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Notes on Improving the Quality of the Estimation of Capital Formation in the SHA

Summary

Capital formation in health systems is an aggregate of major interest for policy analysis and policy makers. However, experience gained over the first four years of the OECD-Eurostat-WHO joint data collection has shown that the majority of the countries still face difficulties in reporting either the total value of capital formation or its breakdown by provider and financing scheme/agents. The purpose of this paper is to stimulate the debate on how to improve the estimation of capital formation in SHA 2.0. To do that it addresses some of the difficulties national SHA compilers have experienced in reporting Gross capital formation in the SHA Joint OECD-Eurostat-WHO data collection (JHAQ) over the last four years, and proposes new guidelines which aim at facilitating the compilation of gross capital formation in SHA.

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INTRODUCTION

1. The purpose of this paper is to improve the quality rather than the quantity of the data on gross capital formation in SHA. Rather than increasing the reporting burden, this paper aims at providing additional information that might help member countries improve the estimation of gross capital formation (for those currently reporting it) or report it for the first time (for those who are not reporting it yet). To do that it addresses some of the difficulties national SHA compilers have experienced in estimating Gross capital formation over the last three years, and proposes new guidelines. Depending on member countries assessment, part or all the information included in this document could be used in the revised SHA manual.

SHORTCOMINGS IN SHA 1.0

2. SHA 1.0 gives the following definition of capital formation:

Total gross capital formation in health care industries = sum of gross capital formation in the institutional units listed under the ICHA-HP classification items HP.1 to HP.3, HP.5 and HP.6, where health care is the predominant activity. Separate estimates should be provided for public and private ownership.

3. By referring to Gross Capital Formation (GCF) the definition seems to suggest that all three main components of GCF should be estimated namely Gross Fixed Capital formation (GFCF), change in inventories and acquisition less disposal of valuables (for a definition of the three components see Box 1 on page 5). However, no further guideline is provided in SHA 1.0 on the content of each of those components in the health system. SHA 2.0 should clarify which aggregate should be compiled. In addition, SHA 1.0 refers to “gross capital formation” or to “capital formation” without making a clear distinction between the concepts of gross or net capital formation.

4. Moreover, the expression “in the institutional units listed under the ICHA-HP classification” does not clearly specify whether the assets to be recorded are those produced by health care providers, those legally owned by the health providers or those used although not legally owned as in the case of operational leasing (See Box 2 at page 6).

5. Finally, in chapter 6 SHA1.0 also stated “The complex issue of accounts for capital formation and its financing is not part of this manual.” However, table 5 proposes a cross classification of health related function (i.e. including gross capital formation) and source of funding. A similar breakdown of expenditure on capital formation by financing agents/schemes is kept in the JHAQ. Limitations due to the issues relating to financing agents and schemes are presented in unit 9. In addition SHA 1.0 does not explicitly deal on how to report the acquisition of those capital goods purchased out of health providers’ own resources (i.e. savings).

Box 1 Terminology

Difference between Gross capital formation (GCF) and Gross fixed capital formation (GFCF)

Gross capital formation is the sum of the value of the following three components:

1. gross fixed capital formation
2. changes in inventories and
3. acquisitions less disposals of valuables.

Therefore gross fixed capital formation is one of the three elements included in the wider aggregate called Gross capital formation.

Capital consumption

As time goes by, capital goods progressively lose part of all of their value. This could be due either to physical use or because they become obsolete. Consider for example a personal computer bought for 1000 Euros three years ago: its current value on the market would definitely be greatly reduced. The loss of the value of capital goods due to their use or obsolescence is called capital consumption.

Difference between Gross and net capital formation

Gross capital formation is measured regardless of the loss of value of the existing capital goods which is due to the use or obsolescence. The latter, called capital consumption, can therefore be subtracting from Gross capital formation to obtain a more refined measure. The resulting aggregate is called Net capital formation.

Investment

While gross capital formation is an investment, not all investments can be classified as gross capital formation. For example the purchase of a financial product is an investment although is not included in gross capital formation.

OVERCOMING THE LIMITATION OF SHA 1.0

6. In order to overcome the limitations of the first edition of the SHA manual, we identified three key questions that need to be answered first: Why do we want to measure capital formation? What exactly do we want to measure? and How do we want to measure it?

Why do we want to measure capital formation?

7. Capital formation in health has high policy relevance. Although the delivery of health-care remains a highly labour intensive process, the importance of medical equipment has been increasing over the past decades. Consider, for example, the use of diagnostic equipment (e.g. ultrasound and MRI machines, PET and CT scanners, x-ray machines and blood test devices), therapeutic equipment (e.g. infusion pumps, medical lasers and LASIK surgical machines), life support equipment (e.g. medical ventilators, heart-lung machines, ECMO, and dialysis machines), medical monitors (e.g. ECG, EEG, blood pressure) or miniature robots employed to perform complex surgery. The use of information and communication technology (ICT) in health is changing the way some services are provided and is offering the opportunity to provide new services. Installation of new equipment sometimes requires the refurbishing of existing health facilities. Also, budget constraints and environmental protection might require deep renovation of existing health infrastructures to cut operational costs, to reduce the use of energy and emissions. The development of urban areas and the need to reach patients in remote or rural areas creates new challenges to patients' transportation. Road and air ambulances are increasing in number and are more and more equipped with increasingly sophisticated medical devices. Finally, new medical software is constantly developed. Altogether, the goods used to deliver health services represent capital formation in the health system.

Box 2 Owners and users of assets

Every asset has both an owner and a user, though in many cases they are the same. The **owner** is the unit having the property of the asset in law, whereas the **user** is the unit acquiring the right to use the asset in its production process although the asset legally remains the property of owner. The distinction is relevant when assets are leased or rented. For example, a helicopter air-ambulance could be owned by a financial corporation which leases it to a health provider who uses it to rescue operation. Two types of leasing are usually identified: the operating leasing and the financing leasing

In the **operating leasing** the lessee (user) acquires the right to use the asset for a certain period of time, which is not necessarily defined in advance. To acquire the right to use the asset the lessee pays a rental to the lessor (owner). However, the leasing period does not cover the whole asset's economic lifetime. During the leasing period it is the responsibility of the lessor (owner) to provide any necessary repair and maintenance of the asset. When the leasing period expires, the asset is returned to the lessor (owner) in the same condition as when it was hired, apart from normal wear and tear. The lessor is then likely to hire out the asset to another lessee or to use it otherwise. The asset is recorded in the lessor's gross fixed capital formation is shown in the lessor's balance sheet during its entire economic life. In this case, the asset is recorded as gross fixed capital formation of the lessor.

Also in **financial leasing** the lessee acquires the right to use the asset in exchange for rental payments over a predetermined and protracted term. However, in this case the leasing period covers all, or most of, the economic lifetime of the asset. At the end of the leasing period the lessee often has the option to buy the asset. All risks and rewards of ownership are, de facto though not de jure, transferred from lessor to lessee. In particular it is the responsibility of the lessee (user) to provide any necessary repair and maintenance of the asset. In this case, the asset is recorded as gross fixed capital formation of the lessee.

In SNA a distinction is made between the concepts of legal and economic ownership. The legal owner of an asset is the institutional unit entitled in law and sustainable under the law to claim the benefits associated with the asset. By contrast, the economic owner of assets is the institutional unit entitled to claim the benefits associated with the use of the asset in question in the course of an economic activity by virtue of accepting the associated risks. Therefore, in SNA, the economic property is transferred from the lessor to the lessee in the case of the financing leasing but not in the operating leasing. Some confusion might arise on the meaning of the term user: some authors see the renting activity of the lessor as a usage of the asset and therefore employ the term user to identify the lessor. This is not the case here. In this context, the term user identifies the lessee only.

What exactly do we want to measure?

8. How much the health system has invested in a certain year in infrastructure, machinery, equipment (including also transport equipment and ICT), research and development, and computer software.

9. Besides information on how much has been spent, it could be of interest to know who has paid (e.g. government, private companies, the providers themselves). Consider for instance the case of Governments transferring grants to health providers with the purpose of covering part or all of the total cost of acquisition of a capital good.

How do we measure it?

10. This paper briefly describes two methods presented in the literature and commonly employed to estimate gross capital formation, the direct method and the indirect method, and how to apply those methods in SHA. Further information on estimation methods could be developed in specific document accompanying SHA2.0.

Important aspects related to capital not treated in this document

11. Firstly, it is important to emphasize that health providers' capital formation is analysed here from the owner viewpoint only. In general terms, indeed, there are two possible approaches to the analysis of capital formation: the producer approach and owner approach. The producer approach measures the value of assets produced by an economic unit regardless of the entities who purchase them, whereas the owner approach measures the value of the assets acquired by a unit whoever has produced them. The producer approach is not considered in this paper.

12. The reasoning behind such a choice is that, whenever a health provider might produce capital assets, such a production should be considered a non-health secondary production and thus should be excluded by the SHA boundaries. However, in the rare event of assets produced by the health providers are also acquired by the same or by another health provider (e.g. software research and development) their value would still be recorded in SHA as the owner criteria applies to the acquiring provider.

13. In addition, there exist a few other important concepts related to capital, though not necessarily to measure gross capital formation, which will not be addressed in this document although they have a high relevance in SHA. These would include the estimation of capital consumption, capital stock, human capital, or the estimation of volume and price measures. As mentioned above, it is proposed to concentrate on gross capital formation only as enhancing the quality of data reporting is currently a priority. In order to enhance the quality of the gross capital formation estimations, a number of issues need to be addressed. To mention just a few, clearly define the boundaries of the aggregate, both in terms of providers and assets, and the valuation criteria. Once the methods on those issues are agreed, the attention could be moved to the other aspects that are currently not addressed here.

CAPITAL FORMATION IN THE HEALTH CARE SYSTEM

The double role of the health providers

14. By defining current health expenditure, SHA identifies at once both the health goods and services consumed by the resident households and the providers which supply those health goods and services. To supply the health care goods and services, health providers require labour inputs and goods and services.

15. Thus, health providers can be seen from two viewpoints. Firstly, health providers can be regarded as producers of health goods and services which are recorded by health function (see unit 7) in the current health expenditure. In this context, health providers represent units of the supply side of the economy. Secondly, health providers can be seen as acquirers of production inputs (labour plus goods and services). In this case health providers represent units of the demand side of the economy.

Differentiating intermediate consumption and capital formation

16. Some goods and services acquired by the health providers as input in their production of health products are either transformed or completely used up in the course of production. Consider for example, the bandage used to hold a dressing in place. Inputs of this kind are transformed and incorporated into the health product produced by the health providers. There exist other inputs which are completely consumed or used up in the production process (e.g. electricity). Whether transformed or completely used up, those goods and services terminate their economic life within the accounting period. Because of this characteristic they are considered as intermediate consumption.

17. However, not all the goods and services employed by the health providers in the production of the health care products conclude their economic life in the accounting period. Some goods and services are used repeatedly or continuously for more than one year in the production of health

services. Examples are the buildings (e.g. the hospital infrastructure) or transport means (e.g. road ambulance). These goods and services represent the gross fixed capital formation (see Box 1 page 5). This paper focuses on capital formation only.

Three perspectives to analyse capital formation in health

18. As current health expenditure can be analysed and reported from at least three view-points (i.e. the functions, financing and provision), also capital formation can be analysed by at least three perspectives (see Figure 1): the providers who acquired the capital goods, the financing agents/sources¹ who funded the acquisition of the assets and the type of assets (e.g. machinery, equipment, buildings, transport means).

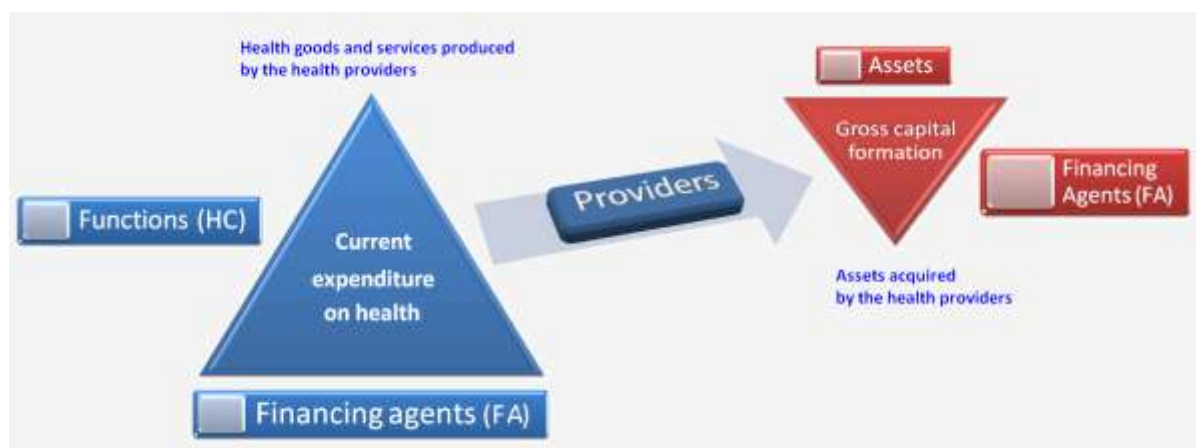
19. However, the following important differences are of note:

- As mentioned above, when dealing with the current health expenditure health providers represent the supply side while they stand for the demand side when capital formation is analysed.
- The boundaries of current health expenditure and those of capital formation aggregates are different, in that products included in one aggregate not included in the other.
- The products included in the current health expenditure are classified using the functional classification of the health goods and services consumed by the resident population while capital goods cannot be classified by health function (a list of asset is proposed below).
- Agents financing current health expenditure do not necessary finance also capital formation and vice-versa. Some might, but not all of them. Consider, for example, the case of European Union (EU) Structural Funds which can granted for the purchase of capital goods (such as the building of a new hospital) but not for current health expenditure. It is currently debated whether the same classification of financing agents/sources can be employed to report the financing of either aggregate or whether a specific classification should be developed. As no conclusion has been reached on this specific issue, in this paper the terms financing agent, financing sources or agent financing are used interchangeably.
- Another important difference is that health providers can fund the purchase of the capital goods using their own resources (i.e. saving). Depending on the institutional setting in place in each country, saving could be a source of funding for capital formation both to private and public providers. Consider, for example, the case of those counties where health services provided to households are paid by the financing agent through a product-based price system that reimburses both current and capital expenditure incurred by providers, and then it is up to the provider to save a part of the amount received to purchase the capital goods. The consequence is that health providers will then also appear among the financing agents/source whenever a part or all the value of the capital goods and service they have purchased is funded out of savings. In that case providers would be included under corporations or non profit institutions serving households (NPISH) depending on their status.
- Finally, households might play an important role in funding capital formation through donations.

¹ In this paper the classification of financing agents is used instead of financing schemes. Indeed, there seems to be a consensus on the fact that the concept of financing schemes (as defined in unit 9) cannot be used to record capital formation. Thus, the classification of financing agents which is based on the aggregation of institutional units seems to be the sole available option to record capital formation.

20. An additional dimension which could be used to analyse the capital formation of health provides is represented by the nature of the different financing flow used by the providers to acquire the assets. For example, it could be of interest to know whether the construction of a new hospital is funded out of transfers from the government, or using the public-private partnership, using donations from abroad or its own accumulated resources. In other words, it could be of interest to explicitly record the transaction underlying the acquisitions of the assets (e.g. capital transfer, grants, capital transfer in kind).

Figure 1 Current health expenditure and gross capital formation in SHA



The owners' approach to the recording of capital formation

21. Capital goods and services could be recorded using two different approaches. On the one hand, the producers' approach aims at recording the capital goods and services according to the industry or sector which has produced them. For example, a road ambulance can be recorded by the Manufacture sector which produced it². On the other hand, the same goods can be recorded by the units that purchase them. The same road ambulance can be recorded as purchased by a hospital (see footnote 1 at page 8).

22. The bulk of the capital goods acquired and employed by the health providers are most likely produced outside the health care sector (either by other sectors of the national economy or imported). The only exception could be represented by the production of research and development and the production of software. In those two specific cases, if the assets are acquired by units that cannot be classified as health providers, then that production should be seen as secondary non-health production activity and thus should be outside the SHA boundaries.

23. In this paper we propose to refer to the ownership of capital goods only. This approach should guarantee a full coverage of capital formation in health. Indeed, if the same assets are acquired by the health providers (either retained by the same unit who had produced them or by another health providers), their value should be captured using the owner approach.

Refining the definition of Gross capital formation in SHA

24. Gross capital formation is measured by the sum of three components:

- i) Gross fixed capital formation

² The sum of the value of health good and services consumed by the resident population plus the value of gross capital formation was referred as "Total health expenditure" in SHA 1.0. Within the SHA revision process a proposal of discontinuing the use of "Total health expenditure" as aggregate has been proposed. However, this paper do not address that issue, in that intends to provide addition information for the estimation of capital formation only.

- ii) Changes in inventories and
- iii) Acquisitions less disposals of valuables.

Each component is presented in the following paragraphs.

Gross fixed capital formation

25. The following definition of gross fixed capital formation can be employed in SHA 1.0:

Definition
 Gross fixed capital formation in the health care system is measured by the total value of the assets that health providers have acquired during the accounting period (less the value of the disposals of assets of the same type) and that are used repeatedly or continuously for more than one year in the production of health services.

26. Asset can be defined as “a store of value”, or a means of carrying forward value from one period to another. By holding or using the asset, the owner can accrue benefits. Examples of assets in the health sector include hospital building, ambulances, medical imaging machine.

27. Health providers can acquire the assets by purchase, through barter or receiving them as capital transfers in kind. Symmetrically, the assets can be disposed by selling them, surrendering in barter or as capital transfer in kind.

28. It is worth noting that, although is unlikely, it is possible for gross fixed capital formation to be negative if the value of the disposed assets exceeds the value of those acquired.

Boundaries

29. Health providers require an array of goods and services which are used as input for the provision of the health services. Goods and services that are transformed or entirely used up in the course of production within the accounting period are regarded as intermediate consumption (e.g. electricity, water, fuel, surgical mask, protective wear). On the contrary, goods and services used repeatedly or continuously for more than one year in the production of health services are classified as capital formation.

30. The guiding principal for the recording of gross capital formation is the legal ownership of the assets by the health providers³. The only category of health providers for which capital formation would not be recorded is the rest of the world, as the acquisitions of capital goods by non resident providers will be recorded in the country of residence of the provider.

31. The inclusion of all providers (except the rest of the world) is a departure from SHA 1.0 which excluded the net acquisition of capital assets made by retail sale of medical goods (as retail sale of medical goods is regarded as a supporting activity). The proposal of recording also the values of gross capital formation acquired by the retail sellers is motivated by the fact that retail sales are part of the health system. In low and middle income countries retail sellers are part of the distribution of medical goods, a different type of providers but as relevant as medical offices. Also in high income countries, such as Switzerland, retail sellers can recommend and prescribe medicines. Prescription and provision of medicines are health services.

³ An exception to the principle of legal ownership is represented by the financing leasing. In that case, the value of the capital goods is recorded as capital formation of the lessee at the beginning of the leasing period, although the lessee could become the legal owner of the asset only at the end of the leasing period (see Box 2 at page 3).

32. For practical reasons, it would be advisable to exclude the capital formation of the providers of administration activities of public health and health care financing or insurance whenever their activity is embedded into larger units for which health administration is not the predominant activity and/or it would be impossible to identify the capital goods used specifically for the health administration. For example, consider the purchase of a new building made by an insurance company dealing with any sort of personal insurance and not just health insurance. It would be advisable to record the value of the portion of the assets used for the provision of health insurance services only as long as such estimation could be made. A similar principle should be applied to recording the capital formation of those health providers classified under the rest of the economy (see unit 8) as the provision of health services is not the predominant activity. To clarify this point consider two air-line companies: the first company has as its sole activity the patients' transportation while the second air-company main activity includes regular and charter passenger transportation, assistance in oil platforms, forest fire-fighting, air filming and photography, but as secondary activities also medical emergencies, patients and organ transportation, high altitude mountain and maritime rescue. If both companies purchase the same specially equipped new helicopter to operate the same health services, both acquisitions should be recorded in SHA, regardless of the fact that patient transportation is the main activity in one company and is the secondary activity in the other. In other words, the guiding principle for the economic units included under HP7, is that it would be recommendable to record the acquisition of those assets used to provide health services only, even if the provision of the health services is a secondary activity of the provider.

33. Finally, health capital goods acquired by households should be excluded unless their costs are reimbursed to the patient.

Relatively inexpensive tools

34. Tools that are relatively inexpensive and purchased at a relatively steady rate, such as hand tools, may be excluded from gross capital formation and considered as intermediate consumption (e.g. stethoscopes, thermometers). However, in the event of the start-up of a new activity the costs for the acquisition of large quantities of relatively inexpensive tools might be relevant. In such a case the purchase of large quantities of inexpensive tools should be recorded as capital formation.

Machinery and equipment integral to buildings

35. Machinery and equipment integral to buildings are not reported separately from the value of the building itself. Consider for example the lifts installed in a new hospitals. If the hospital itself is recorded, the value of the lifts has to be included in the value of the structure.

Immovable assets owned by non-residents.

36. By convention, all health care facilities within the economic territory are owned by resident units. A notional resident unit is specifically created if an owner (or lessee under a financial lease) would not otherwise qualify as a resident.

Existing fixed assets

37. Capital goods acquired by health provider are not necessary newly produced. Since assets have a long life, they may change hands but continue to function as fixed assets for their new owners. Consider for example the case of a hospital converted into a hotel or vice-versa. Thus, when the ownership of an existing fixed asset is transferred the value of the asset sold, bartered or transferred is recorded as negative gross fixed capital formation by the former owner and as positive gross fixed capital formation by the latter. The value of the positive gross fixed capital formation recorded for the purchaser usually exceeds the value of the negative gross fixed capital formation recorded for the seller by the value of the costs of ownership transfer incurred by the purchaser (e.g. taxes). Generally speaking, two cases can be distinguished which are relevant in SHA:

- i) Both units exchanging the assets belong to the health care system. Consider, for example, the case of a hospital sold by a municipality to the central government. In this case, a negative entry would be recorded under the health provider selling the asset (i.e. the municipality); and an equivalent value would be recorded as a positive entry under the provider purchasing the hospital (i.e. the central government) plus an additional entry to include the value of the costs of ownership (e.g. taxes) encountered by the new owner. As a consequence, the overall value of gross capital formation for the whole health sector increases only by the costs of ownership as the algebraic sum of the positive and negative entries mentioned above is null
- ii) One of the units belongs to the rest of the economy or the rest of the world: the value of asset acquired or dismissed by the health provider will be recorded as above. However, the value of the overall gross capital formation for the health sector increase or decreases for the same amount. It is worth noting that, in the case of immovable assets (i.e. buildings) sold by a resident unit to a unit resident abroad, by convention a new statistical unit is created in the economic territory where the immovable asset is in order to represent the foreign unit.

Improvements to existing fixed assets

38. Health care facilities have service lives that may range up to 50 years or more. However, in order to maintain a fixed asset in working order or to increase its performance or productive capacity, renovations and refurbishments are often required. Depending on their nature, some of that expenditure can be considered as ordinary maintenance and therefore recorded as intermediate consumption while other could be recorded as gross fixed capital formation. Drawing the distinction between ordinary maintenance and capital formation is not a clear cut. Ordinary maintenance and repairs can be identified by two features:

- a) They are activities that must be undertaken regularly in order to maintain a fixed asset in working order over its expected service life. The owner or user of the asset has no choice about whether or not to undertake ordinary maintenance and repairs if the asset in question is to continue to be used in production
- b) Ordinary maintenance and repairs do not change the fixed asset's performance, productive capacity or expected service life. They simply maintain it in good working order, if necessary by replacing defective parts by new parts of the same kind.

39. To constitute gross fixed capital formation, improvements to existing fixed assets must produce significant changes in some of the characteristics of existing fixed assets. The following features should be fulfilled:

- a) The decision to renovate, reconstruct or enlarge a fixed asset is a deliberate investment decision that may be taken any time, even when the good in question is in good working order and not in need of repair.
- b) Major renovations, reconstructions or enlargements increase the performance or productive capacity of existing fixed assets or significantly extend their previously expected service lives, or both.

Costs incurred on acquisition and disposal of assets

40. Purchasing a fixed asset often involves the use of lawyers or the payment of taxes. Highly complex machinery might require significant costs associated with delivery and installation that were not included in the purchase price. All the costs associated with acquiring and disposing of assets may be described as costs of ownership transfer and are treated as gross fixed capital formation.

Time of recording

41. Acquisitions and disposals of fixed assets are recorded when the ownership is transferred to the health provider that intends to use its in production (for the acquisitions) or from the health provider who has previously used in the production (in the case of disposals). This time is not generally the same as the time at which the fixed assets are produced. Nor is it necessarily the time at which they are put to use in the production of other goods or services.

42. **Exception.** When the assets are developed under a contract of sale (e.g. the construction of a new hospital building), the producer records work-in-progress as normal but when stage payments are made, these are regarded as purchase of [part of] a fixed asset or as a trade advance if the value of the stage payment exceeds the value of the work put in place. In the latter case, work is recorded as fixed capital delivered to the final owner as work proceeds until the trade credit is exhausted. Also exception is made to financial leasing where the good is recorded when economically transferred to the lessee that intends to use it.

Ownership

43. Generally, the fixed assets recorded in SHA are those legally owned by health providers. However, of particular note are the following two exceptions⁴:

Financial lease

44. A financial lease (also called capital lease) is a contract between two units: the lessee (e.g. the health provider) and the lessor (e.g. finance company or a bank). The terms of the lease are such that the lessor (e.g. finance company or a bank) purchases and therefore is legally the owner of the asset (e.g. MRI machine) but the lessee takes over both the economic risks and rewards of using the asset in production. In return, the lessee pays a series of rentals or instalments for the use of that asset. Rentals paid by the lessee cover a large part or all of the cost of the asset encountered by the lessor plus a mark-up. At the end of the duration of the lease, the lessee has the option to acquire ownership of the asset (e.g. paying the last rental, or bargain option purchase price). In effect, therefore, the lessee becomes the economic owner of the asset even if the lessor remains the legal owner. In these cases, the asset (e.g. the MRI machine) is recorded as being acquired by the lessee (e.g. hospital) in return for a loan extended by the lessor to the lessee. The asset is then recorded on the balance sheet of the lessee and not the lessor. The payments due under the lease arrangement are treated as forming a repayment of the principal of the loan and a payment of interest and possibly a service charge.

Assets produced by communal effort: public-private partnership (PPP) or similar shorthand

45. The term public-private partnership includes a wide variety of different forms and schemes. In the health system, the term public-private partnership (PPP) often refers to a concession contract. A concession awards a company full responsibility for the delivery of services from an asset, including the operational activities, although in health care this does not usually include clinical services. A typical public-private partnership (PPP) example in the health system would be a hospital building financed and constructed by a private developer and then leased to the hospital authority. The private developer then acts as landlord, providing housekeeping and other non medical services while the hospital itself provides medical services. Similar shorthand are the private finance initiative (PFI) or a Build, Own, Operate, Transfer (BOOT) scheme. Under such set of schemes it is not easy to establish which unit is the legal owner of the asset during the contract period. This is currently the subject of a wider accounting debate and experts are identifying the best possible solution to record those assets. While waiting for that debate to come to a conclusion, a possible temporary solution for SHA 2.0 is proposed, that is one of the following conditions should be met:

⁴ See SNA08 10.56

- If the owner qualifies as a health provider the asset is recorded in SHA
- If the acquisition of the asset can be interpreted as a form of financial lease made by a health provider and then can be treated as such.

Valuation

46. The value of the various components of gross capital formation is given by the sum of acquisitions less disposals. Acquisitions include the whole value of fixed assets purchased, acquired through barter, received as capital transfers in kind and the value of fixed assets produced by health providers and retained for their own use (e.g. software). Disposals include the value of existing fixed assets sold, surrendered in barter and as capital transfers in kind. The value of fixed assets purchased or produced by health providers and retained for their own use include new assets, existing assets, the value of improvements to assets and the cost of ownership transfers in respect of these assets. Disposals of assets may cease to be used as fixed assets by their new owners (e.g. hospital sold by local government to central government⁵), assets that are scrapped or demolished by their new owners (e.g. obsolete ambulances) and assets that are exported.

Changes in inventories and acquisitions less disposals of valuables

47. Although gross fixed capital formation constitutes the most important component of capital formation in the health systems, the two additional components making up the aggregate gross capital formation could be considered: namely, change in inventories and acquisitions less disposals of valuables. SHA 1.0 did not clearly specify whether all three components should be recorded (Gross fixed capital formation, change in inventories and acquisition less disposal of valuables) or gross fixed capital formation only. In the rest of this paragraph a brief description of change in inventories and acquisition less disposal of valuables is given for completeness. However, the decision on whether to include the latter components should be regularly reported is still open, depending on its feasibility and usefulness.

Changes in inventories

48. Changes in inventories are measured by the value of the entries into inventories less the value of withdrawals and less the value of any recurrent losses of goods held in inventories during the accounting period.

49. Inventories are produced assets that came into existence in the accounting period or in an earlier period, and that are held by health providers for sale, use in production or other use at a later date. For practical reasons, we would recommend that in SHA 2.0 only expenditure on inventories of considerable value would be considered, such as the storage of medical goods and equipment to be used in the event of a catastrophic occurrence. Change in inventories of health providers for their ordinary activities (e.g. the value of pharmaceutical stored in hospitals) can be neglected assuming for simplicity that the value at the beginning of the accounting period equals the value at the end of the same period.

Work-in-progress

50. Work-in-progress consists of output produced by an enterprise that is not yet sufficiently processed to be in a state in which it is normally supplied to other institutional units. Work-in-progress is recorded under inventories for any output that is not complete at the end of the accounting period. The only exceptions to recording incomplete work as work-in-progress are for partially

⁵ When the transfer occurs, the value of the asset originally attributed to the local government is cancelled from the local government accounts by a negative capital transfer in kind made to the government unit (and registered a positive entry in its account).

completed projects for which the ultimate owner is deemed to have taken ownership, either because the production is for own use or as evidenced by the existence of a contract of sale or purchase. Consider for example the construction of a hospital, which may take years to complete: if the ultimate owner is deemed to have taken ownership, then the partial value of the asset will be recorded as capital formation rather than change in inventories.

Acquisitions less disposals of valuables

51. Valuables are produced goods of considerable value (e.g. art work) usually held as a store of value over time. Whilst artwork is not central element in the provision of healthcare services, it occurs that they are acquired by health providers as they seem to have an impact in the treatment of certain conditions or pathologies.

52. The practice is growing in importance in some countries (e.g. United Kingdom) where art work are displayed in long term care facilities for older people as well as setting dealing with young physically disabilities, mental health and outpatients, rheumatology patients, renal dialysis patients and those in need of palliative care.

53. Although at present this component could be neglected by some countries, it is worth considering it in the new edition of the SHA manual as its importance might increase over the next decades.

Type of asset to be included in Gross fixed capital formation

54. In SHA 1.0, gross capital formation was classified by providers acquiring (and disposing) the assets and by agents financing the acquisitions only. A drawback of the approach proposed in SHA 1.0 is the lack of clarity on the content of the aggregate “capital formation”. Indeed, the fundamental question to be addressed is “what assets are to be included?” For example, are road ambulances included or not? Are buildings included or not? And what about the computers used for the administration of a hospital?

55. The lack of clarity on what assets should be included in the aggregate could harm the international comparability of the data, as some countries might include what others are excluding and vice-versa. To address this issue, we propose a list of broad categories of assets whose value should be included in the aggregate capital formation (see Table 1 below). This list, or classification, is not meant to be used for international reporting. Instead, its primary purpose is to enhance the quality of the data reported by increasing the homogeneity of the content of the aggregate Capital formation. However, this classification could be included in SHA 2.0 as an additional option for countries that wish using it for national reporting. In fact, the classification by type of assets could provide additional information to policy makers concerning the nature of the non financial investment (equipment, machinery, building etc.). This would be of particular relevance due to the technological development embedded in the different assets and on their expected service life. For examples, investments in hospitals are likely to last longer then investment in transport means, and transport means are expected to serve longer then ICT devices. A classification by assets could also serve policy analysts as it could enhance the international comparability, and also facilitate the linkage to non-expenditure statistics (e.g. number of bed, number of scans). Indeed, similarly to current health expenditure for which the functional classification is the classification which allows identifying comparable aggregates, the classification by assets of gross fixed capital formation would allow setting categories which are more directly comparable. For example, it would be more comparable to know how much has been spent on diagnostic equipment rather than how much has been spent on investment by hospitals.

Table 1 Gross fixed capital formation by type of asset

<i>Infrastructure</i>
<i>Residential and non-residential buildings</i>
<i>Other structures</i>
<i>Machinery and equipment</i>
<i>Medical equipment</i>
<i>Transport equipment</i>
<i>ICT equipment</i>
<i>Machinery and equipment n.e.c.</i>
<i>Intellectual property products</i>
<i>Research and development</i>
<i>Computer software and databases</i>
<i>Other intellectual property products</i>

Infrastructure

56. Infrastructure in the health care system includes two components: Residential and non-residential buildings and other structures. These are described in turn below.

Residential and non-residential buildings

57. Residential and non-residential buildings acquired (less those disposed) by the health care providers are included in this category. Examples include Nursing and residential care facilities, hospital setting, ambulatories etc.

Other structures

58. Other structures include structures other than buildings acquired (less those disposed) by the health care providers. Consider for example emergency helicopter landing facilities, warehouse etc. whenever they are not incorporated in the building.

Machinery and equipment

59. Machinery and equipment covers medical equipment, transport equipment, machinery for information, communication and telecommunications (ICT) equipment, and other machinery and equipment not elsewhere classified. As explained above, leased machinery and equipment is recorded under capital formation of the health providers in the case of financial lease only (that is, the providers will eventually become the owner of the assets). On the contrary, assets used by the health providers under operational lease are not recorded a capital formation of the user as the ownership of the assets is the guiding principle for inclusion/ exclusion of the assets. Tools that are relatively inexpensive and purchased at a relatively steady rate, such as hand tools, are considered intermediate consumption and therefore are excluded from capital formation. Also excluded are machinery and equipment integral to building.

Medical equipment

60. Medical equipment consist of assets employed for diagnosis, monitoring or treatment of medical conditions Examples include: diagnostic equipment (e.g. ultrasound and MRI machines, PET and CT scanners, and x-ray machines), therapeutic equipment (e.g. infusion pumps, medical lasers and LASIK surgical machines), life support equipment (e.g. medical ventilators, heart-lung machines, ECMO, and dialysis machines), medical monitors (e.g. ECG, EEG, blood pressure) or miniature robots employed to perform complex surgery, laboratory equipment (blood test devices).

Transport equipment

61. Transport equipment consists of equipment for moving patients, organs and health personnel. Examples include road vehicles (road ambulance, patient transport vehicles, patient transport cars, rapid response cars) air ambulance (either fixed or rotary wing). In a few specific cases it could also include water ambulance (boat) or special motorbike and bicycle for rapid response in urban areas.

ICT equipment

62. Information, computer and telecommunications (ICT) equipment consists of devices using electronic controls and also the electronic components forming part of these devices. In the health system, ICT devices can be used to deliver health care services where distance is a critical factor. Examples include healthcare professionals exchanging information for diagnosis, treatment and prevention of diseases and injuries, research and evaluation, and for continuing education of healthcare providers. In addition, ICT devices can be employed in the administration of health providers.

Other machinery and equipment n.e.c.

63. Other machinery and equipment consists of machinery and equipment not elsewhere classified. This includes, for example, kitchen equipment used in hospital for the preparation of patients' meals, or CCTV used for the security of health care facilities.

Intellectual property products

64. Intellectual property products are the result of research, development, investigation or innovation leading to knowledge that the developers can market or use to their own benefit in production because use of the knowledge is restricted by means of legal or other protection.

65. A "Handbook on deriving capital measures of intellectual property" is currently under preparation. The purpose of the handbook is to provide guidance on deriving capital measures (gross fixed capital formation, consumption of fixed capital, capital services and the stock of capital) of R&D and other intellectual property products. As soon as the handbook will be available, we will investigate to what extent those guidelines could be applied to SHA.

66. Intellectual property products could be produced by the health care providers on own account. Examples of intellectual property products are the results of research and development, computer software and databases.

Research and development

67. A major innovation introduced in the just published 2008 edition of the System of National Accounts (SNA) is the capitalisation of research and development. Although there seems a wide consensus on the theoretical motivation guiding such a choice, the practical implementation of reporting that aggregate remains an issue for a number of countries. While the debate is still open on whether and how to report research and development for the overall economy or for specific sectors of it, the following paragraphs present just the main feature of the research and development component for completeness only. Any decision on whether and when R&D should be included in SHA is left open.

68. The results of research and development (R&D) "consists of the value of expenditures on creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and use of this stock of knowledge to devise new applications. This does not extend to including human capital as assets within the SNA. The value of research and

development (R&D) should be determined in terms of the economic benefits it is expected to provide in the future. This includes the provision of public services in the case of R&D acquired by government. In principle, R&D that does not provide an economic benefit to its owner does not constitute a fixed asset and should be treated as intermediate consumption. Unless the market value of the R&D is observed directly, it may, by convention, be valued at the sum of costs, including the cost of unsuccessful R&D....” (SNA 2008, 10.103).

69. Therefore, R&D in health care providers should be recognised as part of capital formation. In order to achieve this, several issues have to be addressed. These include deriving measures of research and development, price indices and service lives. Specific guidelines, together with handbooks on methodology and practice, will provide a useful way of working towards solutions that give the appropriate level of confidence in the resulting measures.

70. The Frascati Manual provides detailed guidelines for the estimation of expenditure on research and development for R&D in health according to the functional boundaries (OECD, 2002, Annex 4). Further information on international comparisons and examples of national efforts can be found in *Measuring expenditure on Health-related R&D* (OECD, 2001). The separate recording of expenditure on R&D as a component of capital formation is suggested.

Computer software and databases

71. Computer software consists of computer programs, program descriptions and supporting materials for both systems and applications software. Databases consist of files of data organized in such a way as to permit resource-effective access and use of the data.

DIFFERENT APPROACHES ON HOW TO ESTIMATE CAPITAL FORMATION

72. Different approaches could be used to estimate the value of Gross capital formation. In principle, each of the three main dimensions mentioned above (financing agents, provider and type of assets) can represent a valid starting point to estimate capital formation. Among the OECD countries currently reporting capital formation, the majority seems to rely essentially on information concerning the financing of capital formation made by financing agents (see footnote 1 at page 8). A few countries have direct access to the providers’ annual accounts from which they can retrieve the value of capital formation acquired in the accounting period. As the “type of assets” is a new categorisation, no information is currently available on whether countries could have access to sources (e.g. national registries) which could be used to estimate capital formation.

73. Depending on the institutional setting in place in each country, and consequently on the way data sources are organised, a blend of the three approaches could be employed to estimate the value of capital formation or its components. However, each approach has its advantages and shortcomings. The following paragraph briefly describes the three approaches and highlights some of their limitations.

- The financing agent approach relies essentially on the information on capital transfers made by the financing agents (see footnote 1 at page 8) to the providers (e.g. Public bodies capital grant awarded to health providers, the EU structural funds). The main shortcoming of this approach concerns the valuation of capital goods. As mentioned above, estimation of capital formation refer to the total value of the goods and services acquired in the accounting period, whereas the capital transfer can represent one of many instalment made in several accounting period by the financing agent. In addition, this approach is limited in that it provides information on who are the providers receiving the funds and most of all is unable to detect neither “savings” made by the providers nor the donations made by households or corporations. This explains the difficulties that some countries have in reporting capital formation for the private sector.

- The provider approach (sometimes called “*indirect method*”) aims at estimating gross capital formation using the providers’ balance sheet for successive accounting periods. In practice this method consists in taking the “Net book value” of “fixed assets” reported in the balance sheet at the end of the reference period t , and subtracts the corresponding “Net book value” of “fixed assets” reported in the balance sheet at the end of the period $t-1$. The difference between the two should equal the acquisitions, less disposals, of fixed assets during the accounting period. Similarly, change in inventories can be estimated subtracting the values for “Stocks and work in progress” also reported in the accounts of the providers. The main shortcoming of this approach is that it provides no information on financing agents.
- The type of assets approach (also called “*direct method*”) uses directly data on the value of the fixed assets purchased by providers (e.g. using information from the commodity flow estimations). As some of the capital assets are registered in public registers (e.g. building, transport means), the latter can represent an additional source of information. However, this approach, as well as the previous, provides no information on financing agents.

To conclude, as none of the three approaches can be regarded as the “perfect” approach, a blend of the three methods seems to be the best option available at the moment. National availability of data will determine to what extent one method needs to be preferred to the other for the estimation of the different components of Gross capital formation.

REPORTING STANDARDS FOR INTERNATIONAL DATA COLLECTION OF HEALTH GROSS CAPITAL FORMATION.

74. The primary purpose of this paper is to improve the quality of the reported data on gross capital formation in the health systems.

75. Considering the methodological difficulties countries had to face in the past, it would be recommendable to keep in SHA 2.0 the same reporting standards as used in the Joint OECD-Eurostat-WHO data collection over the last four years. This would ensure continuity in the time series and would not result in an increased reporting burden for member countries.

76. In the framework of the Joint OECD-Eurostat-WHO data collection, Member countries were asked to report the value of Gross capital formation in two tables of the questionnaire. The first was the function x provider table, where a vector was included below the line of current health expenditure to report Gross capital formation broken down by provider. The second table was the function x financing agents/scheme table which also had a vector below the line of current health expenditure to break down the value of gross capital formation by financing agents/schemes.

77. However, as there seems to be an argument in favour of separating Gross capital formation from current health expenditure and in so doing drop the use of the aggregate total health expenditure, the two vectors could be eventually be moved to a separate table in the future questionnaire.

78. As the acquisition of capital goods and services can be funded in a wide range of different ways, it could be of interest in some countries to report information on the financing mechanisms. Example could include health providers own resources (i.e. savings), grants received from public and private bodies, donations from households and corporations, capital transfers from abroad (either foreign countries or international organisations) and borrowing/lending. This additional dimension of gross capital formation could be used to breakdown the whole aggregate, and also to cross classify with the other dimensions such as providers, financing agents and assets. Once again, however, this possible extension is not further discussed in this paper as the priority here is enhancing the quality of the data reported rather than the quantity of the reported data.

POINTS FOR DISCUSSION

Two possible options on how to use this paper in the SHA 2.0 Manual

79. Two possible options are available on how to use this paper in the SHA 2.0 Manual:
- a. The concepts outlined above could represent inputs for different unit of SHA 2.0. A proposal would be to have: the new definition of Gross capital formation in the health care system (i.e. paragraphs 0 and 0) in Unit 2; selected parts of the paragraphs from 0 till 0 could feed Unit 3; the classification by assets could be included in Unit 12. The remaining parts of paragraphs from 0 till 0 not used in Unit 3 could also be used in Unit 16.
 - b. Alternatively, the present paper could be kept as a single document which could become a new chapter of the future SHA 2.0 manual. This option would imply the modification of the programme of work as currently no chapter on capital formation is included.

SHA expert are invited to express their opinion on which option they prefer.

Outstanding questions

80. In this note we propose to extend the boundaries of health capital formation as compared to SHA1.0. Indeed, while in the current manual a selection of providers is considered, the approach proposed here includes all health providers (i.e. retail sale, providers of the rest of the economy and households) excluding only the rest of the world as long as the value of assets employed for the production of the health services can be isolated. We would be interested in hearing the SHA experts' opinion on whether capital formation of all health providers should be considered and how feasible would be to report it.

81. Also, while SHA 1.0 did not specify whether all three components of Gross capital formation should be recorded (Gross fixed capital formation, change in inventories and acquisition less disposal of valuables), it would be important that SHA 2.0 clearly identifies which aggregate should be reported. National expert are invited to express their opinion on what aggregate should be considered in SHA 2.0.

82. In SHA 1.0 and in the JHAQ, gross capital formation was cross classified with financing agents (see footnote 1 at page 8). Should this approach be kept also in the future to ensure continuity in the data collection process? Should this approach be kept even in the event of having current health expenditure broken down by financing scheme only?

Further development on estimating capital formation/stock in the health care systems

83. The first natural extension of this paper would be to explore the possibility of cross-classifying the three vectors in which gross capital formation expenditure could be broken down. For example, the vector on type of assets could be cross-classified with providers and providers with financing agents. It could be of interest to investigate together with a few member countries whether the benefit in terms of data availability is worth the additional effort. Comments are invited on the interest is such cross-classification.

84. A second area which could possibly further enhance the quality of the estimation on capital formation is the analysis of the financing mechanisms used by the providers acquiring the assets. Is the construction of a new hospital funded out of transfers from the government, or using the public-private partnership or using donations from abroad? Would it be possible to explicitly report the transaction underlying the acquisitions of the assets (e.g. capital transfer, grants, capital transfer in kind)? If yes, would it be worth developing a Health Capital Account?

85. Research and development is an area of particular interest in health. However, its accountability raises both methodological and practical difficulties. Should this aspect be further explored?

86. Third, using the gross capital formation, estimation of the capital stock could be derived. The health capital stock estimation could not only aid the analysis of the health sector, but also help improving the quality of current health expenditure. In fact, the availability of capital stock estimation would allow the calculation of consumption of fixed capital which is an essential component for the estimation of the output for the health non-market output. As some assets used by health providers are leased (operational lease) from economic agents which are not included in the health boundaries, it could be of interest to estimate the capital stock according to the user of the asset rather than the owner.

87. Finally, SHA experts are also invited to express their opinion on whether the methodology related to the capital formation/ stock should be further developed, to what extent and in which of the areas mentioned above.