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Review Paper

Single-payer or a multipayer health system: a systematic literature review

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ABSTRACT

Objectives: Healthcare systems worldwide are actively exploring new approaches for cost containment and efficient use of resources. Currently, in a number of countries, the critical decision to introduce a single-payer over a multipayer healthcare system poses significant challenges. Consequently, we have systematically explored the current scientific evidence about the impact of single-payer and multipayer health systems on the areas of equity, efficiency and quality of health care, fund collection negotiation, contracting and budgeting health expenditure and social solidarity.

Study design: This is a systematic review based on Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Methods: A search for relevant articles published in English was performed in March 2015 through the following databases: Excerpta Medica Databases, Cumulative Index of Nursing and Allied Health Literature, Medical Literature Analysis and Retrieval System Online through PubMed and Ovid, Health Technology Assessment Database, Cochrane database and WHO publications. We also searched for further articles cited by eligible papers.

Results: A total of 49 studies were included in the analysis; 34 studied clinical outcomes of patients enrolled in different health insurances, while 15 provided a qualitative assessment in this field.

Conclusion: The single-payer system performs better in terms of healthcare equity, risk pooling and negotiation, whereas multipayer systems yield additional options to patients and are harder to be exploited by the government. A multipayer system also involves a higher administrative cost. The findings pertaining to the impact on efficiency and quality are rather tentative because of methodological limitations of available studies.

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Introduction

Universal healthcare coverage is ‘the most powerful concept that public health has to offer’.¹ The redistribution of health risks lies at the core of a universal coverage health system (UCHS), thereby protecting the citizens who are in the greatest need of healthcare services.

Despite the diversity in the design of health systems worldwide, all health systems have the same desired attributes of efficiency, trustworthiness and affordability.² The healthcare system can be defined by three functional processes: (i) service provision; (ii) financing and (iii) regulation, which must be governed by the following principles: (a) equity; (b) financial protection and (c) efficiency and quality, respectively.^{3,4}

The payer type, whether single payer or multipayer, is a highly debatable issue for any country contemplating healthcare reforms.^{4,5} A single-payer health system is delineated by universal and comprehensive coverage, while the payer is a public entity. A multipayer healthcare system, on the other hand, features two or more providers in charge of administering the health coverage. This assumes that a certain level of competition exists and usually the rules of competition, along with the basic principles of healthcare coverage, are demarcated by a governmental body. Cyprus and Ireland are examples of two European countries without a UCHS.⁶ In Cyprus, a parliament-approved National Health System has not been implemented because of concerns about its fiscal sustainability and the lack of consensus among social stakeholders and health professionals. Out-of-pocket payment (private expenditure that does not include copayments in the public healthcare sector) exceeds public funding, while the ability of people to fund their healthcare has been compromised because of the financial crisis and the reduction of household disposable income.⁶ The public healthcare sector has been severely strained, while the financial recession had impaired affordability for private sector health services, whose costs burden patients, thus exposing them to potentially catastrophic expenditure. The current situation begs for the introduction of a universal coverage health system (UCHS). This systematic review aims to enable informed decision-making in the context of Cyprus’ healthcare sector, while still being relevant to an international audience, as many countries are actively pondering reforms to improve their healthcare systems.

Objectives

The objective of this article is to systematically investigate current scientific evidence about the impact of the single-payer and multipayer health system on the areas of equity, efficiency, quality of care and financial protection through a systematic literature review.⁷

Methods

Based on the available literature and the theoretical background of universal coverage framework,^{4,8} the term health

protection, a major determinant in the context of a UCHS, encapsulates:

- a) Equity—timely access not linked to employment status or ability to pay;
- b) Efficiency and high-quality health care—providing the highest possible level of health with the available resources;
- c) Financial protection against catastrophic health expenditure, which can be further stratified into the following categories:
 - Fund collection, which is a policy norm.⁹ Fund collection is a weak stand-alone tool, unless accompanied by pooling of contributions and cross subsidisation of health costs.
 - Social solidarity.
 - Negotiation, contracting and budgeting, comprising the efficient use of health resources. This includes the selection of providers and implementation of cost-containment measures and even performance targets.
 - Health expenditure that provides the funds to meet the health needs of the population.

Studies reporting at least one of the aforementioned health protection parameters were included in the review.

Search strategy

Our research strategy was to look for (a) original and published studies (randomised controlled trials, observational, quantitative, qualitative, meta-analyses); (b) published between 01 January 1980 and 28 February 2015; and (c) studies that discuss single-payer and multipayer health systems, efficiency, solidarity, cost risk sharing and quality of care.

We searched the following databases: Excerpta Medica Databases, Cumulative Index of Nursing and Allied Health Literature, Medical Literature Analysis and Retrieval System Online through PubMed and Ovid, Health Technology Assessment Database, Cochrane database and WHO publications. We also searched for further articles cited by eligible articles.

Screening process

The screening process was conducted in two stages: first, the titles and abstracts were screened by the lead reviewer to exclude distinctly irrelevant references. If the abstract did not provide sufficient data to enable selection, full articles were reviewed. Second, full-text manuscripts were screened for compliance with inclusion criteria of the review by two independent reviewers. Disagreements were resolved by discussion or by consulting with the lead reviewer.

We adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement for reporting systematic reviews and meta-analysis in health care¹⁰ (Fig. 1). The PICO terms are the following:

- 1) Population: beneficiaries enrolled in health systems
- 2) Intervention: single payer vs multipayer health system
- 3) Comparison: single payer vs multipayer health system

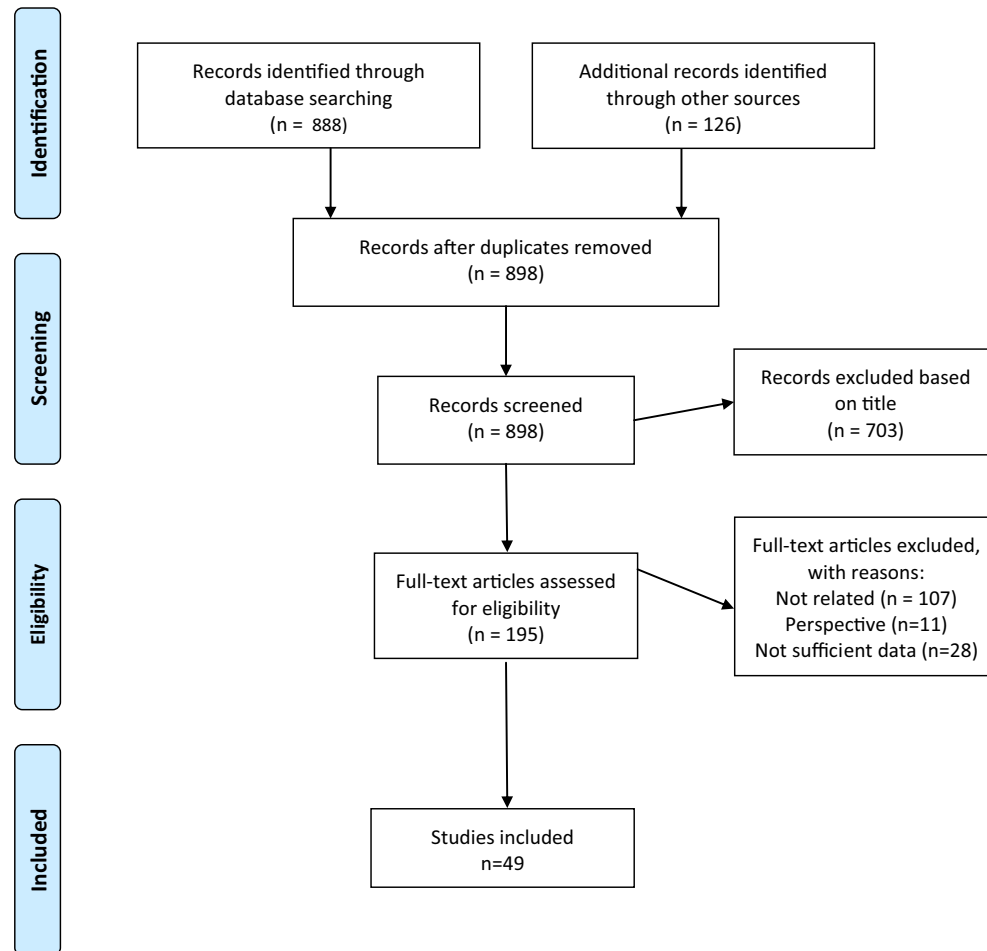


Fig. 1 – Flow Diagram of literature review of single-payer vs multipayer health systems using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

- 4) Outcomes: equity, solidarity, costs, efficiency, risk pooling, contracting negotiation and budgeting.

We used the Medical Subject Headings terms: ‘Single Payer System’, ‘Healthcare Disparities/statistics & numerical data’, ‘Insurance, Health/classification’, ‘System, Single-Payer’, ‘Single-Payer Plan’, ‘Insurance Coverage/statistics & numerical data’, ‘Health Insurance, Voluntary’ ‘Insurance, Voluntary Health’, ‘Group Health Insurance’, ‘Insurance, Group Health’, ‘Reimbursement, Health Insurance’, ‘Third-Party Payments’, ‘Payment, Third-Party’, ‘Payments, Third-Party’, ‘Third Party Payments’, ‘Third-Party Payment’, ‘Health Insurance Reimbursement’, ‘Insurance Reimbursements, Health’, ‘Reimbursements, Health Insurance’, ‘Third-Party Payers’, ‘Payer, Third-Party’, ‘Payers, Third-Party’, ‘Third Party Payers’, ‘Third-Party Payer’, ‘Health Program, National’, ‘Health Programs, National’, ‘National Health Program’, ‘Program, National Health’, ‘Programs, National Health’, ‘National Health Insurance’, ‘Health Insurance, National’, ‘Insurance, National Health’, ‘National Health Insurance, Non-U.S.’, ‘Health Services, National’, ‘National Health Service’, ‘Service, National Health’, ‘Services, National Health’, ‘National Health Services’, using Boolean operators (AND, OR).

Data collection

Data relating to study characteristics, such as study population, outcome measures and analysis undertaken, were extracted on a data extraction form by the lead reviewer and independently checked for accuracy by two independent reviewers, individually. Disagreements were resolved by discussion or by consulting with the lead reviewer.

Study selection

We identified 888 potentially eligible articles and an additional 126 through other sources (including snow-ball citations of the included articles). Deduplication led to 898 articles of which 703 were excluded based on title and 195 were further assessed for eligibility. A total of 112 were further excluded being unrelated to the study topic, 11 were perspective articles, while 24 more did not provide sufficient data. In the end, 49 studies were included in the analysis, including 34 with quantitative end-points and 15 with qualitative end-points (Fig. 1, Table 1 and Supplementary Table 1).

There were 20 studies focussing on the USA and four on Germany. Two compared the USA with Canada and two were

Table 1 – Assessment of qualitative studies.

Authors, year, reference	Author objectives or aims	Population (participants, diagnoses, gender, age)	Outcomes measures and analysis undertaken	Assessment criteria CASP ^a
Abihiro and Allegri, 2014 ⁸	Dimension of universal health coverage	Global perspective	Humanitarian, legal and economic approach	1,2,3,4,6,7,10
Besstremyannaya, 2013 ⁴⁴	Managed competition in health insurance systems in central and eastern Europe	Regulated competition among multiple health insurance companies in central and eastern Europe	Quality indicators (infant and under-five mortality etc.)	1,2,3,4,7,8,9,10
Blanchet and Fox, 2013 ⁵²	Prospective, institutional stakeholder analysis for Vermont's single-payer system	Questionnaire based in Vermont for stakeholders	Attitude for the comprehensive health reform	1,2,3,4,5,6,7,8,9,10
Chollet et al., 2002 ⁶¹	Feasibility study for introduction of single payer in Maine	Population module that estimates Maine's, (USA) population by sex and age	Cost, financing and economic impact module	1,2,5,6,7,8,9,10
Duijmelinck Mosca and van de Ven, 2015 ⁵⁵	Switching between insurers: benefits and costs	Dutch consumers (1091 respondents)	Relevance of the different switching benefits and costs in consumers' decision to switch the insurer	1,2,3,4,6,7,9,10
Geyman, 2005 ⁶⁵	Review paper	Qualitative	Comparison between single vs public	1,2,3,5,6,7,8,10
Hussey and Anderson, 2003 ⁴⁰	Comparison of single- vs multipayer system	Systematic review	Equity, risk pooling, financing and contracting	1,2,3,4,5,6,7,8,10
Mikkers and Ryan, 2014 ⁵	'Managed competition' for Ireland: the single- versus multiple-payer debate?	Qualitative	Effective managed competition	1,5,7,8,9,10
Preker, 1998 ⁶²	Policy paper	Qualitative (European Union [EU])	Strength, weakness and areas of improvement of EU health systems	1,2,3,4,5,6,7,8,9,10
Reinhardt, 2007 ⁴⁶	Perspective	Qualitative	Review of single- vs multipayer system	7,10
Thomson and Mosialos, 57	Insurance choice	Framework in Germany and the Netherlands	The impact of opting out on equity and efficiency	1,2,5,6,7,8,9,10
Vetter and Boecker, 2012 ⁵³	Describe introduction of a single payer in Dubai	Qualitative	Policy analysis framework	1,2,5,6,7,8,9,10
Wendt, Frisina and Heinz, 2009 ⁴	Classification of health systems	Conceptual comparison of health systems	Financing, service provision and access to health care	1,2,3,4,6,7,9,10
Van de Ven, Beck, Van de Voorde et al., 2007 ⁵⁹	Risk adjustment and risk selection	Qualitative study across Belgium, Germany, Israel, the Netherlands and Switzerland	Comparison of risk equalisation schemes	1,2,3,4,5,6,7,8,9,10
Van de Ven, Beck, Buchner et al., 2013 ⁴³	Efficiency and affordability	Belgium, Germany, Israel, the Netherlands and Switzerland	Assessment of efficiency and affordability in five European countries	1,2,3,4,5,6,7,8,9,10

1. Was there a clear statement of the aims of the research? (Consider • What was the goal of the research? • Why it was thought important? • Its relevance).

2. Is a qualitative methodology appropriate? (Consider • If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants • Is qualitative research the right methodology for addressing the research goal? Is it worth continuing?).

3. Was the research design appropriate to address the aims of the research? (Consider • If the researcher has justified the research design [e.g. have they discussed how they decided which method to use?]).

4. Was the recruitment strategy appropriate to the aims of the research? (Consider • If the researcher has explained how the participants were selected • If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study • If there are any discussions around recruitment [e.g. why some people chose not to take part]).

5. Was the data collected in a way that addressed the research issue? (Consider • If the setting for data collection was justified • If it is clear how data were collected [e.g. focus group, semi-structured interview etc]. • If the researcher has justified the methods chosen • If the researcher has made the methods explicit [e.g. for interview method, is there an indication of how interviews were conducted, or did they use a topic guide]? • If methods were modified during the study. If so, has the researcher explained how and why? • If the form of data is clear [e.g. tape recordings, video material, notes etc] • If the researcher has discussed saturation of data).

6. Has the relationship between researcher and participants been adequately considered? (Consider • If the researcher critically examined their own role, potential bias and influence during (a) Formulation of the research questions (b) Data collection, including sample recruitment and choice of location • How the researcher responded to events during the study and whether they considered the implications of any changes in the research design).
7. Have ethical issues been taken into consideration? (Consider • If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained • If the researcher has discussed issues raised by the study [e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study] • If approval has been sought from the ethics committee).
8. Was the data analysis sufficiently rigorous? (Consider • If there is an in-depth description of the analysis process • If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data? • Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process • If sufficient data are presented to support the findings • To what extent contradictory data are taken into account • Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation).
9. Is there a clear statement of findings? (Consider • If the findings are explicit • If there is adequate discussion of the evidence both for and against the researchers arguments • If the researcher has discussed the credibility of their findings [e.g. triangulation, respondent validation, more than one analyst] • If the findings are discussed in relation to the original research question).
10. How valuable is the research? Hint: Consider • If the researcher discusses the contribution the study makes to existing knowledge or understanding e.g. do they consider the findings in relation to current practice or policy?, or relevant research-based literature? • If they identify new areas where research is necessary • If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used.
- ^a Critical Appraisal Skills Program (CASP) qualitative checklist—three options available as a reply: yes, cannot tell and no. Inclusion of checklist number in the table implies a positive answer.

performed with a global perspective. One study dealt with a basket of European Union (EU) countries (Germany, Denmark, the Netherlands, Belgium, Luxemburg, France, the UK, Ireland, Italy, Greece, Spain, Portugal and Austria). One study referred (separately) to Switzerland, the Netherlands, Puerto Rico and Taiwan. Among the studies that referred to specific health conditions, six concentrated on oncology, four on cardiology, three on orthopaedic operations, one on transplantation and one on sepsis. Three studies focussed on disparities in waiting times pertinent to insurance type.

Among the 15 qualitative studies, two referred to a group of five countries (Belgium, Germany, Israel, the Netherlands and Switzerland) and two to the USA. Among the remaining studies, one dealt with EU countries, one combined the Netherlands and Germany, one assessed Dubai, one focussed on central and eastern Europe, one on the Netherlands, one on Ireland, while the others had a global framework.

Data items and critical appraisal

Two reviewers independently assessed the scientific quality using Cochrane Risk of Bias tool and the Critical Appraisal Skills Programme (CASP) tools (Table 1 and Supplementary Table 1, respectively). Disagreements were resolved by discussion or by consulting with the third (lead) independent reviewer.

Discussion

Equity

Equity is a fundamental pillar of health systems and it encompasses timely access, equivalence of care and absence of avoidable or remediable differences among groups of people, pertinent to distinct social, economic, demographical or geographical criteria.^{11,12} Persistent differences in the health status due to socio-economic status constitute a major concern across developed countries.¹³ Health inequalities escalate to significant health disparities, which were primarily reported in the oncology sector. Four out of the six studies that investigated cancer patient outcomes in single-payer vs multipayer health system settings, indicated that the insurance type was interweaved with survival. Among these, one study reported that certain insurances were correlated with advanced stage colorectal cancer diagnosis, which leads to lower relative survival.¹⁴ McDaid et al. concluded that the outlined variability of outcomes of lung, colorectal, prostate and breast cancer could be attributed to insurance type.¹⁵ One study regarding breast cancer evinced that within a multipayer system, patients with private insurances presented with statistically significant smaller tumours, compared with public beneficiaries.¹⁶ Robins and Niu reached the same conclusion for colorectal, breast, lung cancer and non-Hodgkin lymphoma.^{17–19} Nevertheless, two studies did not find significant differences in breast, cervical and colorectal cancer.^{20,21}

Three studies reported on orthopaedic care. Among these, two attested a significant association between income-related health insurance and hindered access to medical care, leading to impaired functionality after hip replacement therapy.^{22,23} It

was also observed that there was a statistical difference among several types of health insurance; patients covered by non-commercial insurance be in a disadvantaged position regarding their referral to rehabilitation services. Martin et al. in 2012 also reported that the payer type was statistically significantly associated with disparate joint arthroplasty outcomes.²⁴

Two more studies reported data on sepsis and lung transplantation. O'Brien et al. argued that risks of sepsis-associated death varied by insurance cover.²⁵ In the same vein, Allen et al. found a statistically significant correlation between survival of lung transplant recipients and insurance type.²⁶ Two studies reported on paediatric data indicating disparities between asthma management and insurance type among children,²⁷ and some payer types demonstrated diverging results contingent on the neonatal and post-neonatal period.²⁸

Three studies reported findings from Germany. Lungen et al. stated that for five specific specialist examinations, patients enrolled with statutory health insurance (SHI) waited 3.08 times longer for an appointment, compared with patients with private health insurance (PHI).²⁹ Kuchinke et al. concluded that private insurance patients in Germany have statistically significant lower waiting times in a sample of 485 hospitals.³⁰ Adding to this, Scwartz et al. concluded that exacerbated discrimination in waiting times between SHI and PHI beneficiaries, is -paradoxically-related to better financial performance of the hospitals.³¹

Four studies reported data in the cardiology sector. The insurance type also proved to determine the use or not of drug-eluting stents.³² Moreover, Laux et al. also stated that PHI patients are more likely to be prescribed newer antihypertensive agents.³³ Two of these four studies reported conflicting data with regard to the association of the payer type and outcomes of cardiac surgery.^{34,35}

Finally, Taiwan's recent shift to a single-payer design verifies that a single-payer system culminates to equal access to healthcare substantiated by high public satisfaction rate.³⁶

Efficiency and quality of health care

Quality in health is a multifactorial process and it has been interlaced with performance management, goal setting through health indicators, academic detailing and introduction of guidelines.³⁷ In general, the private sector is perceived to be more efficient than the public sector. There is an attempt to extrapolate this in the health sector, but this is highly challenged.³⁸ Geyman concluded that private hospital costs are 3–13% higher, employ fewer nurses and death rates are 6–7% higher compared with public hospitals.³⁸ In specialised units, such as dialysis centres, private centres reported 30% higher death rates compared with public units, while premature discharge from private hospitals was also observed. And, if we assume that fragmentation hinders efficiency improvement, we have to take into consideration that in the US, a sample of 2000 patients with depression were enrolled in 189 different plans with 755 different policies.³⁹ Moreover, high-quality healthcare implies that extrinsic factors such as employment status and payment status should not affect the

quality of provided services. The assumptions have exceeded the body of evidence and no differences in outcomes were observed in a study between single-payer and multipayer systems.⁴⁰

A single-payer system with a centralised data mining procedure is more likely to be able to glean and analyse health indicators, while the direct comparability of providers will presumably nurture patients in informed decision-making and concomitantly will engage providers in an efficiency-enhancement saga.⁴¹ Additionally, public single-payer systems are depleted of a profit motive. Although this may reduce overall costs of the system, it also nullifies incentives for efficiency improvement of their operation framework. In this notion, a multipayer system may be more efficient. Nevertheless, the rather oxymoron finding of underinvestment in high-quality care because of enhanced competition between insurers was reported, as quality improvement projects in hospitals run by a specific health insurance will also benefit the patients enrolled with a competitive insurance.⁴² In the same context, it was also reported that patients with private insurance give more favourable evaluations to their physicians ($P < 0.001$) compared with patients enrolled to SHI.

Competition enhancement among purchasers was proved to be a rather unattainable target across a cluster of EU countries,⁴³ while Besstremyannaya reckoned that the increased competition between private insurances in Russia did not lead to an improvement in the quality of care.⁴⁴

Financial protection

Fund collection

A single-payer system can explore synergies with tax-collecting structures at a marginal cost, which concomitantly comprises disadvantage in countries with significant tax evasion.⁴⁵ In tandem, a single-payer system can also be 'pitted against other government priorities', and it is an easy target on fund reduction.⁴⁶ It is also vulnerable under a hostile government due to its interdependence with government structures. Finally, a multipayer system requires replication of several individual mechanisms, from each payer, which further ramps up not only the total costs but also the complexity factor. Apart from this, fund collection is considered to be easier.

Negotiation, contracting and budgeting

Competitive forces in health are flawed because its main attributes entail asymmetry of information, barriers of entry and no potential substitution effect.⁴⁷ This is frequently overseen by people who endeavor to compare the health market with other commodity markets. Nevertheless, some unique and controversial attributes of the health market, such as healthcare's positive externalities, point out the importance of proper access for patients to the necessary healthcare services. Inequalities in access may be further exacerbated by the market, while they are rarely remedied by it.⁴⁸ Therefore, contracting of public good's services such as health services could have negative effects if the operational framework is not liable to constitutional scrutiny and does not abide by legal and ethical accountability.⁴⁹

Contracting

A multipayer system is a market-oriented approach and it perceives health as a commodity.⁵⁰ Feldman contented that a single-payer system deems health as a public good, which will be underprovided for in a multipayer system.⁵¹ Multipayer systems can offer patient-centred packages, an attribute that is debated because several authors demonstrated that a service rarely fits just one patient, but it usually suits a collection of patients of similar sociodemographic characteristics.⁴⁷ Moreover, a multipayer system may accommodate risk-averse individuals, for example individuals who oppose high deductibles and cost sharing. Multipayer schemes assume beneficiaries as temporary contractors, which stems out of its own subsistence. The downside of this characteristic is that preventive policies that usually yield later in time are rather unlikely to be reimbursed because the current beneficiary may change supplier by the time intervention becomes cost-effective. Adversely, a single-payer system does have a strong spur to apply screening and preventive programmes.⁵² This was epitomised in Abu Dhabi's preventive programme 'cradle-to-grave', which encompasses this long-term commitment between payer and beneficiary.⁵³

A single-payer scheme assumes that patients are not adequately informed to make rational choice and they are presumed as passive recipients.^{40,46} Consequently, the provider's response to the consumer's expectations is not correlated to the improvement in patient's utility. The lack of the required information from the patient perspective is not problematic, while the lack of proper evaluation of that information by the patient is what matters the most. A single-payer scheme overcomes this issue by offering the entire spectrum of health services.^{49,51}

The health market is an oligopoly due to high barriers of entry, pertinent to costs, medical licensure and expertise.^{2,4} Therefore, bargaining power shifts to suppliers and erodes the power of buyers. This feature can be exploited by current providers to raise their effective costs and even erect barriers for other providers to enter the market. Some other factors also contribute to the establishment of the health market as substantially less than perfect. Producers of health such as hospitals can influence prices, which will lead to failure of the market.⁴¹ This power escalates if the hospital is established as a monopoly or a centre of excellence, and under this assumption, it will not lead to a Pareto efficient outcome.^{8,9} 'Pareto optimality' describes the allocation of resources in the most efficient way for one party, without harming other involved parties in the same field (i.e. other hospitals or other beneficiaries).³¹ This will also probably cascade to profit maximisation and to stagnation of efficiency improvement because there is no need to explore efficiency as an approach to reduce costs because this can be achieved by maximising profit through the pricemaker attribute, thus exploiting the position in the market.

Insurances subsidise high-risk individuals using utility and resources from low-risk individuals. Nevertheless, if the cross subsidisation surges, this creates an incentive for insurances to selectively shift low-risk enrollees to new contracts. Therefore, when insurances apply the practice of offering new

contracts to low-risk individuals, this leads high-risk patients to a premium spiral.⁵⁴

Additionally, free mobility between insurances, without financially burdening the patients, which supposedly is the hallmark of a multipayer system, also negatively affects high-risk patients. This is attributed to the high cost incurred, the lack of available options or underwriting and fear of rejection. While free selection of insurance constitutes the benefit of a multipayer system, recent findings cast light to inconsistencies of this because one-fifth of responders expressed the concern that their age and health status would impede contracting with a new insurance.⁵⁵ Most countries strived to make the market more transparent either through making the package prices publicly available and/or through the introduction of uniform benefits package and making available comparative information on the price of the benefits package. However, most availed to disseminate adequate comparative information on the quality of health services.^{56,57}

A single-payer health system provides a single authority with all the negotiating power. This leads to an increased level of competition among providers.^{55,57,58} On the contrary, multipayer systems target different group of patients by segregating their schemes. The multipayer system will also lead to fragmentation of the market, which will augment the power of providers. If the market is heavily regulated, as in Russia and the Netherlands, market distortion may take shape. In Russia, this has led to insurances being merged and for the premiums to increase.⁴⁴ In the Netherlands, this has led to consolidation of pharmacies, and fears were expressed for even more to come.⁵ This will compromise the level of care to the insured. Market competition is not a solution, and the degree of competition among insurers affects their performance. Overall, in a single-payer health system, the insurance provider is better placed to counteract the negative effects of the market power of the suppliers and the agency failures.

Three studies assessed the mobility across payers, pertinent to contracting. One study reported that in Germany and the Netherlands, the choice of public or private coverage violates equity in funding, aggravates the risk for the public sector and waives the incentives for efficiency enhancement in the private sector.⁵⁷ To the same direction, the second study delineated transaction costs, learning costs, 'benefit loss' costs, uncertainty costs, the costs of (not) switching provider, and sunk costs, as potential barriers.⁵⁵ These switching costs hamper transfers for as many as half the population who do not switch insurances, an aspect magnified for people with comorbidities. This cascades to the lack of incentives for further investment in high-quality health care, relevant to these people, because their mobility is impeded. Finally, a study in Switzerland concluded that as the number of providers expands, the willingness of patients to switch between providers diminishes, thus perpetuating the creation of significant price differences even for homogeneous products.⁵⁸ The multipayer system can also selectively contract with some providers who satisfy a specific need of their target group, usually low cost or some exclusive treatments, which act as a differentiating point. The multipayer system may strive for excellence in a specific healthcare speciality,

capitalising on risk adjustment, which, paradoxically, in some cases can be profitable.⁵⁹ This opposes integration and health continuity, which are fundamentals of health care today. Selective contracting entails the notion of a substantial coverage, but it may not extend over life-threatening conditions that are the most significant reason for obtaining a health insurance, thus avoiding the catastrophic expenditure possibility. Selective contracting was also associated with a significant distance to access health care by Martin et al.²⁴ Evidence from the Netherlands also indicated that insurances attempt to ‘enforce a joint purchase of basic and supplementary insurance’, thus splitting the cost.⁵⁴ One out of four health insurances offer supplementary insurance if patients are already enrolled with a basic one, while 40% of all insurances who do not apply the previous rule, use surcharges instead on beneficiaries who opt only for supplementary insurance.⁵⁴

Finally, contracting with a single payer is a much more simple and straightforward process and does not allow deviation from provided bundle of services. From a payer perspective, a single-payer system applies minimal barriers compared with screening in a multipayer system.

Health expenditure

A single-payer system has lower administration costs, through economies of scale, which implies that its cost advantage arises (actual costs per unit declining) with increased output, which is ascribed to the optimum usage of its resources. Therefore, by capitalising on its bargaining monopoly power, it can negotiate lower prices.^{60–62} This has to be monitored because it can backlash if prices fall below a feasibility threshold for providers: either by induced demand or by reducing adoption of innovation.⁶³

The Vermont's single-payer feasibility study forecasted that under a single-payer system, expenses may temporarily rise due to its universal coverage, but they will be offset by the reduction of administrative costs.⁶⁴ The conclusion has also been confirmed by the South Korea paradigm, in which the country shifted its healthcare system to a single-payer scheme, thus resulting in a reduction of managerial costs (from 8.5% in 1997 to 2.4% in 2008), attributed to the standardisation of operational processes. Taiwan's shift to a single-payer system led to savings that have largely offset the incremental cost of covering the previously uninsured people, offering at the same time greater financial risk protection.³⁶

A single-payer system gravitates to less use of copayment and deductibles which was proved to impede access to health care for low- and middle-income patients.⁶⁵ Multipayer systems imply the duplication of structures; therefore, it is obvious that this would be feasible only under a minimum number of beneficiaries and this will also lead to soaring administrative costs as in the case of the USA administration costs (\$US 400 billion of a total health expenditure of \$US 1.6 trillion in 2003).⁶⁶

Risk pooling

Health insurance dispenses risk among individuals, thus elaborating a safety net for people in need. Although risks can be highly unpredictable at the personal level and consequent health expenditure can be catastrophic for the individual, a

large sample leads to predictable risk which can be distributed between low- and high-risk enrollees.⁶⁷

Risk pooling is interrelated with adverse selection, a phenomenon where one member of the transaction is less informed than the other. In the case of health insurance, an insurer may not disclose all his medical history, while an insurance organisation may increase fees, or ask for more medical examinations from high-risk individuals.⁵⁴ This is spawned by an asymmetrical flow of information between the two parts. Patients at a higher risk will be more likely to need health coverage, while insurance will try to identify exact health status of potential beneficiaries. Therefore, in a single-payer system, all patients, regardless of their risk and health status, will be enrolled in the same scheme. On the contrary, a multiple-payer setting will unavoidably perpetuate to a diversified portfolio of schemes: expensive and complete coverage for people at high risk and cheaper but minimal, and potentially catastrophic, coverage for low-risk individuals. This is better described by *cream skipping* or *cherry picking*, the policy of screening and identifying high-risk individuals and excluding them by offering disproportionate high fees, or, on the contrary, focussing on low-risk individuals by offering them attractive schemes.⁵⁹ In any of the aforementioned cases, patients with chronic diseases and high-risk individuals will have to pay more, leading to the *inverse law* paradigm.⁶⁸

If adverse selection is left unchecked, it can lead to a premium death spiral, where high-risk individuals gravitate to plans with richer benefits, which escalates to the point that plans are no longer financially sustainable, further compounded by the preference of low-risk patients to opt out and pursue lower cost alternatives. Multipayer health insurance tries to waive this uncertainty and all adjoined risks through risk adjusters. Risk adjusters (risk equalisation) redistribute resources among fragmented patient pools. It is a resource-demanding process, both in human and monetary terms. It can be complicated, while it can be only partially effective. To grapple meaningfully excess risk, demographic data, medical history, ex-post utilisation, current medical condition, chronic illness, urbanisation, and diagnostic cost groups are used to adjust the risk. Demographic data are the easiest to collect, but their projecting power is low. Therefore, selection of appropriate adjusters must reflect the ability to gather data and risk of manipulation of data. An optimum risk adjuster is still an unmet objective.

Risk equalisation can be performed either ex-ante, thus at the beginning of the financial year, or ex-post, which is done at the end of the financial year. The downsize of risk equalisation in a multipayer system is that the weaker the risk adjusters are, the higher the possibility of costly patients (i.e. suffering from chronic diseases) being averted by private insurances and burdening the public insurer, which will have to be subsidised by the government.² Conversely, a potent risk equalisation may support the implementation of effective chronic disease management programmes as an incentive to the insurer to reduce the cost of the chronic diseases.⁶⁷

Social solidarity

Social solidarity embeds the social cohesion and interdependence among the members of a geographically, ethnologically

or socially defined group. The sense of solidarity can also be expanded to accommodate the sense of responsibility and giving to vulnerable groups of the society, such as the elderly, disabled, socially and financially deprived and persons with chronic, life-threatening and orphan diseases.

Social solidarity is expressed as a form of exclusion from contribution either to the fund and/or to the point of care. This assumes that their costs will be shifted and spread across the other beneficiaries. Progressive contribution to health funds is a concept that better fits the concept of solidarity: people who are wealthier contribute a higher amount of money, which without financially affecting them can be used to finance others. This bridges the gap between rich and poor beneficiaries, primarily by alleviating financial burden from the poorer and subsidisation of the health costs of low-income individuals. A single-payer system may better serve solidarity because a multipayer system perpetuates to fragmented patient pools. Usually patients in a multipayer system with an annual income above a specific threshold are allowed to apply for a PHI, while patients with lower income can only contract with public insurance.²⁹ The use of premiums on a disease basis, as applied in multipayer schemes, does not seem to serve social solidarity. On the contrary, Taiwan's paradigm underpins that solidarity in healthcare financing is more prominent under a single-payer system.³⁶

Conclusion

This systematic review identified that there is not a gold standard contingent to a UHCS, and the payer type is highly pertinent to each country's characteristics, public policies, social coherence and national structure. Thus, country-specific cultural, institutional and sociodemographic factors are imperative and decisive factors for an effective payer-type selection³ (Table 2).

Current evidence accentuate that a single-payer system is more equitable to patients than a multipayer system, mainly

because of access and its progressively financing pattern. Multipayer systems use premiums collected by the patients, which constitutes a regressive pattern. This can also comprise their differentiating point because they may compete for the direct premium part of the funding.^{54,69}

A single-payer health system can also effectively distribute risk throughout a large risk pool. The risk distribution must be regulated under a multipayer system on the basis of relative claims made by policy holders, which provides that insurances with high payouts will receive additional funds. This aims to waive any incentives to deter high-cost individuals.

In a single-payer system, the government is the single payer, an attribute that while it augments single-payer's bargaining power, it may also emerge as a drawback under a hostile or inefficient government. In this case, a multipayer system would be better-off. The ability of a multipayer system to provide tailor-made healthcare coverage based on the individual's characteristics intertwines with the adverse selection, which is also linked to the individual's characteristics. Adverse selection can be avoided, usually with highly sophisticated risk-adjustment programmes, a factor that inflates costs. This accentuates why multipayer systems seem to be costlier, mainly imputed to increased administration costs.

Although there is some evidence that a single-payer system is more likely to sustain solidarity and equity, this review is inconclusive in fully supporting it. Moreover, there is an indication that the single-payer system lacks the motive for efficiency enhancement, in contrast to multipayer systems.

Finally, current paradigms from recent reforms in several countries corroborate that a single-payer system is a preferred scheme, albeit the selection must be compatible with each country's policies and governance pattern. The ability to collect revenue, expertise in risk adjustment and diversity of population are merely some of the issues that may influence setting selection.

Table 2 – Type of payer among European countries.

Country	Payer type	Efficiency of system	Gatekeeping	Health expenditure (% GDP)
Austria	Multi	9th	Free access	10.8
Belgium	Multi	21st	Free access	10.5
Czech Republic	Multi	48th	Free access (referral for hospitals)	7.5
Denmark	Single	34th	Partially	11.1
Finland	Single	31st	Yes	9
France	Multi	1st	Partially	11.6
Germany	Multi	25th	No	11.3
Greece	Single	14th	No	9.1
Hungary	Single	66th	Yes	7.9
Ireland	Single	19th	Partially	8.9
Italy	Single	2nd	Yes	9.2
Malta	Single	5th	Partially	
The Netherlands	Multi	17th	For hospitals	11.9
Norway	Single	11th	Yes	9.3
Portugal	Single	12th	Yes	10.2
UK	Single	18th	Yes	9.4
Spain	Single	7th	Partially	9.3
Sweden	Single	23th	No	9.5

GDP, gross domestic product.

Five-year outlook

The sustainability of health systems worldwide is going under a stress test, which is expected to intensify as life expectancy increases, culminating to the proliferation of healthcare needs. In the context of hovering financial recession, health systems will be faced with the dubious tasks of satisfying increasing needs with constrained resources, a 'do more with less' approach. The constant introduction of new medicines, with higher costs and uncertainty apropos their clinical effectiveness, further aggravates the feasibility of health systems to adequately provide health care, especially in the current era, which is characterised by easy dissemination of information to the public. Moreover, an ageing population, will surge expenditure for social care.

This implies that health agencies will scrutinise the payer type of their health systems, with the ultimate task to further enhance their efficiency. This becomes even more complex in tandem with the current refugee crisis in Europe, the worse since the end of World War II, which has seen millions of people, the majority presenting with physiological and physical conditions, migrating to Europe. Because asylum seekers and refugees are entitled to free medical care in almost all European countries, this mounts the pressure for continuous research and ensuing refinement of health system functions, primarily the payer type.

Author statements

Ethical approval

This article does not contain any studies with human participants or animals and therefore does not require ethical approval.

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Competing interests

The authors declare that they have no conflicts of interest.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.puhe.2018.07.006>.

REFERENCES

- Chan M. *Address to the 65th world health assembly*. Geneva: World Health Organization; 2012.
- Sanders J. Financing and organization of national health systems. In: Fried Bruce, Gaydos Laura, editors. *World health systems: challenges and perspectives*. Chicago: Health Administration Press; 2002.
- Wendt C, Frisina L, Rothgang H. Healthcare System Types: A Conceptual Framework for Comparison. *Soc Pol Adm* February 2009;43(1):70–90.
- Chisholm D, Evans DB. *Improving health system efficiency as a means of moving towards universal coverage* Dan World Health Report. 2010. Background Paper, 28 available at: <http://www.who.int/healthsystems/topics/financing/healthreport/28UCefficiency.pdf>.
- Mikkers M, Ryan P. "Managed competition" for Ireland? The single versus multiple payer debate? *BMC Health Serv Res* 2014;14:442.
- Petrou P. Crisis as a serendipity for change in Cyprus' healthcare services. *J Med Econ* 2015;18(10):805–7. <https://doi.org/10.3111/13696998.2015.1049179>.
- Kutzin J. A descriptive framework for country-level analysis of health care financing arrangements. *Health Pol* 2001;56:171–204.
- Abiuro GA, De Allegri M. Universal health coverage from multiple perspectives: a synthesis of conceptual literature and global debates. *BMC Int Health Hum Right* 2015;15:17.
- Carrin G, Inke Mathauer, Xu K, Evans DB. Universal coverage of health services: tailoring its implementation. *Bull World Health Organ* 2008;86:857–63.
- Moher D, Liberati A, Tetzlaff J, Altman D. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ* 2009;339:b2535.
- Tandon A, Murray C, Lauer JA, Evans DB. Measuring overall health system performance for 191 countries GPE Discussion Paper Series: No. 30 EIP/GPE/EQC. World Health Organization. Available at: <http://www.who.int/healthinfo/paper30.pdf>. last accessed August 2018
- Schoen C, Doty MM, Collins SR, Holmgren AL. Insured but not protected: how many adults are Underinsured? *Health Aff* 2005. <https://doi.org/10.1377/hlthaff.w5.289>.
- van Doorslaer E, Koolman X. Explaining the differences in income-related health inequalities across European countries. *Health Econ* 2004;13:609–28.
- Ortiz-Ortiz KJ. Effects of type of health insurance coverage on colorectal cancer survival in Puerto Rico: a population-based study. *PLoS One* May 2014;9(5).
- McDavid K, Tucker TC, Sloggett A, Coleman MP. Cancer survival in Kentucky and health insurance coverage. *Arch Intern Med* 2003;163:2135–45.
- Adepoju L, Wanjiku S, Brown M, et al. Effect of insurance payer status on the surgical treatment of early stage breast cancer: data analysis from a single health system. *JAMA Surg* 2013 Jun;148(6):570–2. <https://doi.org/10.1001/jamasurg.2013.61>.
- Robbins AS, Pavluck AL, Fedewa SA, Chen AY, Ward EM. Insurance status, comorbidity level, and survival among colorectal cancer patients age 18 to 64 Years in the national cancer data base from 2003 to 2005. *JCO* August 1, 2009;27(22):3627–33.
- Niu X, Roche LM, Pawlish KS, Henry KA. Cancer survival disparities by health insurance status. *Cancer Med* 2013;2(3):403–11.
- Pulte D, Hermann B, Jansen L. Survival disparities by insurance type for patients with non-hodgkin lymphoma. *Blood* November 15, 2013;122(21):17.
- Farkas DT, Greenbaum A, Singhal V, Cosgrove JM. Effect of insurance status on the stage of breast and colorectal cancers in a safety-net hospital. *Am J Manag Care* 2012 May;18(5 Spec No. 2):SP65.
- Levinson KL, Bristow RE, Donohue PK, Kanarek NF, Trimble CL. Impact of payer status on treatment of cervical cancer at a tertiary referral center. *Gynecol Oncol* 2011 Aug;122(2):324–7.

22. Hinman A, Bozic K. Impact of payer type on resource utilization, outcomes and access to care in total hip arthroplasty. *J Arthroplasty* 2008;23(6 Suppl. 1).
23. Rhee PM, Grossman D, Rivara F, et al. The effect of payer status on utilization of hospital resources in trauma care. *Arch Surg* 1997 Apr;132(4):399–404.
24. Martin CT, Callaghan JJ, Liu SS, Gao Y, Warth LC, Johnston RC. Disparity in total joint arthroplasty patient comorbidities, demographics and postoperative outcomes based on insurance type. *J Arthroplasty* 2012 Dec;27(10):1761–5.
25. O'Brein J, Lu B, Ali NA, Levine DA, Aberegg SK, Lemeshow S. Insurance type and sepsis-associated hospitalizations and sepsis-associated mortality among US adults: a retrospective cohort study. *Crit Care* 2011;15:R130.
26. Allen J, et al. International Society for Heart & Lung Transplantation (ISHLT) 30th Anniversary Meeting: Abstract 79. Presented April 21, 2010.
27. Piper CN, Elder K, Glover S, Baek JD, Murhp J. Disparities between asthma management and insurance type among children. *J Natl Med Assoc* 2010 Jul;102(7):556–61.
28. Kucik JE, Cassell CH, Alverson CJ, Donohue P, Tanner JP, Minkovitz CS, et al. Role of health insurance on the survival of infants with congenital heart defects. *Am J Public Health* 2014 Sep;104(9):e62–70. <https://doi.org/10.2105/AJPH.2014.301969>.
29. Lungen M, Stollenwerk, Messne P, Lauterbach KW, Gerber A. Waiting times for elective treatments according to insurance status: a randomized empirical study in Germany. *Int J Equity Health* 2008;7:1.
30. Kuchinke BA, Sauerland D, Wubker A. The influence of insurance status on waiting times in German acute care hospitals: an empirical analysis of new data. *Int J Equity Health* 2009 Dec 21;8:44.
31. Schwierz S, Wübker A, Wübker A, Kuchinke BA. Discrimination in waiting times by insurance type and financial soundness of German acute care hospitals. *Eur J Health Econ* 05/2010;12(5):405–16.
32. Gaglia Jr MA, Torguson R, Xue Z, Gonzalez MA, Collins SD, Ben-Dor I, et al. Insurance type influences the use of drug-eluting stents. *JACC Cardiovasc Interv* 2010 Jul;3(7):773–9. <https://doi.org/10.1016/j.jcin.2010.04.011>.
33. Laux G, Szecsenyi J, Miksch A, Grün B, Gutscher A, Grün B, et al. Antihypertensive pharmacotherapy of patients in primary care with either a statutory or private health insurance. *Med Klin (Munich)* 2009 Feb 15;104(2):108–13. <https://doi.org/10.1007/s00063-009-1028-4>. Epub.
34. Polanco A, Breglio AM, Itagaki S, Goldstone AB, Chikwe J. Does payer status impact clinical outcomes after cardiac surgery? A propensity analysis. *Heart Surg Forum* 2012 Oct;15(5):E262–7. <https://doi.org/10.1532/HSF98.20111163>.
35. LaPar DJ, Bhamidipati CM, Walters DM, Stukenborg GJ, Lau CL, Kron IL, et al. Primary payer status affects outcomes for cardiac valve operations. *J Am Coll Surg* 2011 May;212(5):759–67.
36. Lu R, Hsiao W. Does universal health insurance make health care unaffordable? Lessons From Taiwan. *Health Aff* 2003;22(3):77–88.
37. Freeman T. Using performance indicators to improve health care quality in the public sector: a review of the literature. *Health Serv Manag Res* 2002 May;15(2):126–37.
38. Geyman JP. The corporate transformation of medicine and its impact on costs and access to care. *J Am Board Fam Pract* 2003;16(5):449.
39. Grembowski DF, et al. Measuring the “managedness” and covered benefits of health plans. *Health Serv Res* 2000;35(3):707–34.
40. Hussey P, Anderson GF. A comparison of single- and multi-payer health insurance systems and options for reform. *Health Pol* 2003;66(3):215–28.
41. Nichols LM, et al. Are market forces strong enough to deliver efficient health care systems? Confidence is waning. *Health Aff (Millwood)* 2004;23(2):8–21.
42. Emmert M, Meier F. An analysis of online evaluations on a physician rating website: evidence from a German Public reporting instrument. *J Med Internet Res* 2013 Aug 6;15(8):e157.
43. Van de Ven A Wynard PMM, Beck Konstantin, Buchner Florian, Schokkaert Erik, (Erik) Schuta FT, Shmuelif Amir, et al. Preconditions for efficiency and affordability in competitive healthcare markets: are they fulfilled in Belgium, Germany, Israel, The Netherlands and Switzerland? *Health Pol* 2013;109:226–45.
44. Besstremyannaya G. *Managed competition in health insurance systems in central and eastern Europe*. CEFIR; Free Policy Brief Series; October 2013.
45. Hussey P, Anderson GF, Osborn OR, Feek C, McLaughlin V, John Millar J, et al. How does the quality of care compare in five countries? *Health Aff* 2004;23(3):89–99.
46. Reinhardt U. Single-payer systems spark endless debate. Are they a panacea or a form of “socialised medicine”? Americans just cannot agree. *BMJ* 28 April 2007;334.
47. Dranove D. Demand inducement and the physician/patient relationship. *Econ Enq* 1988;26:251–98.
48. Bloom Gerald, Standing Hilary, Lloyd Robert. Markets, information asymmetry and health care: towards new social contracts. *Soc Sci Med* 2008;66:2076e2087.
49. Freeman J. *The contracting state*. 28 Fla. St. U. L. Rev.; 2000.
50. OECD. *Health care systems: getting more value for money*. OECD Economics Department Policy Notes; 2010. No. 2.
51. Feldman Roger. Quality of care in single-payer and multi-payer health systems. *J Health Polit Policy Law* August, 2009;34(3):649–70.
52. Blanchet N, Fox A. Prospective political analysis for policy design: enhancing the political viability of single-payer health reform in Vermont. *Health Pol* 2013 Jun;111(1):78–85.
53. Philipp Vetter, Boecker Klaus. Benefits of a single payment system: case study of Abu Dhabi health system reforms. *Health Pol* 2012;108.
54. Anne-Fleur Roos, Schut Frederik T. Spillover effects of supplementary on basic health insurance: evidence from The Netherlands. *Eur J Health Econ* 2012;13:51–62.
55. Daniëlle MID, Duijmelinck Ilaria Mosca, van de Ven Wynand PMM. Switching benefits and costs in competitive health insurance markets: a conceptual framework and empirical evidence from The Netherlands. *Health Pol* 2015 May;119(5):664–71.
56. Thomson S, Busse R, Crivelli L, van de Ven W, Van de Voorde C. Statutory health insurance competition in Europe: a four-country comparison. *Health Pol* 2013;109:209–25.
57. Thomson S, Mossialos E. Choice of public or private health insurance: learning from the experience of Germany and The Netherlands. *J Eur Soc Pol* 16(4):315–327; 068271.
58. Frank Richard G, Choice Karine Lamiraud. Price competition and complexity in markets for health insurance. *J Econ Behav Organ* 2009;71:550–62.
59. van de Ven Wynand PMM, Beck Konstantin, Voorde Carine Van de, Wasem Jürgen, Zmora Irit. Risk adjustment and risk selection in Europe: 6 years later. *Health Pol* October 2007;83(2–3):162–79.
60. Sheils JF, Haught RA. *Analysis of the costs and impact of universal health care models for the state of Maryland: the single-payer and multi-payer models*. Fairfax, Va: Lewin Group; 2000.
61. Chollet D, Mays G, Angeles J. *Feasibility of a single-payer health care model for the state of Maine*. Mathematica Policy Research, Inc; 2002.

62. Preker AS. The introduction of universal access to health care in the OECD: lessons for developing countries. In: Nitagayumphonng ES, Mills A, editors. *Achieving universal coverage of health care*. Bangkok: Ministry of Public Health; 1998. p. 103.
63. Woolhandler S, et al. Costs of health care administration in the United States and Canada. *N Engl J Med* 2003;**349**:768–75.
64. Wallack AR. Single payer ahead — cost control and the evolving Vermont model. *N Engl J Med* 2011;**365**. 7 nejm.584.org august 18.
65. Geyman J. Myths and memes about single-payer health insurance in the United States: a rebuttal to conservative claims John P. *Int J Health Serv* 2005;**35**(1):63–90.
66. Morra D, Nicholson S, Levinson W, et al. US physician practices versus Canadians: spending nearly four times as much money interacting with payers. *Health Aff (Millwood)* 2011;**30**:1443–50.
67. Ven Van de WPMM. Risk adjustment and risk equalization: what needs to be done? *Health Econ Pol Law* 2011;**6**(01):147–56.
68. Van de Ven WP MM, Ellis R. Risk adjustment in competitive health plan markets. In: Newhouse JP, Culyer AJ, editors. *Handbook of health economics*. Amsterdam: Elsevier; 2000.
69. Yates R. *Universal health coverage: progressive taxes are key*, vol. 386; July 18, 2015. www.thelancet.com.