on what interventions work best in a variety of settings, there is minimal documentation on the actual supply and cost of public health practice. In order to say that there is too little or too much public health provision, we need to know how much is supplied, as well as how cost-effective these interventions are.

We conducted an economic survey of current practice of public health services in Alberta, Canada.