

Chapter 13. Human health activities

This chapter presents practical guidance as well as main issues and challenges for compiling SPPIs for Human health activities (ISIC 86).

13.1. Human health activities (Bonnie Murphy, U.S. Bureau of Labor Statistics)

13.1.1. Industry description (ISIC 86)

ISIC division 86 includes activities of short- or long-term hospitals, general or specialty medical, surgical, psychiatric and substance abuse hospitals, sanatoria, preventoria, medical nursing homes, asylums, mental hospital institutions, rehabilitation centres, leprosaria and other human health institutions which have accommodation facilities and which engage in providing diagnostic and medical treatment to inpatients with any of a wide variety of medical conditions. It also includes medical consultation and treatment in the field of general and specialised medicine by general practitioners and medical specialists and surgeons. It includes dental practice activities of a general or specialized nature and orthodontic activities. Additionally, this division includes activities for human health not performed by hospitals or by practicing medical doctors but by paramedical practitioners legally recognized to treat patients. Note that residential care activities with some level of nursing services are included in ISIC 87 - Residential care activities, and strictly are not considered human health activities as classified in ISIC 86.

The division 86 is further divided into the following ISIC groups:

- 861 - Hospital activities;
- 862 - Medical and dental practice activities;
- 869 - Other human health activities.

Human health activities may be characterised as having either marketed or non-marketed output. Output is considered market production when transactions have economically significant prices associated with them. Nonmarket production is characterized by the lack of observed prices. Price indices for human health activities industries can only be calculated if observable prices exist.

The U.S. healthcare market is comprised of two types of economically significant prices:

1. Market value prices paid by private payers, including private insurance companies and individual patients that pay directly (known as out-of-pocket payers); and
2. Market value prices paid by public or government payers.

In the U.S., public payers can be separated into two main categories, Medicare and Medicaid. Medicare is a federally funded program for persons over age 65. Medicaid is a state administered, jointly funded (federal and state) program for the indigent. Price indices are calculated for transactions with both types of payers as prices are observable in both cases.

In developing SPPIs for health activities, it is important to consider what types of transactions reflect marketed output and are measureable. Health care is financed differently among countries and development of an SPPI in this important area should not be limited to financing considerations only.

U.S. hospital activities and medical practices are not very concentrated. Relatively large hospital systems exist in the U.S. but do not dominate. Medical and dental practices exhibit even less concentration, as these industries are predominantly composed of small single-location establishments. For the other human health activities group, medical laboratories, diagnostic imaging centres, and blood and organ banks are very

concentrated, and the dominant providers have significant price-making power for some payers. Due to the highly complex and expensive machinery that is needed in these classes, economies of scale are evident.

The U.S. measures changes in the values that human health providers expect to receive from all payers for the services they provide. This is referred to as the “expected reimbursement” and may differ significantly from the amounts that appear on a patient’s medical bill due to both pre- and post-billing negotiations and delinquent accounts.

The major price determining factors for hospital activities include the following:

- Principal diagnosis, often represented by a Diagnosis Related Group (DRG¹) in the U.S;
- Principal procedure;
- Type of payer;
- Inpatient or outpatient;
- Length of stay (inpatients only).

These characteristics are the main components of the total service package that a hospital patient receives during their entire length of stay from admission to discharge. In the U.S., the two most important price determining characteristics are the DRG and the type of payer. The DRG is often the basis for pricing in general medical and surgical hospitals, while the principal diagnosis is used for pricing in psychiatric hospitals and most specialty hospitals.

The major price determining factors for medical and dental practice activities include the following:

- Type of service, often represented by the Current Procedural Terminology (CPT) code for physicians and the Current Dental Terminology (CDT) code for dentists in the U.S.;
- Type of payer;
- Setting where service is provided (in a physician’s office, hospital, etc.);
- Geographical location where service is provided;
- Specialty of physician providing service.

The two most significant price determining characteristics are the type of service and the type of payer. The range of services provided in this industry is quite large so it is important to specify what services are being priced on a monthly basis. Types of payers are also important due to the relationship between payers and providers and the prices they are able to negotiate.

The major price determining factors for other human health activities include the following:

- Type of payer;
- Type of test, panel, profile or automated multichannel test for Medical laboratories and Diagnostic imaging centres;
- Type of blood product, organ, or tissue for blood and organ banks;

- Type of service such as medical care, hospice care, or home infusion therapy for home health care.

13.1.2. Classification aspects

13.1.2.1. Industry classification

In the area of human health activities, the main difference between ISIC and NAICS is that ISIC classifies activities by who is providing the counselling which is not done in NAICS. If a medical professional provides the counselling, the activity is classified in Medical and dental practices. If a non-medical professional provides the counselling, the activity is classified in other human health activities.

13.1.2.2. Product classification

In general, the NAPCS codes are much more detailed than the CPC counterparts, as each NAPCS code is based upon an International Classification of Disease (ICD) chapter that describes a disease or major body system. Examples of NAPCS titles include Surgical interventions, diseases of the digestive system, inpatient; Non-surgical interventions, diseases of the skin and subcutaneous tissue, inpatient; and Diagnosis and treatment services for diseases of the skin and subcutaneous tissue. The U.S. currently publishes price indices for General medical and surgical hospitals by detailed NAPCS product lines and is researching the feasibility of publishing detailed service line indexes for additional health service industries in a similar manner.

13.1.3. Scope of the survey

Ideal human health activities SPPIs measure all relevant marketed output, including transactions to private and public payers. In the U.S., as mentioned in section on industry description, detailed service line indices for general surgical and medical hospitals are published for services related to the treatment of specified diseases and disorders. Additional indices are also published for all hospital services by type of payment: Medicare patients, Medicaid patients and all other patients. For physician services, detailed service line indices are published based on type of practice, *i.e.* one or two physician practices or single specialty group practices vs. multispecialty group practices. Within the former type of practice, service line indices are further broken down by specialty such as general/ family practices, paediatrics, internal medicine, etc. For dental services, detailed service line indices are published by major lines of services provided, *i.e.* dental visits and consultations, dental surgical intervention services, and dental non-surgical intervention services.

13.1.4. Industry vs. product based SPPI

The U.S. calculates and publishes approximate product based SPPIs in addition to industry based SPPIs. Although product based SPPIs are most useful for deflating input-output national accounts, an industry based survey for health services that delineates primary production from secondary activities can be used as an acceptable alternative. In the U.S., sampling frames are available by 6-digit NAICS industry (not by product) and services that are not primary to the actual health service industry where the company is classified are considered “other receipts” and given a chance of selection at each sampled company. When publication criteria are met, a price index for these “other receipts” is published. These “other receipts” contribute between 1% and 7% of U.S. industry

turnover in this division depending on the specific NAICS industry. Some examples of common “other receipts” include parking at hospitals, food and beverage sales, sales of goods like toothbrushes and medical equipment, and physical therapy services performed at a physician’s office.

The U.S. publishes approximate product based indices using the same items that are sampled by industry and used to calculate the industry based SPPIs but organised somewhat differently and with considerably less detail. For the health service industries, distinct product based indices are published for patient care services provided in an inpatient setting and those provided in an outpatient setting. This distinction is not available for the industry based SPPIs, so these indices allow for additional analysis. Detailed indices by payer type are also available within the approximate product based indices.

13.1.5. Sample design

The appropriate sample design to employ for classes in this division will vary greatly by country depending on the availability of administrative data. The information below details how the U.S. SPPI sampled various classes.

The U.S. survey for hospitals includes general medical and surgical, psychiatric, and specialty hospitals. Although many hospitals within the U.S. operate as part of integrated health systems made up of multiple hospitals, the sample units are generally individual hospitals. This is because prices are usually set at each individual hospital. For physicians, the sample units are practices, which may include an individual physician or a group of physicians that work together in a single practice.

For all health care classes, probability proportionate to size selection is ideal. For hospitals, firms may be selected based on turnover. If this is not available, hospital expenses, number of patient admissions, or number of beds are potential alternative sampling size measures. For medical and dental practices, number of physicians may be used if turnover data are unavailable. For other human health activities, such as medical laboratories, employment may be used as an alternative size measure.

Distinct strata based upon type of hospital may be used to ensure a representative sample for this activity. The U.S. survey is stratified by these hospital types:

- Large/Small Urban;
- Large/Small Rural;
- Large/Small Metropolitan.

Distinct strata based on physician specialty may be used to ensure a representative sample for this activity. The U.S. survey is stratified by these specialty types:

- General/Family;
- Internal Medicine;
- General Surgery;
- Paediatrics;
- Obstetrics/Gynaecology;
- Anaesthesia;

- Radiology;
- Pathology;
- Other Specialty;
- Multiple Specialties.

13.1.6. Collection of information and specification of the service

For initial data collection, representative healthcare services are selected in consultation with respondents. Respondent representatives are typically employees from the healthcare firms' billing departments, since these individuals have access to pricing records. Items are typically selected based on each service's relative contribution to total firm turnover. For hospitals, however, services are statistically selected prior to the data collection visit based upon national turnover data organized by DRG. This is done to ensure that the item sample represents the national DRG distribution and not just the local DRG distribution.

During the collection visits, each of the major price determining characteristics outlined in section 1 are recorded and described for each selected item. This information is listed as the item specification and is used to accurately re-price the item.

In many cases, prices received by providers from public payers may be publicly disclosed so respondent contact may not be needed to collect this information. In these cases, prices are collected via administrative data.

13.1.7. Main pricing methods

Prices for human health activities should ideally reflect the total amounts providers receive for providing services to all patients. The provision of medical or health services to patients is the primary output. This includes all payments received from patients paying directly, and all payments from third parties, such as private insurance companies and government institutions paying on behalf of patients. More specifically, total reimbursement to a provider for a specified medical service may include payments from multiple payers making pricing more complicated. For example, Medicare may pay the hospital for part of a hospital stay and the patient's supplemental private insurance company may pay for the remaining portion of the medical services not covered by Medicare.

13.1.7.1. Model pricing

Model pricing is the ideal type of price to collect for most human health activities because the exact item specification data collected at initiation will not be observed on a recurring basis in almost all cases due to unique patient characteristics. For transactions priced according to this method, individual patient bills are selected and the billed services are held constant over time. In subsequent periods, respondents are asked to provide the price they would charge if they were to offer the same services to a similar patient. In this way, hypothetical transactions based on those prevalent in the market are priced over the life of the sample.

Though model pricing is often the most appropriate pricing method for most types of health services, there are nevertheless some inherent problems with this methodology, for which mitigation strategies need to be considered. Some respondents may have difficulty providing accurate price estimates as some insurance providers do not release

reimbursement information without actual claims (transactions) taking place. Additionally, the respondent burden required by this method is very high. This is mitigated by the standardisation of procedural terminology by various medical associations, professionals and classification experts, which allows for consistency of billed services. Therefore substitutions are only necessary if new procedures replace current procedures to increase treatment effectiveness. This type of adjustment is rare.

Substitutions are more likely to occur when a particular insurance or health plan is no longer accepted by a provider. In these cases, the expected reimbursement from the new payer is substituted.

In the U.S., prices negotiated between third party payers and healthcare providers typically change once per year. Medicare, for example, reimburses using fixed, predetermined amounts. This is referred to as a Prospective Payment System (PPS) and greatly simplifies price index calculation as prices are fixed by law for an exact amount of time. Item prices can be directly observed using this administrative data without the need for direct respondent contact.

13.1.7.2. Direct use of prices of repeated services

An alternative to model pricing is to follow the selected patient bill over time using the direct use of prices of repeated services method. This is most commonly used for other human health activities transactions where standard prices are often charged to all patients. These providers often can provide the prices they receive directly from a standard fee schedule.

In the U.S., urgent care (also called emergency care) must be provided to all citizens. This can complicate the accurate measurement of healthcare price change as some patients may not have to pay the entire reimbursement amount or they may default on all or a portion of their healthcare debt. In the former case, providers may at times discount their services if the patient is indigent and this discount will vary depending upon the patient's income. Transactions with these patients are eligible for selection. When selected, the patient's income range and the applicable discount in the item specification are recorded. In future periods the respondent updates the discount and income range as needed when reporting the current price. Because the U.S. uses the "expected reimbursement" as the transaction price, individual patient default on healthcare payments does not affect index levels.

13.1.8. Quality issues

In the U.S., the health outcomes of patients are not specifically assessed for potential quality adjustment as changes in these outcomes are indicative of changes in consumer utility but do not necessarily represent changes in the nature of the services provided. Quality adjustment is only undertaken when the nature of the production changes. In these cases, it is appropriate to use producer costs to quantify the quality change. Differences in quality and competence among medical practitioners are extremely difficult to measure accurately, and as a result, it is generally not possible to use these factors as a basis for quality adjustment.

However, the U.S. has developed systematic quality adjustment methods in several healthcare classes. As part of this effort, a quality adjustment method to account for changes in a selection of patient treatments performed at hospitals is now employed. This quality adjustment procedure is discussed in further detail in the paper titled "Proposal for

Adjusting the General Hospital Producer Price Index for Quality Change” listed in the bibliography of this section. The U.S. Department of Health and Human Services (DHHS) created a Hospital Compare (HC) database to compare the service quality across hospitals. The database contains measures (from data provided by the vast majority of U.S. hospitals) of service quality for the treatment of some major conditions (heart attack, heart failure, pneumonia, or surgery). These measures are services that medical experts (based on scientific evidence) deem are important for optimal recovery. When hospital-specific data from the HC database indicate that the percentage of patients within a DRG that have received these specific services changes, DHHS-provided cost data are used to quantify and adjust for these changes in service. This procedure is currently used for transactions that cover patients diagnosed with heart failure, heart attack, and pneumonia. If, for example, DHHS data indicate that an increased percentage of heart failure patients at a sampled hospital are given an evaluation of their left ventricular systolic (LVS) function, then this percentage increase is applied to the average cost of treating these patients. The resulting figure is used as the basis for explicit quality adjustment. When a particular hospital evaluates a higher percentage of their patients for LVS function, quality is considered (by the medical experts who were consulted in developing the quality measures) to be increased and the price index will decline after this adjustment is applied (assuming no reported price change).

The U.S. also systematically quality adjusts transactions in the Nursing care facility industry (NAICS 623110) using the Nursing Home Compare database that was also developed by DHHS. This database contains staffing level information. Medical experts have determined that the quality of production at nursing homes is affected by facility staffing levels. As a result, quality adjustment is performed to account for reported changes in staffing levels. This quality adjustment procedure is discussed in further detail by Lucier and Agliata (2003).

As more data are released by DHHS, the U.S. will research and develop additional systematic quality adjustment methodologies. Additionally, the opinions of medical experts in published documentation will continue to be assessed in order to determine which changes in production correspond with changes in the quality of the output.

13.1.9. Weighting and aggregation

For each of these U.S. SPPI index series, the lower level indices are aggregated using industry turnover data as weights. Although the indices are calculated using the Laspeyres formula, these weights are updated approximately every five years. Within the lowest level indices, each health care company is weighted by its own turnover provided at the time of data collection. These company weights remain fixed throughout the life of the sample.

The following are three examples of U.S. SPPI publication structures for industry based outputs which are classified in human health activities (table 13.1.1). The specific structure that is chosen for publication depends on many factors, some of which include requests from industry specific data users, the availability of turnover data to accurately weight the lowest level indices, and the needs of national accountants to create accounts according to disease.

Table 13.1.1. U.S. PPI industry based publication structures for the human health activities

SPPI Code	Industry based index title
621111	Offices of physicians (except mental health)
621111P	Primary services
6211114	One and two physician practices and single specialty group practices
621111411	General/family practice
621111412	Internal medicine
621111413	General surgery and other surgical specialties
621111414	Pediatrics
621111415	Obstetrics/gynecology
621111419	Other specialty
6211115	Multispecialty group practice
621111SM	Other receipts
621511	Medical laboratories
621511P	Primary services
6215112	Medical laboratory services
62151123	Medicare patients
62151124	Medicaid patients
62151125	Private insurance patients
62151126	All other patients
621511SM	Other receipts
622110	General medical and surgical hospitals
622110P	Primary services
622110101	Diseases and disorders of the nervous system
622110103	Diseases and disorders of the ear, nose, mouth, and throat
622110104	Diseases and disorders of the respiratory system
622110105	Diseases and disorders of the circulatory system
622110106	Diseases and disorders of the digestive system
622110107	Diseases and disorders of the hepatobiliary system and pancreas
622110108	Diseases and disorders of the musculoskeletal system and connective tissue
622110109	Diseases and disorders of the skin, subcutaneous tissue and breast
622110111	Endocrine, nutritional and metabolic diseases and disorders
622110112	Diseases and disorders of the kidney and urinary tract
622110113	Diseases and disorders of the male reproductive system
622110114	Diseases and disorders of the female reproductive system
622110115	Pregnancy, childbirth and the puerperium
622110116	Newborns and other neonates with conditions originating in the perinatal period
622110117	Diseases and disorders of the blood and blood forming organs and immunological disorders
622110118	Myeloproliferative diseases and disorders and poorly differentiated neoplasms

Table 13.1.1. U.S. PPI industry based publication structures for the human health activities, *continued*

622110	General medical and surgical hospitals
622110119	Infectious and parasitic diseases
622110122	Alcohol/drug use and alcohol/drug induced organic disorders
622110123	Injury, poisoning and toxic effects of drugs
622110125	Factors influencing health status and other contacts with health services
622110126	Multiple significant trauma
622110127	Human immunodeficiency virus infections
622110128	Other diseases and disorders
622110SM	Other receipts

Table 13.1.2. lists the approximate product based index structure for the U.S.

Table 13.1.2. U.S. PPI product based publication structures for health care services

51	Health care services
511	Outpatient care (partial)
5111	Outpatient care (partial)
511101	Physician care
51110102	Medicare patients: physician care
51110103	Medicaid patients: physician care
51110104	Private insurance patients: physician care
51110105	All other patients: physician care
511102	Medical laboratory and diagnostic imaging center care
51110201	Medical laboratory care
511102011	Medicare patients: medical laboratory care
511102012	Medicaid patients: medical laboratory care
511102013	Private insurance patients: medical laboratory care
511102014	All other patients: medical laboratory care
51110202	Diagnostic imaging center care
511102021	Medicare and Medicaid patients: diagnostic imaging center care
511102022	Private insurance patients: diagnostic imaging center care
511102023	All other patients: diagnostic imaging center care
511103	Home health and hospice care
51110301	Home health and hospice care
5111030101	Medicare and Medicaid patients: home health and hospice care
51110301011	Medicare patients: home health and hospice care
51110301012	Medicaid patients: home health and hospice care
5111030102	Private insurance and all other patients: home health and hospice care
51110301021	Private insurance: home health and hospice care

Table 13.1.2. U.S. PPI product based publication structures for health care services, continued

511	Outpatient care (partial)
51110301022	All other patients: home health and hospice care
511104	Hospital outpatient care
51110401	Hospital outpatient care
511105	Dental care
51110501	Dental care
512	Inpatient care
5121	Inpatient care
512101	Hospital inpatient care
51210101	Hospital inpatient care
512101011	Hospital inpatient care, general medical and surgical hospitals
5121010111	Medicare patients: hospital inpatient care, general medical and surgical hospitals
5121010112	Medicaid patients: hospital inpatient care, general medical and surgical hospitals
5121010113	Private insurance & all other patients: hospital inpatient, general medical and surgical hospitals
51210101131	Private insurance patients: hospital inpatient care, general medical and surgical hospitals
51210101132	All other patients: hospital inpatient care, general medical and surgical hospitals
512101012	Hospital inpatient care, psychiatric & substance abuse hospitals
5121010121	Hospital inpatient care, psychiatric hospitals
51210101211	Medicare patients: hospital inpatient care, psychiatric hospitals
51210101212	Medicaid patients: hospital inpatient care, psychiatric hospitals
51210101213	Private insurance and all other patients: hospital inpatient care, psychiatric hospitals
512101013	Hospital inpatient care, specialty hospitals.
5121010131	Medicare patients: hospital inpatient care, specialty hospitals
5121010132	Medicaid patients: hospital inpatient care, specialty hospitals
5121010133	Private insurance and all other patients: hospital inpatient care, specialty hospitals
512102	Nursing home care
51210201	Nursing home care
5121020101	Medicare and Medicaid patients: nursing home care.
51210201011	Medicare patients: nursing home care.
51210201012	Medicaid patients: nursing home care.
5121020102	Private insurance and all other patients: nursing home care.
51210201021	Private insurance patients: nursing home care.
51210201022	All other patients: nursing home care.
512103	Intellectual and developmental disability centre care
51210301	Intellectual and developmental disability centre care
5121030101	Medicaid patients: Intellectual and developmental disability centre care
5121030102	Medicare, private ins. & all other patients: Intellectual & develop. disability centre care
513	Sales of blood and blood products, organs, and tissues
5131	Sales of blood and blood products, organs, and tissues
513101	Sales of blood and blood products, organs, and tissues
51310101	Sales of blood and blood products, organs, and tissues

13.1.10. Specific aspects

Since most payments for human health activities in the U.S. are made by parties other than the individual patients, adjustments are applied to ensure that medical expenditures data reflect the ultimate recipient of the services. The U.S. shifts transactions reimbursed by public payers (such as Medicare and Medicaid) from the government consumption account to the personal consumption expenditure (PCE) account. Transactions reimbursed by private insurance companies are similarly shifted from the private business investment account to PCE.

PPI data is used to deflate human health activities output in the national accounts, where available. For areas where PPI data is not calculated, PCE price indices prepared by the U.S. Bureau of Economic Analysis are used.

The U.S. is currently developing a satellite account that organizes health care expenditures based on disease episodes, rather than spending on specified services in separate industries. A disease based concept combines, for example, all prescription drug, inpatient, and outpatient medical services provided for a specified medical condition. This approach is designed to provide greater clarity on the sources of changes in health care spending, and to evaluate the return on medical treatments. A disease based approach necessitates price index deflators that are also organized by disease. The U.S. is currently developing price indexes that can be used for this purpose.

13.1.11. Overview of national methods

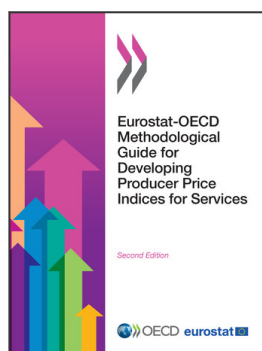
The U.S. is the only country participating in the compilation of this manual that produces SPPIs in the human health activities division.

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Notes

1. DRGs are used to classify patients by the resources they consume during treatment.



From:
**Eurostat-OECD Methodological Guide for
Developing Producer Price Indices for Services**
Second Edition

Access the complete publication at:
<https://doi.org/10.1787/9789264220676-en>

Please cite this chapter as:

OECD/Eurostat (2014), "Human health activities", in *Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services: Second Edition*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264220676-17-en>

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