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# National Health Insurance: A conceptual framework from conflicting typologies

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ABSTRACT

In the path to universal health coverage, policymakers discuss different alternative health system's financing schemes. Classical typologies have been posited, including models such as National Health Service, Social Health Insurance and Private Health Insurance. More recently, National Health Insurance (NHI) has been suggested as a separate model. Nevertheless, there are discrepancies regarding what defines an NHI model. The purpose of this article is to propose a comprehensive definition of an NHI model, aimed to disentangle the current discrepancies in the conceptualization and the scope of this type of arrangement. Based on the previous literature we identified some common characteristics across NHI definitions, namely universal coverage, pooling in a single fund and a purchasing function based on a single-payer financing mechanism. Areas of controversy were also identified. While some authors emphasized the importance of an effective separation between the purchaser and provider functions, others highlighted the relative importance of privately-owned provision to define a system like NHI-type. Based on empirical data, we suggest that the ownership is not a critical variable to distinguish an NHI from other models, and instead, suggest that a pivotal characteristic of the NHI is the single payer mechanism that is not integrated with the health providers.



## 1. Introduction

Countries are continuously striving to implement effective health policies and reforms to improve population's health and wellbeing. There is a growing global consensus on the need to accomplish universal health coverage and equitable access to health services. The Pan American Health Organization (PAHO) defines universal health coverage (UHC) in its strategy for universal access to health and UHC as a situation "where all people and communities have equitable access to the comprehensive and guaranteed quality services that they need, throughout the life course, without financial hardship" [1]. This definition emphasizes the importance of guaranteeing an equitable access and providing financial protection and broad benefits to the population as crucial elements to reach UHC.

Effective health insurance, understood as the pooling financing function, is a key instrument to achieve financial protection. Health insurance is defined as "a way to distribute financial risk associated with the variation of individuals' health care expenditures by pooling costs over time through pre-payment and over people by risk pooling" [2].Therefore, health insurance should generate a broad effective resource pooling, ideally incorporating the whole population in a single risk fund, delinking financial contributions from health needs. This can be achieved through different institutional designs including such as the National Health Service (NHS), National Health Insurance (NHI) or Social Health Insurance (SHI) schemes.

The NHI emerges within the range of possible health financing models to head towards UHC, ensure equitable access to healthcare, reinforce stewardship and improve systems' efficiency. This article aims to understand the key features and characteristics of the NHI model, which has emerged more recently and received comparatively less attention in the specialized literature than NHS and SHI schemes. Moreover, a substantial inconsistency remains in the use of the concept "National Health Insurance" to describe very different health systems [3–5]. For example, while in some countries

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the term NHI is referred to a public insurer among multiple health insurances, in others is used to refer to an institution acting as a single-payer or a vertical program with a narrow scope for specific diseases at a national level. Additionally, even when NHI is conceptualized as a single-payer, further discrepancies emerge on key characteristics such as revenue collection and providers ownership.

In this context, we attempt to contribute with greater clarity about the crucial features of a NHI to further inform policymakers and reformers searching for new organizational schemes to improve health systems performance, especially in the Americas. For this purpose, in the next section we provide a brief overview of the health system's and health financing functions as a background for further discussion. In the third section, we review typologies for the health systems' organization that incorporate the NHI-type within their scope of analysis. In the fourth section, we provide a critical assessment of current definitions, using data from selected countries to characterize their limitations. In the fifth section, we propose an extended and more accurate definition of the NHI-type model, guided by the characteristics of countries frequently presented in the literature as typical NHI systems. Finally, we present an overview of those countries in order to exemplify some common characteristics across them.

## 2. Health system and financing functions

A health system could be broadly defined as "all the activities whose primary purpose is to promote, restore or maintain health" [6]. The main functions of a health system are often defined as: stewardship, resource generation, service provision and financing [6]. Stewardship refers to the governance and administration of the health system - overseeing all the other functions-, in order to reach national health policy objectives, which relies largely on the government. It is a political process which involves setting the strategic direction, detecting distortions and, articulating and regulating actors. Resource generation entails producing both the human and physical resources needed to accomplish the health systems' goals. Service provision involves the organization and actual delivery of health care services to respond to population needs, by either public or private providers, which in turn may be for profit or not-for profit.

The financing function refers to the process of collecting, pooling and allocating the resources needed to accomplish the health system goals. Based on the historical, policy, institutional and regulatory contexts, these three sub-functions can be developed in distinctive ways.

First, revenue collection is the mobilization of resources from different origins, typically from general or earmarked taxes, compulsory or voluntary health insurance premiums, out-of-pocket expenditures (OOPE), and/or external aid. Most countries collect revenues from these sources in different proportions. Importantly, it is well documented that OOPE impact negatively on equitable access and impose a significant financial risk to the individuals [7]. In contrast, revenues from progressive sources such as taxes or social security funds reduce the financial risk for the households [8]. Therefore, some international organizations, such as the PAHO, have recommended that countries should aim to reduce, and eventually completely eliminate OOPE by increasing prepaid contributions from taxation and compulsory social security payments [1].

Second, pooling, which refers to the accumulation and redistribution of prepaid resources in order to spread the financial risks associated with illness among all the insurance members. Pooling may be performed in different ways, which may range from the complete pooling of all the resources into a single fund to multiple independent funds, which has been called horizontal segmentation [9,10]. Also, pooling mechanisms can be implemented by regulating transfers based on risk between the multiple funds. Less frequently, minimal or even the absence of any pooling mechanism is observed in the context of individual private insurance arrangements.

Third, purchasing refers to the resource allocation to healthcare providers [7]. Purchasing may be performed through a single-payer or multiple-payers [11]. A further clarification is needed when referring to systems with multiple-payers, where two different forms of arrangements are possible: a) Institutional multi-payer systems where the purchasing function is concentrated in a few institutions, either public or private, that collectively contract with the providers to establish payment mechanism; b) Individual multi-payer systems where individuals (and not institutions) are responsible for the payment function. The latter is an infrequent arrangement but still observable in privately financed systems with high levels of OOPE.

Integration between payer and provider is a relevant dimension of health financing arrangements, closely related to the purchasing function. The characteristics of the relation between payer and provider are usually regarded in the literature as either vertical integration or vertical segmentation [10,12]. As an example, the World Health Report 2010, identifies three main ways of purchasing based on the level of integration between payers and providers: 1) Integration, for example when government provides budgets directly to its own health providers; 2) Segmentation at an institutional level, where providers are separated from the purchasing agent, which pays for services for the population, and; 3) Segmentation at the individual level, where patients incur in direct payments to providers without a third party acting as payer [7].

Based on the previous description about different ways of developing the health financing functions, in the next section, we provide a literature review and discussion about typologies for health system's classifications based on their financial arrangement organization.

## 3. Typologies of health financing schemes

A wide variety of taxonomies for health system's organization have been proposed in the last decades. Taxonomies are useful to learn from other health system experiences as an input for future reforms. While no single taxonomy could be sufficiently complex to account for all the elements that define a health financing arrangement, they are useful as long as they identify relevant elements that help to understand the functioning and, to a certain degree, the level of success of each arrangement.

### 3.1. Bismarck, Beveridge and private health insurance

Traditionally, the schemes proposed by Bismarck's Social Health Insurance in Germany and Beveridge's National Health Service in the United Kingdom have been presented as the two classical models. Beveridge or the National Health Service has been characterized as a model financed by general taxes and entitlement based on citizenship, on which both the financing and provision are managed by the government. In contrast, the Bismarck or Social Health Insurance model has been characterized as the one financed by social security contributions (payroll/earmarked taxes), entitlement related to contribution and multiple insurers managed by independent non-governmental institutions [13,14]

Then, the Private Health Insurance (PHI) model was added to the Bismarck-Beveridge typology, mainly based on the particular characteristics of the US system [15]. Busse et al. classify countries regarding their main source of revenue collection as either tax-financed, social security contributions systems and mixed systems with mainly private financing [15]. The three models (NHS,

SHI and PHI) have been denominated the "standard tripartite" or trichotomous classification for health systems [16].

These simpler typologies have been criticized for several reasons. First, most countries have a mixture or modified versions of these arrangements, leading to a much more complex and diverse variety of health systems. Second, since these typologies are based mainly on the predominant source of revenue, they tend to ignore other relevant characteristics of the health system arrangement. Third, most countries collect resources from a variety of sources in different proportions, making the classification arbitrary or imprecise. Therefore, the historical Bismarck-Beveridge typology or even the "standard tripartite" based on the revenue collection functions seem insufficient to account for the complexities of modern health systems.

### 3.2. Moving beyond

Attempting to surpass the mentioned limitations, classification accounting for other health system's functions have been proposed during the last decades.

Classification efforts that tried to account for further dimensions of health systems could be traced back to the 70 s. Field classified health systems in four "ideal types" based on the providers ownership, payment mechanisms and degree of autonomy of the medical profession: socialized (i.e. Eastern Europe and Soviet Union), health service (i.e. U.K), health insurance (i.e. most Western European countries and Japan) and "pluralistic" (i.e. U.S) [17] The later three types have important similarities with the NHS, SHI and PHI models.

In the late 1980s, Frenk and Donabedian suggested a classification based on the "modalities of medical care" within each health system [18]. These modalities could be understood as subsystems within the overall system. Their classification accounted for the degree of state intervention in two dimensions: 1) the form of state control over the production of medical services and, 2) the basis for eligibility of the population. Twelve types of modalities were identified as possible, including the NHS and the NHI among them. Both modalities share an eligibility based on citizenship (rather than contribution), but they differ in the form of state control. While the NHS has a form of state control based on concentrated ownership (i.e. UK), the NHI has a state control based on concentrated financing (i.e. Canada). Moreover, the authors present a second type of NHI characterized by "dispersed financing" (i.e. Germany), a modality that is classified more frequently by other authors as SHI.

In the early 1990s, OECD suggested a taxonomy for health systems based on revenue sources and payment methods to providers [19]. The source of financing is classified as voluntary or compulsory. Payment method to providers is classified into: a) out-of-pocket by consumers without insurance; b) out-of-pocket by consumers, who are reimbursed by their insurance; c) indirect payment by third parties via arm's length contracts, and; d) indirect payment by third parties, via budgets and salaries within an integrated organization. One of the resulting eight combinations (compulsory-out-of-pocket payment) is hardly found in practice and, therefore, excluded from the taxonomy. The other possible models are presented in the Online Appendix (Table S1). Three implicit questions guide the OECD taxonomy: how population contributions are regulated, who make the payments to providers and what are the payment mechanisms involved. Similarly, as Frenk and Donabedian, the OECD distinguishes a public integrated model (concentrated in Frenk terminology) and a public contract model (dispersed in Frenk), the former with payments based on budget and salaries, while the later on contractual agreements. This is the first taxonomy including the payer-provider relationship in the classification of health financing models.

Building on previous work, Londoño and Frenk [20] provide a taxonomy for classification of health systems in Latin America, based on four health systems' dimensions: financing, delivery, modulation (defined as setting transparent and fair rules) and articulation (coordination and management of the several actors within the health system). Depending on how these functions are performed, four structures were identified: Unified Public Model, Public Contract Model, Segmented Model (the most common in Latin American countries) and the Atomized Private Model. Interestingly, the distinction between the two public models runs close to the previous established differences between the NHS and NHI models. Also, the authors describe a new model denominated Structured Pluralism (SP), which proposedly is in the middle ground between "the monopoly of public sector and the atomized private sector". It is relevant to note that the proposal of a SP model accepts rather uncritically the horizontal segmentation of Latin-American health systems and its pervasive effects over health equity.

Kutzin presented a framework to understand market structure of insurers in 2001 [21]. This framework divides the systems in three types: single-payer systems, multiple non-competing insurers and multiple competing insurers. The single-payer system includes countries with one single insurer managing the main benefit package nationally, but also multiple insurers only when they cover and act as a single-payer in geographically different populations, such as the provinces of Canada. In contrast, the multiple insurer model is defined by the coexistence of multiple insurers for the same population, on competitive or non-competitive market.

Rothgang et al in 2005 presented a taxonomy grounded on three dimensions of the healthcare system (regulation, financing, and service provision), plus the participation level of three types of actors (state, societal, and private) in each dimension [22]. Three basic questions were addressed in this model: who regulates and controls relations between actors, how resources are collected and allocated and who is the major owner of health providers (Table S2 – Online Appendix). Based on the possible combination of these three dimensions with three possible actors for each, 27 theoretical types of health systems emerged, but did not mention explicitly one of them as NHI in earlier stages of the framework development. Instead, they refer to what they will call NHI as a State-based mixed-type health care system [23].

Although other authors had mentioned the term NHI in the past [24,25], to the best of our knowledge, the first taxonomy that formally introduced the National Health Insurance as a type of system was Lee et al. In 2008, they classify health financing arrangements according to two dimensions: the degree of state administration for health financing and the main body for health provision. Thus, countries could be classified as NHS (concentrated financing and public provision), NHI (concentrated financing and private provision), SHI (dispersed financing and public provision) and Liberal or Private model (dispersed financing and private provision). Therefore, the authors extended the standard tripartite typology to a four-tier typology that formally includes the NHI.

More recently, Böhm et al. further developed and tested the empirical applicability of Rothgang's comprehensive taxonomy [26]. They analyzed 30 OECD countries, concluding that most of the theoretical types proposed by Rothgang were not identifiable in practice. Moreover, all countries fitted in either one of the traditional standard tripartite taxonomy models or in two new emerging categories: The National Health Insurance and the Etatist Social Health Insurance. The former is defined as a system that combines NHS regulatory structures and tax financing with dominantly private service provision. The latter is defined by the authors as an arrangement where the state has the regulatory power, but the financing and provision relies on for-profit providers [26].

In 2016, Toth presented a classification based on 5 financing systems (standard tripartite models plus the NHI and Residual programs). The NHI is defined by Toth as a compulsory private health insurance with multiple funds acting as a multi-payer system, and

the Residual Programs as those financed by general taxation targeting specific populations. Each of these 5 financing systems have two versions: the integrated and separated model. The later makes an important contribution including the integration of insurers and providers as a key element to analyze the health systems, resembling the OECD taxonomy. Thus, the author recognizes that the NHS is characterized by the integration of insurers and providers, whereas other universal publicly financed systems like Australia and Canada have a "separated universalist system", were the payer and providers establish contractual relationships [27].

Based on the published literature of the last decade, it is clear that the NHI has emerged and consolidated as an independent health financing arrangement within new typologies. Nevertheless, substantial differences concerning the definitions and boundaries that diverse authors proposed for a National Health Insurance remains.

## 4. The National Health Insurance

### 4.1. Single-payer or National Health Insurance?

To refer to NHI literature requires a review of the concept of single-payer system, a phrase sometimes used interchangeably with NHI system. Probably the most accepted definition of a single payer is a "single purchaser for the main service package on behalf of the entire population living in a defined geographic area" [21]. Other authors refer to further dimensions, for example Tuohy describes single-payer as a system financed by the government and delivered by privately owned providers [28]. Hsiao identifies as the major attributes of a single-payer system as the: 1) pooling of health risk of the whole population (national or provincial) in one risk pool; 2) insuring of all citizens with an uniform benefit package; 3) resource generation to ensure affordable access; 4) one single purchasers who set rules for providers; 5) capacity to control health expenditure inflation [29]. An excellent review of the concept of single-payer can be found elsewhere [30].

Even more, some authors suggest that single-payer system could be used interchangeably with NHI model [31]. As we will review in the following section, all NHI-type models are indeed single-payer systems, consistent with the definitions proposed by Kutzin, Hsiao and others. However, not all single-payer systems are NHI. NHS-type models also conform to the main attributes of a single-payer system, thereby requiring further clarifications in the definition to be able to adequately disentangle differences between NHI and NHS.

### 4.2. Overview of previous NHI definitions

The NHI was early referred by Terris (1977), in the US context, without using a broader taxonomy or classification for the health systems. His definition relies on the contrast of the NHI to the classical NHS, suggesting that the main difference between both models was the relationship between the government and health providers. While in the NHS providers were run directly by the government, in the NHI these were independent actors who maintained contractual agreements with the government [24]. This definition was questioned by Roemer (1978) arguing that most NHI's had all their health personnel directly contracted by the government [25].

Later, Londoño and Frenk (1997) in their classification, included a model characterized by public financing, universal coverage, and budget assigned to a set of private or public providers, through contracts, as a function of productivity and quality [20]. These definitions resemble in several ways the main characteristics highlighted by Terris as an NHI. Although, the authors preferred to call it "Public contract model" instead, more descriptively, and they do not emphasize the importance of a single-pooling and single-payer structure.

Further on, Lee et al proposed a definition for NHI as a scheme with universal enrollment, which collects revenues from different sources as taxes and social security contributions, which are pooled in a single risk fund that acts as a single-payer, with a high degree of government intervention and predominantly private-owned provision [3].

Böhm et al., based on Rothgang, defines the NHI model as a system that combines the NHS regulatory structures and financing via taxes with dominantly private service provision [32]. In a following paper, the same author states that the NHI is characterized by a private for-profit provision [26].

As mentioned, Toth (2016) differs from the previously constructed definitions, characterizing the NHI as a compulsory private health insurance with multiple funds, acting as a multi-payer system. Nevertheless, the author's Separated Universalist system, universally public but with lack of integration between payers and providers, is more consistent with the characteristics of NHI presented in the previous literature [27].

### 4.3. Commonalities and controversies

In Table 1, we present a comparative perspective between the NHI definitions proposed in the previous literature. Generally, authors agree in several aspects. First, the universal nature of the coverage, where the NHI effectively delinks entitlement to contribution. Second, the pooling of resources in a single fund for the benefit of the whole or at least the vast majority of the population within a defined geopolitical area, that could be a nation, province or region. Third, the NHI acts as a single-payer which is not vertically integrated with the health providers. Thus, the insurance establishes contracts with different providers to ensure population access to health services.

There are two main areas with substantial discrepancies on the conceptualization of the NHI. First, the revenue source is an issue of controversy. Although Böhm and Londoño assert that NHI's are primarily funded by general taxes, Lee and Terris, state that it could be funded by either taxes or social security contributions. The broader definition of public sources, concordant with the later authors, is probably more accurate and enables to surpass the controversy in any context where a given health scheme relies on mixed revenue sources. It is unlikely that the decision to finance the system mainly through mandatory social security contributions (i.e. Korea and Taiwan) or general taxes (i.e. Australia and Canada) produce a meaningful difference within health financing arrangements.

Second, some authors have stated that a distinctive feature of the NHI would be a predominantly privately-owned provision [3,26,27]. Böhm goes beyond this definition, stating as a distinguishing characteristic the predominant for-profit provision. In contrast, other authors such as Terris, Toth and Londoño, emphasize as a key-element of the NHI model the separation between the purchaser and providers, which are related through contractual agreements.

Third, while there is a wide consensus among the authors defining the NHI-model as a single fund and single-payer system with universal coverage, several countries name their health insurance schemes, a national public institution or a specific national health program "National Health Insurance", regardless the health financing system of the country [33]. For example, Israel names "National Health Insurance" their country SHI-model based on a multi-insurance system. Japan uses "National Health Insurance" to refer to one of the two major types of health insurance schemes in the country, which targets the population not eligible for insurance provided by the employee, in the context of a SHI-model. Several African countries such as Ghana, Kenya or Tanzania have insurance

**Table 1**
Distinctive elements of previous NHI definitions.

| Author | Year | Coverage | Revenue | Pooling | Purchasing | Providers | Stewardship |
|---|---|---|---|---|---|---|---|
| Terris [24] | 1977 | (-) | Public (general or federal taxes or social security contributions) | (-) | Government establishes contractual agreements with independent providers | Public or private providers | (-) |
| Londoño[a] [20] | 1997 | Universal | Public Financing | (-) | The public fund generates contracts with providers | Public or private providers | Traditional weakness of the modulation |
| Lee [3] | 2008 | Universal | Public financing (Social insurance contribution and Tax) | National pooling | Single-payer | Private sectors dominantly provide health care services | Extensive and strong state regulation on private health care resources |
| Böhm [26] | 2013 | Universal | Tax financing | (-) | (-) | Private for-profit provision. | State regulation and financing |
| Toth[b] [27] | 2016 | Universal | (-) | (-) | Single-payer Insurers and providers are functionally separated | (-) | State regulation and private health insurers |

(-) = Not mentioned.
[a] Public contract model.
[b] Separated universalist systems. Note that Toth use the term "Compulsory national Health Insurance" to mandatory enrollment multi-payer systems that are usually referred as SHI in the broader literature.

schemes denominated "National Health Insurance". Nevertheless, these schemes are not universal, as they cover only a small percentage of the population (11–35%) -mainly formal sector employees [4,34]. These uses of the term NHI have probably contributed to some confusion in the literature. We agree with previous authors in the specialized literature that the term NHI-type model should be reserved for a single fund, single-payer system with universal coverage. Regardless of the variability in the use of the concept across different jurisdictions, the said features arise as distinctive when compared with other types of health financial arrangements. Thus, further elements are required to clearly distinguish the NHI-type model and NHS-type, as the payer-provider relationship. In the next section we will get into a deeper discussion on this issue of either providers ownership versus insurer and providers separation as a distinctive characteristic of the NHI model.

### 4.4. Unified ownership or purchaser-provider split?

To disentangle the debate on the controversy of the relevance of the provider ownership or the payer-provider split, we take a further look at countries that had been referred as NHI-types by other authors. Lee et al. (2008) classified Korea and Taiwan as *NHI-type* systems. Böhm et al., classified Australia, Canada, Ireland, New Zealand, and Italy. Although, the authors recognize that for Ireland and Italy they did not have full access to data on the distribution of health providers, leading to potential limitations classifying these countries within the NHI accurately [26]. Finally, Toth (2016) included Australia and Canada in his separated universalist systems.

Recent and extensive work published on comparative health systems [35] have shown relevant data on provider ownership for NHI-type systems (Table S3 – Online Appendix). First, notably, primary care ownership is mainly managed by private actors in almost all health systems. Generally speaking, they are individual or a small group of general practitioners that maintain contracts with the National Health Insurance to provide services for the population. Nevertheless, this is a characteristic also seen in a variety of countries usually classified either as NHS (i.e. UK) or SHI (i.e. Germany and Netherlands). Therefore, the ownership, at least of primary care providers, seems not to be a distinct feature of NHI models.

Moving to hospital care ownership, the situation is more heterogeneous. All NHI countries base their system in contracts with public, private not-for-profit and private for-profit providers in different proportions. In the cases of Australia and New Zealand, the predominance of public providers is clear. On the other hand, in Korea and Taiwan, most hospital beds are private not-for-profit. This ownership is more clearly aligned with the "societal" actor in the provision dimension as defined in Rothgang classification and therefore would disprove Böhms classification of NHI-type models as private (for-profit) providers as the dominant actor.

In Fig. 1 we replicate and extend the exploratory analysis presented by Lee et al., organizing countries based on the public health expenditure (PHE) as a share of the total health expenditure (THE) and the public hospital beds as a share of the total beds. We include a broader list of countries and several years available from the OECD Stats database (1991–2015) [36]. As it can be seen in exhibit A, the raw data shows that most of the countries are in the upper right corner of the plane (high % of PHE and high % of public beds). In exhibit B, we present results of a Principal Component Analysis (PCA) using the two variables proposed by Lee. We added to Lee's taxonomy the Structured Pluralism model to account for the proposed definition of Frenk for Latin-American countries. Notably, when we incorporate more countries in the analysis, it becomes evident that the seemingly straightforward definition based on the ownership of hospital providers is no longer an accurate predictor to adequately classify countries in either one category or another. Only the Structured Pluralism model and the Liberal model countries are correctly classified using the dimensions of revenue collection and provider ownership. For the NHS and NHI categories, providers ownership does not appear to be a sufficient dimension to classify a country in either one group or another, with the sole exception of Korea in our sample. Lee et al., also included Taiwan as a case of NHI in his analysis, showing a similar pattern than Korea. We were unable to obtain international validated data to include Taiwan within our analysis, but it would expectedly follow a similar pattern to Korea.

Based on this data, it seems evident that there is an overemphasis on the role of the providers'ownership as substantive difference between health financing systems. The more generally accepted idea of a separation from the payer and the providers through contractual or quasi-contractual relationship seems to prevail.

## 5. Proposal of a common definition

It is important to clarify the characteristics that describe and distinguish the NHI from other financial schemes. We suggest an extension of previous classifications based on the purchasing function, in particular regarding the relationship between the payer and providers. Whereas the NHI celebrates contractual agree-

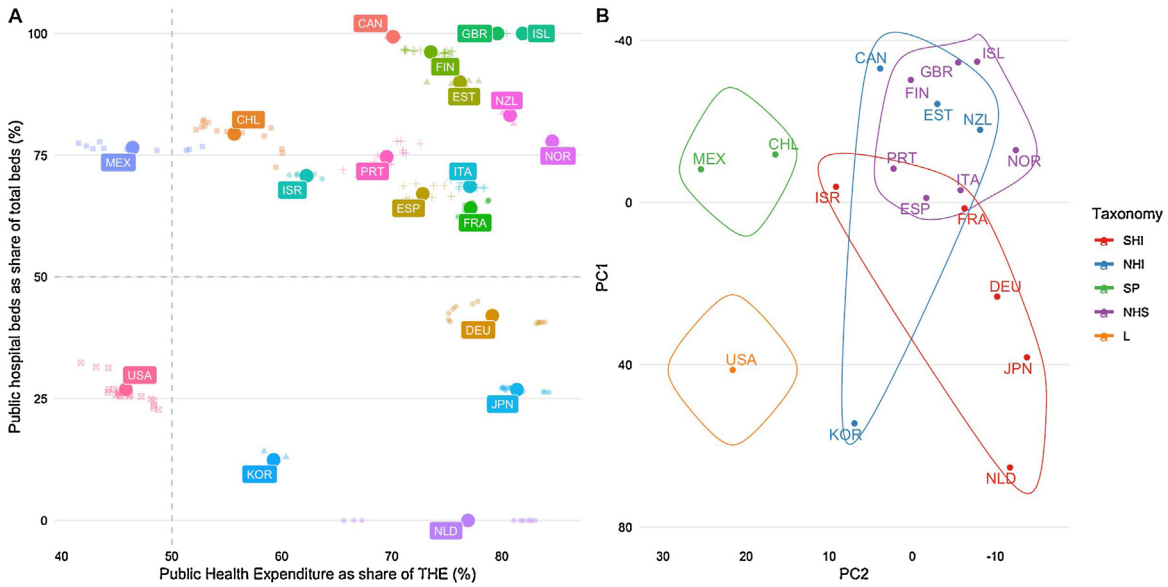


**Fig. 1.** Classification of countries based on revenue collection and provider ownership.
CAN = Canada; FIN = Finland; GBR = Great Britain; ISL = Iceland; EST = Estonia; NZL = New Zealand; MEX = Mexico; CHL = Chile; ISR = Israel; PRT = Portugal; ITA = Italy; NOR = Norway; ESP = Spain; FRA = France; USA = United States of America; DEU = Germany; JPN = Japan; KOR = Korea; NLD = Netherlands; THE = Total Health Expenditure; PC = Principal Component; SHI = Social Health Insurance; NHI = National Health Insurance; SP = Structured Pluralism; NHS = National Health Service; L = Liberal.
*The data has some limitations in terms of comparability between countries due to the standards used by each country for reporting. For instance, within Canadian standards, the public hospital ownership at the Regional/District level (hospital owned by regional or district authority) also includes hospitals with voluntary ownership as defined in The Standards for Management Information Systems in Canadian Health Service Organizations. This applies to a hospital owned by a non- government organization, or a religious group or by a lay voluntary group but controlled by government units [49].
Source: The authors, based on OECD Stats database (2017) (36)*.

**Table 2**
Main differences of NHI and other types of financing schemes.

**a. National Health System (NHS) (e.g. United Kingdom)**
This arrangement is traditionally described as a as a government-based universal coverage system financed through general taxation. The providers are predominately public with state ownership of facilities and state-directed provision of services. For instance, the Ministry of Health finances their own network of public facilities. Therefore, the main difference between the NHS and a National Health Insurance (NHI) scheme is the relationship between the insurance scheme and the providers. Whereas in the NHS the public providers are vertically integrated with the insurance and in the NHI the provision is not integrated with the insurance, contracting with mix of public and private providers.
**b. Social Health Insurance (SHI) (e.g. Germany)**
Although there is not a single and definitive definition for Social Health Insurance, the main characteristics of SHI are that it is funded by wage-based contributions, often through a dedicated payroll tax. Independent "quasi-public" bodies are the major managing funds of the system and pay providers [47]. Traditionally, the revenue collection relies on social security contributions [48]. Most SHI has multiple pools although there are a few SHI schemes in which a single pool has been created over time. More significantly, SHI always has multiple payers in contrast with the NHI single-payer structure.
**c. Private Health Insurance (PHI) (e.g. United States)**
Countries that have private health insurance are characterized by a coverage related to the ability to purchase an insurance plan with premium calculated according to individual risk or, as is more common, having an employment-based insurance plan with a premium calculated on a group basis. There is limited control of insurance and service provision by the state [22]. Health service are provided by private actors. Unlike NHI where the insurance is publicly owned, insurance is privately owned and directed.

ments with both public and private (non-for-profit and for-profit) providers as a single-payer, there is no vertical integration between the NHI and these providers. This is a clear distinction with the NHS-type model, where there is common ownership between the payer and the providers, particularly at a hospital level. This proposed definition is arguably more accurate than the previously published typologies, in particular regarding its capacity to adequately differentiate NHI and NHS systems. A comparison of the NHI with the standard tripartite models is presented in Table 2.

Thus, we define NHI as a scheme characterized by universal compulsory enrollment in which entitlement benefits are independent of the individual's capacity to contribute. The NHI collects revenues from the different mandatory sources as general taxes and social security contributions. All these resources are pooled in a single risk fund, achieving minimal or nearly nonexistent population segmentation. In terms of the purchasing function the NHI, as a single-payer, contracts services with both public and private providers. Therefore, the NHI and the providers are not vertically integrated. Finally, in terms of stewardship of the system, the NHI relies in a high level of state participation and control but integrating within its governance different degrees of participation from diverse societal actors such as patients, employees, employers and providers.

It is worth noting that the state control in a NHI scheme could be exerted through federal or regional governmental structures (e.g. Australia and Canada) but where central government retains key-functions such as benefit package definition, pooling and resource allocation to reduce potential inequities across regions.

The main characteristics of the National Health Insurance are summarized in Table 3.

In Table 4, the main characteristics of each model's features are presented. Although separated, the models may be seen as a continuous spectrum, on which certain countries may be in the border between different models. For instance, some authors argue that the Canadian health system, due to the high levels of decentralization, encompass not one but thirteen single-payer systems,

**Table 4**
National Health Insurance in context of other health financing schemes.

| | | | | | |
|---|---|---|---|---|---|
| **Collection** | Tax-based | Public sources | Social security based | | Privately financed |
| **Contribution** | | Income-related | | Risk-related | |
| **Pooling** | Single fund | Single fund | | Multiple funds | No pooling |
| **Purchasing** | Single-payer | Single-payer | Multi-payer | | |
| **Providers** | Public | Mixed | Mixed | | Private |
| **Governance** | Central government | Mixed | Corporatism | | Market |
| **Provider-insurer relation** | Integrated | Non-integrated | Non-integrated | | |
| **Types of health systems** | National Health System (NHS) | National health Insurance (NHI) | Social Health Insurance (SHI) | Structured pluralism (SP) | Private Insurance (PHS) |
| **Examples** | UK, Nordic countries | Korea, Taiwan, Canada, Australia | Germany, Netherlands | Chile, Peru, Mexico | US |
| **Concentration** | + | Insurance = high<br>Provider = variable | | | - |
| **State participation** | + | High | | | - |
| **Market participation** | - | Variable | | | + |
| **Segmentation** | - | Low | | | + |
| **Coverage** | Universal | Universal | | | Individual |

*Source:* The authors.

**Table 3**
Characteristics of a National Health Insurance.

| Characteristics | National Health Insurance |
|---|---|
| Coverage | Universal |
| Stewardship | State regulation with some degree of societal representation |
| Revenue collection | Public sources (taxes and social security contributions) |
| Pooling | Single fund |
| Purchasing | Single-payer |
| Providers | Mixed (Public and Private in different proportions) |
| Vertical integration | Strict separation of payer and providers |

*Source:* The authors.

with each province and territory operating its own system, which leads to important levels of variations within the country [28]. This explains that some provinces resemble more an NHI-type model (e.g. Ontario) while others have a more integrated structure more closely similar to a NHS-type model (e.g. Alberta).

Also, there are certain characteristics of countries with SHI that may position them closer to the NHI. For example, in the German Social Insurance System's, there is a single fund which is redistributed among the insurance funds, achieving one single pool. Also, prices are set nationally through public organisms, thus, some author consider that it shares the characteristics of a single-payer [29]. On the other side of the spectrum within SHI-type models, farther from the NHI, there are countries like Switzerland, which have fragmented financial flows between the multiple funds (30% of the THE), although there are subsidies from general taxes for low income individuals. Also, the insurance funds perform the purchasing function completely separately, thus constituting a multi-payer [37].

## 6. Examples in context

The path to implementing NHI models has been diverse worldwide. Countries' specific epidemiological, economic, cultural and political context determine different trajectories to achieve their actual health system arrangements. In this section, some case-countries experiences of NHI implementation are presented, trying to capture both the particularities of the implementation process of a NHI and if their current health system arrangement is in line with the proposed definition of a NHI.

### 6.1. Korea and Taiwan: from multiple insurers to a single fund

Taiwan and Korea have been cited as usual examples of NHI. Both countries implemented a National Health Insurance in the context of the transition to democracy [3]. Also, both followed a transition from multiple insurance schemes to a single fund, single-payer system. Taiwan implemented the NHI in 1995, which currently covers over 99% of the population [38]. The NHI's revenue comes from several sources: employees, employers and government, both national and local, which are pooled in a single fund. The NHI acts as a single-payer to multiple private and public providers [39]. NHI benefits are uniform and comprehensive [38]. On the other hand, Korea implemented the NHI in several stages between 1977 and 2000, actually covering 96% of the population, while the other 4% is ensured by a governmental scheme for those unable to contribute, providing equal health benefits to the NHI [40]. Korea's NHI is funded by contributions from employers and employees. The fund acts as a single-payer and purchase services to private and public providers, with a higher share of private actors compared to other NHI schemes.

### 6.2. Australia and Canada: expanding universal benefits

Canada (1957–1984) and Australia (1975–1984) also implemented NHI systems, but instead of merging multiple insurance schemes, these countries built the NHI by merging existing "acts" or health programs that provided specific coverage (i.e. specific laws for access to medicines or ambulatory care) into a comprehensive plan provided by the NHI, run at a provincial level. Both countries NHI's virtually cover 100% of the population, and revenues are collected mainly from taxes at a federal and provincial levels. The redistribution of funds between provinces is performed by transfers from the central governments to the provinces. The contracts with providers are executed at a provincial level via contracts with either private or public providers [41,42].

### 6.3. Estonia: from central planning, through multi-payer, to a modern single-payer

Estonia's health system prior to their health reform was based on the Soviet Semashko model. Then, moved to a system based on

a Bismarckian framework with 22 non-competing sickness funds in 1991, which collected earmarked income taxes, establishing contracts with providers. However, the scheme initially lacked centralized revenue and pooling mechanisms [43]. In 1994, Estonia integrated the 22 Sickness Fund into one central sickness fund, on which the revenue collected was pooled centrally and reallocated to the regions on a capitation basis. Finally, in 2001 Estonia established the Estonian Health Insurance Fund (EHIF), a single-payer that actually covers 96% of the population in which the primary source of revenues is payroll taxes paid by employers. The fund establishes contracts with providers, mainly publicly owned, using a wide variety of payment mechanisms.

### *6.4. Uruguay: from multiple insurance schemes to NHI through a phased plan*

Uruguay is a more recent case, actually in process of transition. The implementation of an NHI came as a result of decades of political discussion that precipitated the creation of the National Health Fund (FONASA) in 2007. Through, a three years phased plan which included five laws, the Uruguayan health system was entirely reorganized [44]. Uruguay moved from multiple insurance schemes to a NHI in which the FONASA celebrates contractual or quasi-contractual agreements with providers (public: e.g., ASSE or private: e.g., Mutuals) acting as a single-payer. The system of risk-adjusted reimbursement to providers reflects the collective nature of the insurance [43]. Regarding collection, FONASA presents a mechanism whereby those insured contribute based on income, employers contribute in proportion to wages paid, and the State's general fund supplements these (PAHO 2016). These funds finance a Comprehensive Health Care Plan (PIAS) that covers the entire population [45,46].

## 7. Conclusion

In the ongoing challenge of reforming health systems in order to achieve Universal Health Coverage, the organization of the health systems' financing is crucial. In order to learn from countries experience, classification of health systems regarding their financing functions has been identified as a useful tool.

The growing complexity of health systems arrangements have left the standard tripartite classification of the health systems insufficient to account for real-world country experiences. Thus, during the last decades, new emerging models have been suggested in the literature, such as the National Health Insurance. This model has been defined by universal coverage, a single fund and a single-payer. Nevertheless, there has been disagreement in previous definitions on the relative importance of the sources of revenue, the participation of private providers or the degree of integration between the insurance and providers as substantive characteristics to define a NHI scheme.

In terms of revenue, we suggest that the NHI is characteristically financed by a mix of public sources, general taxes and social security contributions, as their main source of revenue. Regarding the characteristics of the provision, although some authors have stated that the NHI is defined by a predominantly private provision, our analysis show that common examples of NHI systems do not fit with such pattern and, therefore, disregard the importance of private provider ownership as a relevant characteristic for the NHI schemes. Finally, building on previous definitions, we suggest that a distinctive feature of the NHI is the clear separation of insurance and provider functions with clear established contractual agreements and selective contracting.

Several countries have adopted a NHI-type model, concordant with our proposed definition, such as Australia, Canada, Estonia, Korea and, more recently, Uruguay. These successful transition cases underline that from very different historical and institutional trajectories it was feasible to fully implement a NHI to reach universal health coverage. Policy-makers considering health financing reform strategies should consider the NHI as an alternative to provide efficient and equitable access to health care, learning from the past experience of these countries.

In this context, the more detailed analysis of the organization of the health care system remains a challenge, although the existence of a single-payer implies the intention of the financing institution (the insurance) to support the efficient development of integrated health networks based on primary health care strategies, to allow equitable access to health care, as well as prevention and promotion activities

There are future research areas that could be of high priority for countries considering the implementation of a NHI. First, globally, the impact of the implementation of NHI schemes on relevant health system performance indicators remains unanswered. This should include indicators on financial protection, equitable access, administrative efficiency, quality of care, and patient satisfaction, among others. To this date, no systematic assessment of the impact of the implementation of NHI-type models across countries has been published. Second, it would be useful to analyze the political process and socio-historical context of successful reforms, understanding the agenda, actors, fiscal space and other key elements that act as barriers and facilitators for the implementation of NHI in different countries during the last decades. Third, a comprehensive identification of NHI-type health systems across countries and detailed description of their health systems could allow further analytical comparisons, identifying similarities and differences among them.

This article is useful for countries in the Americas and other regions, where ongoing discussions over the future of health financing are occurring, in the continuous processes of reform and transformation of health systems to achieve universal access to health and universal health coverage. Such reforms discussions are indivisible linked with the society to be aspired and would be benefited by greater conceptual clarities for the arguments and alternatives under consideration.

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## Conflict of interest statement

The authors declare no competing interests regarding the topic covered in this article.

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## Appendix A. Supplementary data

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