The 27th Voorburg Group Meeting on Service Statistics
Dublin, Ireland, 22 – 26 September 2014

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United States Producer Price Indices for Human Health Activities
NAICS 621-622
ISIC 86

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BLS

Introduction

The U.S. Bureau of Labor Statistics currently publishes Producer Price Indices (PPIs) for nine health care industries within two distinct NAICS Sub-sectors:

- NAICS sub-sector 621 Ambulatory Health Care Services
- NAICS sub-sector 622 Hospitals

This paper discusses the development and maintenance of the indices within these sub-sectors.

1. Definition of the service being priced

The U.S. publishes PPIs for the following industries related to human health activities:

- NAICS sub-sector 621 Ambulatory Health Care Services
    - NAICS 621111 Offices of physicians, except mental health
    - NAICS 621210 Offices of dentists
    - NAICS 621511 Medical laboratories
    - NAICS 621512 Diagnostic imaging centers
    - NAICS 621610 Home health care services
    - NAICS 621991 Blood and organ banks

- NAICS sub-sector 622 Hospitals
    - NAICS 622110 General medical and surgical hospitals
    - NAICS 622210 Psychiatric and substance abuse hospitals
    - NAICS 622310 Other specialty hospitals

The U.S. does not publish PPIs for industries within NAICS 6213, Offices of Other Health Practitioners; NAICS 6214, Outpatient Care Centers; or 62191, Ambulance Services.

The primary output for human health activity establishments is providing health care for individuals. The services provided by establishments in this sector are delivered by trained professionals. All industries in the sector share this commonality of process, namely, labor inputs of health practitioners with the requisite expertise. Many of the industries in the sector are defined based on the educational degree held by the practitioners included in the industry.

2. Pricing unit of measure

The unit of measure for health care varies by industry. The typical unit of measure for each of the PPI's health care indices follows:

Industry Code	Industry Title	Pricing Unit of Measure
NAICS 621111	Offices of physicians, except mental health	per visit, or per treatment
NAICS 621210	Offices of dentists	per visit, or per treatment
NAICS 621511	Medical laboratories	per test
NAICS 621512	Diagnostic imaging centers	per test

NAICS 621610	Home health care services	per billing period (e.g., hour, week, month, etc.)
NAICS 621991	Blood and organ banks	per unit
NAICS 622110	General medical and surgical hospitals	per stay (inpatient), or per treatment (outpatient)
NAICS 622210	Psychiatric and substance abuse hospitals	per stay (inpatient), or per treatment (outpatient)
NAICS 622310	Other specialty hospitals	per stay (inpatient), or per treatment (outpatient)

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) below 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 indics are calculated for transactions with both types of payers as prices are observable in both cases.

The major price determining factors for NAICS 621111, Offices of physicians, except mental health; and NAICS 621210, Offices of dentists; 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, dentist'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 these industries is quite large so it is important to specify the services that 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 NAICS 621511 Medical laboratories, NAICS 621512 Diagnostic imaging centers, NAICS 621610 Home health care services, and NAICS 621991 Blood and organ banks include the following:

- Type of payer
- Type of test, panel, profile or automated multichannel test for Medical laboratories and Diagnostic imaging centers
- 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

The major price determining factors for NAICS 622110 General medical and surgical hospitals, NAICS 622210 Psychiatric and substance abuse hospitals, and NAICS 622310 Other specialty hospitals include the following:

- Principal diagnosis, often represented by a Diagnosis Related Group (DRG[1]) 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 diagnosis and the type of payer.

3. Market conditions and constraints

a. Size of industry

The following table provides size statistics for select sub-sectors of the U.S. health care sector based on the 2007 U.S. Economic Census.

Industry sub-sector	Number of firms	Turnover ($1,000)
621 Ambulatory Health Care Services	547,561	668,453,209
622 Hospitals	6,505	702,959,800

[1] Diagnosis related groups (DRGs), are used to classify patients by the resources they consume during treatment.

The following tables illustrate the turnover for each of the PPI's health care indices as a percentage of total sub-sector turnover, according to the 2007 U.S. Economic Census.

621 Ambulatory Health Care Services: turnover concentration by sub-sector			
NAICS Code	NAICS Title	2007 Turnover ($1,000)	Percentage of Sub-sector Turnover[2]
621111	Offices of physicians, except mental health	332,018,716	49.7%
621210	Offices of dentists	93,930,384	14.1%
621511	Medical laboratories	22,856,315	3.4%
621512	Diagnostic imaging centers	17,221,396	2.6%
621610	Home health care services	47,617,015	7.1%
621991	Blood and organ banks	8,913,726	1.3%

622 Hospitals: turnover concentration by sub-sector			
NAICS Code	NAICS Title	2007 Turnover ($1,000)	Percentage of Sub-sector Turnover
622110	General medical and surgical hospitals	657,318,093	93.5%
622210	Psychiatric and substance abuse hospitals	17,189,050	2.5%
622310	Other specialty hospitals	28,452,657	4.0%

U.S. hospital activities and physician practices are not very concentrated. Relatively large hospital systems exist in the U.S. but do not dominate. Physician 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 centers, 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 for these activities, economies of scale are evident.

b. Special conditions or restrictions

In recent years, one of the single largest trends in the U.S. health care sector has been provider consolidation. Consolidation takes several forms (e.g. merger, acquisition, joint venture, etc.) and typically consists of intra-industry consolidation, though inter-industry consolidation has been increasing as well. In cases where inter-industry consolidation occurs (e.g., a hospital system consolidates with a physicians' group), proper attention must paid to ensure proper industry classification of the acquired firm. For example, if a physician practice is purchased by

[2] The summed value does note not equal 100% as the PPI does not calculate all indices within the 621 sub-sector.

a hospital and no longer maintains a separate profit maximizing center[3] (PMC), it is collected as part of the hospital industry and not the physician industry. As a result, due to the prevalence of inter-industry consolidation, the number of establishments classified in the offices of physicians industry may decline even though the services provided by the physicians' groups remain the same.

c. Record keeping practices

The Health Insurance Portability and Accountability Act of 1996 (HIPAA) prohibits U.S. health care providers from providing Protected Health Information, including an individual's medical records and payment history, to third parties. PPI data collectors often select individual patient bills to serve as the basis for model pricing. Due to HIPAA regulations, health care providers are required to block or remove personally identifiable information from the bills before they can be shared. This makes the data collection process more difficult, and increases health care providers' concerns about participating in the voluntary survey.

Most patient bills are stored at the location where services were rendered. In cases where a large system operates multiple locations, records may be kept at a central location, typically at the company headquarters. There are many administrative and private data sets pertaining to health care that are collected and maintained in the U.S. The PPI uses some of these data sets as sampling frame sources and to assist in item selection at sampled firms. For example, data files maintained by the American Medical Association (AMA) and the American Hospital Association (AHA) are used as the sampling frames for the PPIs for Offices of Physicians and General Medical and Surgical Hospitals, respectively. Health expenditures data from the Centers for Medicare and Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services, is used to determine the proportion of hospital inpatient and hospital outpatient services that are requested for pricing. This data is also used to allocate requested hospital items based on the primary type of payer, including bills primarily paid by private insurance companies, government programs, and by patients directly. Data about patient encounters from the U.S. Agency for Healthcare Research and Quality (AHRQ) is used to determine the number of hospital items requested by DRG, or type of medical service provided.

Private companies maintain very large data sets that aggregate information from insurance claims. These data sets are typically not comprehensive of all claims, and are very expensive. The U.S. does not currently use any of these data sets for the PPI.

[3] The profit maximizing center (PMC) is the desired first stage sample unit for the PPI. It is an establishment or cluster of establishments owned by the same company and engaged in an integrated production activity for which prices are formed, products are marketed, and records are kept. Each PMC has its data available at a single record center. The PMC closely corresponds to the economic concept of the firm.

4. Standard classification structure

NAICS Definition

Industries in the 621 Ambulatory Health Care Services subsector provide health care services directly or indirectly to ambulatory patients and do not usually provide inpatient services. Health practitioners in this subsector provide outpatient services, with the facilities and equipment not usually being the most significant part of the production process.

Industries in the 622 Hospitals subsector provide medical, diagnostic, and treatment services that include physician, nursing, and other health services to inpatients and the specialized accommodation services required by inpatients. Hospitals may also provide outpatient services as a secondary activity. Establishments in the Hospitals subsector provide inpatient health services, many of which can only be provided using the specialized facilities and equipment that form a significant and integral part of the production process.

Comparison to ISIC Rev. 4 Definition

NAICS sub-sectors 621 and 622 most closely compare to ISIC division 86, Human health activities. ISIC 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 specialized 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 and are not considered human health activities as classified in ISIC 86.

This division is further divided into the following ISIC groups:
861- Hospital activities
862- Medical and dental practice activities
869- Other human health activities

The following table provides the classifications for each type of activity.

Activity	ISIC Rev 4	NAICS
Hospital activities	8610	6221 6222 6223
Medical and dental practices	8620	6211 6212 6214 (partial)
Other human health activities	8690	6213 6214 (partial) 6215 6216 6219

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

North American Product Classification System

The following table lists the health care services as defined by the North American Product classification System (NAPCS). The classification is primarily based on the International Classification of Disease (ICD) system that describes diseases or major body systems.

Industry	NAPCS Code	Title
621-2 (except 6212, 6216, and 6219)	1	Diagnosis and treatment services for certain infectious and parasitic diseases (A00-B99)
	2	Diagnosis and treatment services for neoplasms (C00-D48)
	3	Diagnosis and treatment services for diseases of the blood and blood forming organs and certain diseases involving the immune mechanism (D50-D89)
	4	Diagnosis and treatment services for endocrine, nutritional and metabolic diseases (E00-E90)
	5	Diagnosis and treatment services for mental and behavioral disorders (F00-F99)
	6	Diagnosis and treatment services for diseases of the nervous system (G00-G99)
	7	Diagnosis and treatment services for diseases of the eye and adnexa (H00-H59)

	8	Diagnosis and treatment services for diseases of the ear and mastoid process (H60-H95)
	9	Diagnosis and treatment services for diseases of the circulatory system (I00-I99)
	10	Diagnosis and treatment services for diseases of the respiratory system (J00-J99)
	11	Diagnosis and treatment services for diseases of the digestive system (K00-K99)
	12	Diagnosis and treatment services for diseases of the skin and subcutaneous tissue (L00-099)
	13	Diagnosis and treatment services for diseases of the musculoskeletal system and connective tissue (M00-M99)
	14	Diagnosis and treatment services for diseases of the genitourinary system (N00-N99)
	15	Diagnosis and treatment services for pregnancy, childbirth and the pueperium (O00-O99)
	16	Diagnosis and treatment services for certain conditions originating in the perinatal period (P00-P96)
	17	Diagnosis and treatment services for congenital malformations, deformations, and chromosomal abnormalities (Q00-Q99)
	18	Diagnosis and treatment services for symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified (R00-R99)
	19	Diagnosis and treatment services for injury, poisoning and certain other consequences of external causes (S00-T98)
	20	Diagnosis and treatment services for external causes of morbidity and mortality (V01-Y98)
	21	Diagnosis and treatment services for factors influencing health status and contact with health services (Z00-Z99)
	99	Related services
62121 Dental Services	1.1	Consultation services, dental
	1.2	Preventative services, dental
	1.3	Surgical intervention services, dental
	1.4	Non-surgical intervention services, dental
	2.1	Reselling services for drugs, medicines, and dental devices and appliances, retail
	2.2	Anesthesia services
	2.3	Medical diagnostic imaging services
	2.4	Clinical and pathology laboratory testing services
	2.5	Training services, dental
	2.9	Other related products
62161 Home Health Care Services	1.1	Home health care bundled service
	1.2	Home nursing care services
	1.3	Home nursing aide care services
	1.4	Home hospice care services
	2.1	Home therapy services
	2.2	Home medical care and support counseling services
	2.3	Home-aide services
	2.4	Rental of home health-care equipment
	2.5	Reselling services for medical and health equipment and supplies, retail

	2.6	Reselling services for merchandise, except prescription and nonprescription drugs, vitamins, other supplements and herbal remedies, and medical equipment and supplies, retail
	2.7	Training services, home medical care
	2.8	Other related products
62191 Ambulance Services	1	Ambulance services
	2	Standby ambulance and first-aid services
	3	Related services
62199	1.1	Human blood services
	1.2	Organ, tissue, and cell bank services
	2.1	Medical care management services
	2.2	Health screening services, except by health practitioners
	2.3	Personal emergency health monitoring and response service
	2.4	Rental of medical equipment with operator
	2.5	Smoking cessation clinics and classes

Comparison to CPC Ver.2

The following table lists the CPC codes and titles related to human health services.

CPC code	CPC Title
93111	Surgical services for inpatients
93112	Gynecological and obstetrical services for inpatients
93113	Psychiatric services for inpatients
93121	General medical services
93122	Specialized medical services
93123	Dental services
93191	Childbirth and related services
93192	Nursing services
93193	Physiotherapeutic services
93194	Ambulance services
93195	Medical laboratory services
93196	Diagnostic imaging services
93197	Blood, sperm and organ bank services
93199	Other human health services, NEC

The following table maps the North American Product Classification System (NAPCS) product codes to the CPC Ver.2 structure for class 931.

CPC code	Title	NAPCS Code
931	Human health services (except 93123 Dental services, 93192 Nursing services, 93194 Ambulance services, and 93197 Blood, sperm, and organ banks)	1 (621-2)
		2 (621-2)
		3 (621-2)
		4 (621-2)
		5 (621-2)
		6 (621-2)
		7 (621-2)
		8 (621-2)
		9 (621-2)
		10 (621-2)
		11 (621-2)
		12 (621-2)
		13 (621-2)
		14 (621-2)
		15 (621-2)
		16 (621-2)
		17 (621-2)
		18 (621-2)
		19 (621-2)
		20 (621-2)
		21 (621-2)
		99 (621-2)
		2.1 (62199)
		2.2 (62199)
		2.3 (62199)
		2.4 (62199)
		2.5 (62199)
93123	Dental services	1.1 (62121)
		1.2 (62121)
		1.3 (62121)
		1.4 (62121)
		2.1 (62121)
		2.2 (62121)
		2.3 (62121)
		2.4 (62121)
		2.5 (62121)
		2.9 (62121)
93192	Nursing services	1.1 (62161)
		1.2 (62161)

		1.3	(62161)
		1.4	(62161)
		2.1	(62161)
		2.2	(62161)
		2.3	(62161)
		2.4	(62161)
		2.5	(62161)
		2.6	(62161)
		2.7	(62161)
		2.8	(62161)
93194	Ambulance services	1	(62191)
		2	(62191)
		3	(62191)
93197	Blood, sperm, and organ banks	1.1	(62199)
		1.2	(62199)

In general, the NAPCS codes are much more detailed than the CPC counterparts, as each NAPCS code is based upon an ICD. 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 ICD-based service line indices for additional health service industries in a similar manner.

5. Evaluation of standard vs. definition and market conditions

The U.S. publishes both industry-based and product-based indices. Although product-based PPIs 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.

Below are three examples of U.S. PPI publication structures for industry-based outputs.

Index 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

Index code	Industry-based index title
621511	Medical laboratories
621511P	Primary services
6215112	Medical laboratory services
621511SM	Other receipts

Index code	Industry-based index title
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
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

Product-based indices in the U.S. are created using the same items that are sampled by industry and used to calculate the industry-based PPIs. 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 provided for the industry-based SPPIs, so these indices allow for additional analysis by data users. The table below provides one example of a U.S. product-based index for Outpatient care.

Index code	Product-based index title
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 patients: home health and hospice care
51110301022	All other patients: home health and hospice care
511104	Hospital outpatient care
51110401	Hospital outpatient care
511104011	Hospital outpatient care, general medical & surgical hospitals
5111040111	Medicare patients: hospital outpatient care, general medical and surgical hospitals
5111040112	Medicaid patients: hospital outpatient care, general medical and surgical hospitals
5111040113	Private insurance and all other patients: outpatient care, gen. medical and surgical hospitals
511104013	Hospital outpatient care, specialty hospitals
511105	Dental care
51110502	Private insurance patients: dental care

511105021	Private insurance patients: dental visits and consultations
511105022	Private insurance patients: dental surgical intervention services
511105023	Private insurance patients: dental non-surgical intervention services
51110503	Medicare, Medicaid and all other patients: dental care
511105031	Medicare, Medicaid and all other patients: dental visits and consultations
511105032	Medicare, Medicaid and all other patients: dental surgical intervention services
511105033	Medicare and Medicaid and all other patients: dental non-surgical intervention services

Additionally, this product-based index structure allows for the calculation of aggregate health care PPIs organized by payer type, which was developed at the request of data users and has been published since July 2014. The following table illustrates the U.S. product-based aggregate indices by type of payer.

Index code	Product-based index title
SIHCARE1	Health care services, Medicare patients
SIHCARE2	Health care services, Medicaid patients
SIHCARE3	Health care services, private insurance patients
SIHCARE4	Health care services, all other patients

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.

6. National accounts concepts and measurement issues for the area related to GDP measurement

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[4]. 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.

7. Pricing method(s) and criteria for choosing various pricing methods

Prices for human health activities should ideally reflect the total amounts providers receive for providing services to patients. 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, the 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.

Model pricing is the ideal type of price to collect for most human health activities because the specific transaction collected in the initiation period will not be observed on a recurring basis in almost all cases due to unique patient characteristics. For transactions priced with 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 amount they would expect to be reimbursed 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 with most types of health services, there are some inherent problems with the model pricing 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 or a lot of time and research is necessary so respondent burden can be very high. This is mitigated by the standardization 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 does not occur often.

[4] Additional information about the health care satellite account is provided at the following link: http://www.bea.gov/national/health_care_satellite_account.htm

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. U.S. PPI staff are able to directly enter item prices using an administrative data set without the need for direct respondent contact in many cases.

An alternative to model pricing is to follow a 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 accurately measuring 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 U.S. records the patient's income range and the applicable discount in the item specification. 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.

8. Quality adjustment methodology

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. The U.S. quality adjusts only when the nature of the production changes. In these cases, it is appropriate to use producer cost 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 health care classes. As part of this effort, the U.S. now employs a quality adjustment method to account for changes in a selection of patient treatments performed at hospitals. 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"[5]. The U.S. Department of Health and Human

[5] http://conference.nber.org/confer/2008/si2008/PRCR/murphy2.pdf

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 for 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, the U.S. uses DHHS-provided cost data 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).

9. Evaluation of comparability with turnover/output measures

Every five years, the U.S. Census Bureau publishes turnover (revenue) data for the health care industries in the Economic Census. This data includes all health care industries, and not just those covered by the PPI. The Census Bureau also publishes quarterly and annual turnover data at the four-digit for NAICS 6211, 6212, 6215, 6216, 6219, 6221, 6222, and 6223.

10. Summary

Health care price indices in the U.S. reflect the change in reimbursement amounts over time providers receive for providing services to all patients. The U.S. PPI pricing methodology primarily attempts to capture expected reimbursement amounts for health care services using two methods: 1) model pricing, whereby individual patient bills are selected and the billed services are held constant over time; and 2) direct use of prices of repeated services, whereby a provider utilizes a standardized fee schedule to charge the same price to all patients.

For situations where the provider no longer accepts a particular insurance or health plan or the share of patients that use the insurance or plan drops so that the provider cannot consistently provide an accurate price, the most common solution is to substitute a new payer.

The U.S. quality adjusts transactions in the hospital index using databases developed by the U.S. DHHS to monitor and improve the quality of care. The 622110 General medical and surgical hospitals index quality adjustment methodology uses the Hospital Compare database to account for changes in a selection of patient treatments performed at hospitals.

The most significant question statistical agencies must consider when creating price indices for health care services is whether all payer types are appropriately represented. The U.S. health

care sector represents 18 percent of U.S. GDP and contains a multitude of payers (public and private). In order for the indices to accurately reflect changes in the price level for health care services, all payer types need to be included.