

INFLUENCE OF PATIENT AND PROVIDER CHARACTERISTICS
ON THE OVERUSE OF HEALTH CARE SERVICES

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Abstract

Objective: To examine the association between patient- and provider-level characteristics and utilization of five low-value health care services and to estimate the prevalence and costs of those services.

Methods: This study uses 2012 administrative claims data from an Upper Midwest health plan on enrollees who were at risk of receiving five commonly overused services, including: (1) Pap tests performed on females younger than 21 years old. (2) HPV tests performed on females younger than 30 years old. (3) PSA tests performed on male patients 75 years and older. (4) Colorectal cancer screening tests performed on patients older than 75 years old. (5) Imaging tests for non-specific low back pain within four weeks of diagnosis. I used a two-level mixed-effects probit model to estimate the association between patient and provider characteristics and occurrence of selected services.

Results: The prevalence varied across services from 2.3 percent to 17.4 percent, and generated \$1.38 million in allowed charges in one year. Probabilities of cervical cancer screening overuse increased with age for girls, and the probabilities for prostate and colorectal cancer screening declined with age for the elderly. Individuals with moderate and high health risks were more likely to receive low-value services, but the probability decreased for the highest risk category. Medicare enrollment was associated with increased utilization of low-value preventive cancer screenings. Some neighborhood socio-economic determinants were associated with overuse; these included a greater proportion of White residents, less well-educated residents, and neighborhoods with low

poverty rate. After controlling for both patient and provider characteristics, overuse was positively associated with older providers, specialists, and physicians, as opposed to other non-physician clinicians.

Conclusions: Overall, this study expanded on prior literature by examining additional provider characteristics associated with overuse. The patient- and provider level correlates and their relative contribution varied for the five selected services.

Key words: overuse, low-value care

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CHAPTER 1. INTRODUCTION

This thesis is organized as follows. The first section provides an introduction and background information on the overuse of health care services, as well as a literature review. The second section is devoted to discussion of the analytic methods used in this study. The third section presents the results and findings from the quantitative analyses, including prevalence and associated costs of the selected low-value health care services, and the impact of patient and provider characteristics. The last section discusses implication of this study for practice and policy, and directions for future research.

Background and Significance

Rising Health Care Costs

U.S. national health care expenditures are growing at an unsustainable rate - \$2.8 trillion in 2012, or \$8,915 per capita, accounting for 17.2 percent of the nation's gross domestic product (GDP). This is more than twice as much as the average of developed countries measured per capita and as percentage of GDP [1-3]. Expenditure reached \$3.3 trillion in 2016 and the share of GDP devote to health care spending was 17.9 percent, more than any other country [4]. By 2022, an estimated one-fifth of U.S. GDP will be spent on health care or \$5 trillion. This increase translates into an average growth rate of 5.8 percent annually between 2012 and 2022, bringing annual per capita health expenditures to \$14,664 [5, 6]. Despite a reputation of efficient delivery of care in Minnesota, health care spending reached \$39.8 billion in 2012, accounting for 13.5

percent of the state's economy, or \$7,403 per capita. State projections indicate that health care expenditure may almost double by 2022 [7].

U.S. national health expenditures on personal health care are increasing largely due to the growth in physician and clinical services among all types of personal health care services [1]. Private health insurance spending on these services is growing fast with an acceleration in the out-of-pocket spending, while Medicare spending decelerated slightly in 2012 [2]. Non-price factors including the volume and intensity of services are growing at a faster pace than unit prices in fees, leading to the increase in private health insurance payments for physician and clinical services [2, 6]. It becomes not only a policy imperative but it is also important for all health stakeholders including patients, providers, and payers to work together to reducing ever-escalating health care costs.

Overuse in Health Care

In addition to rising health care costs, there is growing evidence that the current way health care is delivered include too much waste. Though analytic approaches varied, several studies arrived at similar approximations on the amount of waste, estimated at least 30 percent to one-third of national health expenditures were spent on unnecessary health care services, accounting for approximately \$700 billion in waste annually [8-10]

The Institute of Medicine (IOM) convened a series of meetings and defined six major areas of excess health costs: unnecessary services, services inefficiently delivered, prices that are too high, excessive administrative costs, missed prevention opportunities, and medical fraud. The IOM reported more than \$750 billion were wasted in 2009 and

the biggest contributor, unnecessary services, was more than \$200 billion [8]. The Centers for Medicare and Medicaid Services (CMS) estimated that 15 to 30 percent of health care expenditures are wasteful. Medicare spending exceeded \$500 billion in 2010, suggesting that \$75 billion to \$150 billion could be cut without reducing necessary services [9, 11]. The Congressional Budget Office reported that 10 to 30 percent of \$2.7 trillion spending on health care in U.S. in 2011 is unnecessary, a midpoint estimate of \$910 billion, or 34 percent of national health expenditures were wasted in a year. The spending on overtreatment is estimated to be between \$158 and \$226 billion, representing the largest category of waste. Upon this trend, overall excess expenditures would be translated to over a trillion in 2014 [12].

Physician and Patients' Concern on Overuse

While the concept still is evolving, there is broad agreement among physicians that the negative consequences of some procedures for some patients outweigh the expected benefits. In a survey of primary care providers conducted by the American Medical Association (AMA) in 2009, 42 percent of primary care providers reported that their patients received too many unnecessary medical services [13]. According to a nationwide survey for physicians in 2013, over sixty percent of providers reported patients request tests or procedures that the clinician considered unnecessary at least several times per week. More than seventy percent of physicians said that average medical doctor prescribes an unnecessary service at least once a week. Eighty percent of them said they would order tests or procedures when a patient insisted [14]. In 2013, a local survey conducted by the Minnesota Medical Association (MMA) reported 35

percent of local practicing physicians said that patients ask for unnecessary tests or procedures several times a week, and only 44 percent of patients would follow the physician's advice to avoid it. Specifically, a national survey found that more than one-third of physicians would order lumbar magnetic resonance imaging for uncomplicated acute low back pain if a patient insisted on it even after the physician explained that it was unnecessary [15].

From the patient's perspective, according to a survey conducted by the Commonwealth Fund, one-third of U.S. adults reported they experienced duplicative or unnecessary care [16]. In another recent national survey, less than 10 percent of the patients reported that their physician had informed them about the risk of overdiagnosis and overtreatment when discussing cancer screening [17].

Literature Review

Defining Overuse

Overuse of health services increasingly is recognized as a problem that affects both the quality and cost of health care. In addition to physicians' and patients' concerns, policy and advocacy groups and researchers have a longstanding interest in overuse. An "Inappropriate service" was defined in 1980s by the RAND Corporation as a service when the expected negative consequences (e.g., mortality, morbidity, anxiety, pain, time loss) outweighed the expected benefits of a procedure [18]. In 1998, the Institute of Medicine Roundtable on Health Care Quality defined the term "overuse" as provision of care in circumstances where potential for harm exceeds the possible benefit [19]. Their

report in 2010 categorized “unnecessary service” as (1) overuse of services beyond evidence-established levels, (2) discretionary use of services beyond benchmarks, and (3) unnecessary choice of higher-cost services [8].

In 2008, the National Quality Forum (NQF) convened the National Priorities Partnership (NPP) and declared a priority of curbing overuse while ensuring the delivery of appropriate care. Nine domains of “overuse” or “inappropriate care” were identified: (1) inappropriate medication use, (2) unnecessary laboratory tests, (3) unwarranted maternity care interventions, (4) unwarranted diagnostic procedures, (5) inappropriate non-palliative services at the end of life, (6) unwarranted surgical procedures, (7) unnecessary consultations, (8) preventable emergency department visits and hospitalizations, and (9) potentially harmful preventive services with no benefits [20]. In 2009, three types of overuse were identified at Agency for Healthcare Research and Quality (AHRQ) Appropriateness Small Conference: (1) clinically harmful overuse, (2) overuse that is not cost-effective, and (3) overuse of appropriate care.

While definitions differ in the literatures, more recent studies used the term “low-value” to indicate care for which risk of harm outweighs potential clinical benefit, given the cost, available alternatives, and preferences of the patient [21]. For example, an imaging test is considered as low-value is if it is unlikely to provide information that will change the course of treatment. For clarification, the terms “overutilization”, “overuse”, “inappropriate”, “unnecessary”, and “low-value”, all refer to this pattern of resource use in this study.

Developing Guidelines Identifying Overuse

The overuse of health care services is prevalent, inefficient, and costly to both individuals and the U.S. health system [22]. Low-value services do not only result in unsustainable expenditures, but also pose significant risks to the health of individual patients and the overall population. They are less cost-effective compared to alternatives and other appropriate treatments, and often trigger unnecessary follow-up tests and treatments with additional risks and costs.

According to the Institute of Medicine report, one-third of the health care expenditures could be considered wasteful and one-third of this waste is due to the provision of low-value services, which provide us a sense of the scope of overuse [8]. However, while there is long-standing agreement about the need to reduce overuse and deliver high-value care, there is limited guidance and consensus on which services are low-value, why they are provided, how to measure them and what to do to reduce it.

Over the past several years, scholars, professional societies, provider organizations, and expert panels have conducted evidence-based reviews of specific health care services and identified low-value services that contribute to waste in health care. In 2008, the Centers for Medicare & Medicaid Services (CMS) released a list of health services that may be low-value or provide minimal benefit as potential candidates for national coverage determination (NCD). A NCD is a nationwide determination of whether Medicare will consider the service as reasonable and necessary and pay for it. The CMS is keeping this list updated by synthesizing public's concern and internal consideration. Some NCD topics sparked discussion but most services like PSA tests and

colonoscopies are still covered for all Medicare beneficiaries. The United States Preventive Services Task Force (USPSTF), an independent panel of experts in primary care and prevention, has conducted evidence-based guidelines to review clinical preventive health care services by age, gender and medical history. Their recommendation statements suggested that those who receive health services outside of these guidelines incur potentially unnecessary and costly services of low-value [23].

In recent years, physician specialty societies are taking the lead in developing guidelines to identify low-value services across different specialties. A working group of the American College of Physicians (ACP) devoted early effort to identify high-value, cost-conscious screening or diagnostic tests. They convened a workgroup of physicians to identify 37 common clinical situations in which screening and diagnostic tests are used in ways that do not reflect high-value care. Examples include screening for colorectal cancer or in adults older than 75 years or in adults with a life expectancy of less than 10 years; screening for prostate cancer in men older than 75 years or with a life expectancy of less than 10 years; and performing imaging studies in patients with nonspecific low-back pain [24]. The concept of “Top Five List” proposed by Brody provided the groundwork of developing lists of top five unnecessary tests or procedures commonly ordered by clinicians [25]. In 2009, inspired by the “Physician Charter on Professionalism” [26], the Promoting Good Stewardship in Clinical Practice project funded by the American Board of Internal Medicine (ABIM) foundation put the framework of Brody into practice. The project engaged National Physicians Alliance (NPA) members from three primary care specialties: Family Medicine, Internal Medicine, and Pediatrics. In 2011, each group released an evidence-based list of “5 Things You Can

Do in Your Practice” identified common clinical activities where the quality of care and efficiency of resource use could be improved [27]. Twelve unique low-value services from NPA’s “top 5 lists” generated \$6.76 billion in health expenditures in 2009 [28, 29].

Originally piloted by NPA’s Good Stewardship project, the Choosing Wisely campaign was launched in April 2012 for patients and physicians to question about overuse of health care resources and encourage them to share decision-making on treatment choices [30]. Nine leading medical specialty societies representing 375,000 physicians each released a list of "Five Things Physicians and Patients Should Question" and identified five tests or procedures commonly used in their field, whose necessity should be questioned and discussed [27, 30]. The Choosing Wisely Campaign is a collaborative multi-year effort by the ABIM Foundation to improve health care outcomes and reduce costs. By the end of 2017, their original “Top-five” lists now have grown to over 500 tests and procedures identified by over one hundred medical specialty societies as low-value, and more organizations are joining. Their recommendations were shared with their collective membership of more than 700,000 physicians. Consumer Reports, the world’s largest independent consumer organization, has also participated to provide patient-education resources and promote dissemination.

Measures and Magnitude of Overuse

While many public and private sector initiatives, including the Choosing Wisely campaign, are gaining momentum in developing guidelines to identify low-value services and to improve quality of care, there has been limited empirical work on the extent to which patients actually are receiving the low-value services and the magnitude of overuse.

According to a systematic review of 22 years (1978-2009) of studies on overuse in the U.S., 172 articles examined rates of procedures, tests and medications [31]. Within each service studied, rates of overuse varied widely in different studies.

Previous studies estimating the magnitude of overuse are limited, due in part to the lack of a comprehensive set of overuse measures. Most overuse concepts in medical standards and clinical guidelines are missing specific definitions of the selection criteria for valid measure development. In a critical review of existing overuse measures, Chan and colleagues identified 160 measures of overused health services, but only 37 were specified measures that provided definitions of denominators, numerators and exclusions. Only 15 of the specified measures could be computed using only administrative claims data. Most measures require medical records or patient-reported data. In addition, the specified measures were limited to only a few clinical topics [32].

The RAND Appropriateness Method (RAM) is the first and most widely accepted method for defining appropriate care. It provided guideline to measure the appropriateness of medical interventions in a large number of clinical situations [33, 34]. More organizations started developing measures of overuse in recent years. The National Quality Forum (NQF) and the National Committee for Quality Assurance (NCQA) have identified curbing overuse as one of their priority areas and are developing measures to identify inappropriate care [35]. The NQF endorsed specialty performance standards for physician-focused ambulatory care through their Quality Positioning System [36]. The NCQA developed the Healthcare Effectiveness Data and Information Set (HEDIS) provided specifically defined performance measures of care and service. The CMS

collaborated with the Lewin Group and developed a set of outpatient imaging efficiency measures disseminated through QualityNet. The AHRQ established National Guideline Clearinghouse (NGC) to provide quality measures and evidence-based clinical practice guidelines.

While most previous studies focused on the overall waste of overuse, not many studies have looked at the magnitude of overuse of specific services, particularly preventive screening and imaging tests. Screening tests have been used for the early detection and treatment of chronic diseases, such as cancers. Diagnostic imaging tests have been used to warrant further treatment if a disease condition exists. These tests could increase individual's life expectancy and reduce costs. However, cancer screening and diagnostic imaging tests are associated with complications and risks, leading to overdiagnosis and overtreatment [37]. As reported in a national survey, Americans have been enthusiastic about preventive screening for years. Eighty-seven percent adults believe that routine cancer screening is always good [38]. Among the medical guidelines identifying unnecessary services, NPA, ACP, USPSTF, and Choosing Wisely lists largely are populated by overuse of screening and imaging studies. However, previous studies are focused principally on the assessment of antibiotics use or over-prescription. In Korenstein's 2012 systematic review, 18 unique therapeutic procedures, 24 diagnostic tests, and 13 medications were evaluated among the 172 studies, 59 of them focused on antibiotics for upper respiratory tract infections, only 8 publications addressed preventive and diagnostic services [31]. Furthermore, the published interventions to reduce overuse by primary care providers are outdated. In a total of 35 interventions between 1996 and

2011, 24 interventions to reduce overuse were attributed to the clinical domain of antibiotics, prescribing or polypharmacy [39].

Low-value preventive service use of low-risk or asymptomatic patients may lead to unnecessary follow-up treatment which result in substantial harms and costs. Overuse of screening and imaging studies is prevalent, although the rate of specific health care services varied. Methodologically, specifying appropriateness for preventive cancer screening and diagnostic services relies on fewer prognostic factors than most services, and often do not require clinical records [22]. Imaging services represented the largest category of low-value services with specified measures and measurement opportunities [32]. The current dearth of research allowed further investigation on the overuse of preventive cancer screening and diagnostic imaging studies.

Since the launch of the Choosing Wisely campaign, several recent studies have published prevalence of a limited set of low-value service measures primarily using a national population. A study examined costs of 12 commonly overused services identified by the Good Stewardship Working Group using data from federal medical surveys. Tests included Pap tests to screen for cervical cancer in teenagers and low back pain imaging studies. The 12 health care services accounted for \$6.8 billion in medical costs in 2009. The largest waste category in dollars was physicians ordering brand-name statins before trying patients on a generic drug first, which accounted for \$5.8 billion [27].

In recent years, researchers started translating Choosing Wisely recommendations into claims-based algorithms for measurement purposes. Both the prevalence of these services and the associated spending has been estimated at the population level. One of

the first data-driven efforts to quantify the magnitude of low-value care using administrative data was published in 2014. This study developed a list of 26 overuse measures using 2008-2009 Medicare claims data. Depending on the level of sensitivity used, their measures found that 25 to 42 percent of beneficiaries received at least one low-value service in a year, comprised between 0.6 and 2.7 percent of Medicare spending. Among them, 4 to 9 percent of patients with a diagnosis of low back pain received non-indicated imaging, corresponding to 1.1 to 2.5 million beneficiaries for the entire Medicare population. Estimates of annual Medicare spending on imaging for uncomplicated low back pain ranged from \$82 million to \$226 million, while the cost of all 26 services totaled 1.9 to 8.5 billion for the entire Medicare population, or \$189 to \$227 per beneficiary [40].

Taking low-value low back pain imaging test as an example, the rates of overuse varied widely. Another retrospective analysis using Medicare claims data between 2006 and 2011 to compare rates of low-value services estimated that among 2 million beneficiaries with uncomplicated low back pain, 22.5 percent received an X-ray, CT scan, or MRI within six-weeks of initial diagnosis [41]. A study examined the use of seven Choosing Wisely low-value services in commercially insured adults. The percentage of receiving low back pain imaging remained high (53.7 percent) from 2010 to 2013 [42]. Another study examined the use of 28 Choosing Wisely low-value services in 1.5 million commercially insured adults in 2013 and found the rate of imaging for nonspecific low back pain was only 1.3 percent [43].

Factors Contributing to Overuse

While previous studies have examined potential effects of individual or provider-level variations on the health services utilization, results have focused largely on underuse of services [44]. Factors associated with underuse of preventive care and disparities in access to care have received a great deal of attention in the health services research literature; the interest in overuse is more recent and there are fewer empirical studies on factors contributing to overuse.

In 1990, the RAND Corporation assessed the use of carotid endarterectomy, upper gastrointestinal endoscopy, and coronary angiography and they concluded that appropriateness of care cannot be adequately explained from easily observable characteristics of patients, physicians, or hospitals [45, 46]. Other studies showed that overuse rates could not be explained by different health care systems or different coverage types, or geographic locations. A 2013 systematic review by Keyhani compared rates of overused health care services in different health care systems and among different coverage types. The review provided no consistent evidence that any specific type of delivery system or insurer had lower rates of overuse of health care services [47]. A comparison study on low-value care in Medicaid vs. commercially insured populations using regional claims data found no consistent association between insurance types. They summarized low-value care may be more closely related to local practice patterns than to insurance benefit structures [48]. Another systematic review by Keyhani and colleagues on geographic variation found limited literature that explored the relationship between inappropriate use of procedures and geographic variations in cost or intensity of services

[49]. However, the influence of regional variation on health care utilization has been controversial. When explaining cost-outcomes disparities, studies reported geographic variation across the U.S. [50, 51]. According to other studies, geographic variation is not associated with overuse, underuse or misuse [49, 52].

In recent years, some studies have shown that overuse varies by patient characteristics. For example, patient's socioeconomic status, race, and ethnicity are known to impact prevalence and cost of health services use [53]. There are substantial disparities in utilization of low-value screenings across socio-economic groups, but there is a lack of agreement about their relative contribution. For example, overuse of colorectal cancer screening and cervical cancer screening are associated with more frequent outpatient visits. Overuse did not vary by patient demographic characteristics or health status for colorectal cancer screening, but younger women are more likely to receive the Pap test [54-56]. Some studies have reported that patients who were male, white, and with a higher income level were more likely to receive unnecessary colorectal cancer screening [43]. Other studies concluded that patients who were female, African-American, or had more comorbidity were more likely to experience colonoscopy overuse [57-60].

Relatively few studies have identified the potential provider characteristics associated with overuse, and the findings vary from one study to another. Previous studies have examined physician factors affecting utilization of services and referrals to specialists, and medical group determinants of the volume of resource used [61, 62]. Controlling for patient factors and disease severity, larger-size medical groups with a

higher percentage of primary care providers, and multispecialty group practices, were associated with higher resource utilization and more inappropriate emergency department (ED) visits [62, 63]. Bridges and colleagues used 2008 Medicare claims data to examine healthcare infrastructure measures associated with 20 overused services, and found that overuse was associated with higher hospital bed count, hospital-based physicians count, and primary care physician count [64]. Moreover, physicians who were female or were gynecologist were more likely to overuse cervical cancer screening [56, 65]. Another study concluded that physicians who were male, older, or urologists were more likely to order inappropriate prostate cancer screening. Nurse practitioners and physician assistants had a lower level of inappropriate prostate-specific antigen (PSA) screening than physicians [66]. However, family physicians had a lower rate of inappropriate MRI ordering for the low back than neurologists, neurosurgeons, or orthopedic surgeons [67]. Rural providers were reported more likely to overuse imaging studies [68].

While some studies reported that overuse varies by patient or provider characteristics, most studies are limited since they did not systematically look at different levels of factors, such as the patient and provider level characteristics. Colla and colleagues incorporated a set of both patient and provider characteristics in their model and found areas with higher proportions of minority groups (Hispanic, black), worse health, higher overall Medicare spending, and a greater concentration of specialists used more low-value care. Rural areas, areas with a greater proportion of population in poverty, and a greater density of primary care providers were less likely to use low-value tests and services [41].

In sum, to date in the literature, a large proportion of previous research used data collected prior to 2010. Most claim-based studies used administrative data from Medicare, and only assessed a limited set of measures. Although previous studies found statistically significant differences across health plans in utilization rates of six preventive care services [69], results based on older adults in fee-for-service Medicare may not be generalizable to younger populations or those in managed care [40].

This analysis expands on prior studies by incorporating both government and commercial health plans. Its unique contribution is the examination of overuse of imaging and screening studies as a function of both patient- and physician-level characteristics in a hierarchical model. A hierarchical model could ascertain the precision of their relative contribution by accounting for the within-provider correlation due to enrollees attributed to the same provider.

CHAPTER 2. METHODS

Specifying the Low-value Services

Previous studies have shown that administrative data provide an important source of information that can be used to identify patients receiving potentially overused procedures but the identification process is not straightforward [70]. Identification of low-value services can be an essential first step in improving quality and reducing overuse.

I considered services that have been identified as low-value by professional norms, clinical practice guidelines, and panel recommendations (e.g., Choosing Wisely campaign, USPSTF, NPA, ICSI) and existing consensus overuse measures from major measure developers and measure clearinghouses (e.g., QualityNet, NCQA, AHRQ's NGC, NQF), or peer-reviewed medical literature [71]. Because many procedures require judgment based on symptoms, testing or clinical results, the health plan administrative data may lack the clinical information and level of specificity to determine the appropriateness of the procedure. Many risk factors could not be captured in claims (e.g., smoking status, family history). I reviewed the list of low-value health care services and selected the low-value services reliably measurable through claims and applicable to the general population.

I chose procedures with the least ambiguous conditions that did not require information on patient symptoms, risk factors, or disease severity for their identification; as such information cannot be directly gathered from claims (e.g. cardiac imaging in the

evaluation of patients without risk factors or symptoms). I also excluded procedures that did not require multiple (>2) years of claims for their identification (e.g. Dual-energy X-ray absorptiometry bone scan in an interval shorter than two years). Moreover, services that required prescription drug claims were also excluded (e.g. routine antibiotic prescription for acute sinusitis).

After applying the exclusion criteria, I developed five low-value scenarios that could be evaluated using health plan claims data. Selected health care services are based on both the “Five Things Physician and Patients Should Question” lists from the Choosing Wisely Initiative and the USPSTF “D” recommendations. They come from the original 45 non-recommended services in the initial nine specialty societies’ lists released in 2012, representing 15 Choosing Wisely recommendations. They also represented a compilation of services listed by multiple agencies, and associated with high levels of overuse based on previous literature.

Cervical cancer screening for young women

Cervical cancer is a disease in which cells in the cervix, the lower, narrow end of the uterus, grow out of control. Each year, approximately 12,000 women are diagnosed with cervical cancer in the U.S., resulting in an estimated 4,000 deaths annually[72]. Cervical cancer can be detected early by Cytology (Pap test) or Cytology/HPV co-testing. A Pap test looks for cells that are not normal and can cause cervical cancer. Pap tests scrape cells from the cervix that are viewed under a microscope to look for pre-cancerous lesions and cellular changes. Pap tests can detect pre-cancerous lesions before developing into cervical cancer and identify cervical cancer in its earliest states when treatment is

most effective. An HPV test looks for high-risk HPV genotypes, which are known to cause precancerous cell changes and cervical cancer.

All women with a cervix are at risk for cervical cancer, but it occurs most often in women over the age of 30. Cervical cancer is rare in women younger than 21 years old, even if they are sexually active. According to Surveillance, Epidemiology, and End Results statistics, cervical cancer occurs in approximately 1 in 1,000,000 girls aged 15 to 19 years. Cervical cancer screening in adolescents has not changed the incidence of cervical cancer [73]. Adolescent females tend to have high rates of transient HPV infection and regressive cervical abnormalities [72, 74]. Abnormal cervical cytology findings due to HPV infections are common, leading to a higher incidence of false-positive results in younger women [75]. Most suspected abnormalities for cervical cancer disappear spontaneously in adolescents.

A Pap test could cause temporary bleeding and infection. Abnormal screening test results may lead to psychological harms including anxiety, distress and depression for adolescents [74], and also may result in more frequent unnecessary possibly harmful follow-up tests and treatments [72]. A HPV testing, alone or in combination with cytology, could result in more harm than benefits in women younger than 30 years of age. The harms include additional testing and invasive diagnostic procedures such as colposcopy and cervical biopsy that might cause bleeding, cramping, discharge, and infection. Follow-up tests, lab fees and treatments resulting in significant costs [76][77]. Approximately 4.7 million women under 21 receive a Pap test annually, equating to a

cost of about \$500 million per year in the United States. This estimated cost does not include downstream costs for monitoring and/or treating irregular screening results [75].

Before 2012, cervical cancer screening guidelines differed by age to start and how often to get screened for cervical cancer [78]. This made it difficult for providers to follow the guidelines and provide preventive services. Fewer than 25 percent of clinicians provide care consistent with current cervical cancer screening guidelines, even though many medical societies and evidence-based guidelines recommend against cervical cancer screening in females less than 21 years of age [79, 80]. The USPSTF determined that screening of women younger than 21, regardless of sexual history, does not reduce the incidence and mortality of cervical cancer compared with beginning screening at 21. In 2012, a symposium cosponsored by the American Cancer Society (ACS), the American Society for Colposcopy and Cervical Pathology (ASCCP), and the American Society for Clinical Pathology (ASCP), which was attended by 25 organizations, recommended that cervical cancer screening by Pap test should not be used for women aged <21 years, regardless of initiation of sexual activity [81]. The guidelines are based on a systematic evidence review, contributions from six working groups and have become the consistent standard for cervical cancer screening. The agencies in **Table 1** recommend against screening for women younger than 21 years, and recommend against screening with HPV testing (alone or with cytology) prior to age 30.

Prostate cancer screening for men 75 years and older

Prostate cancer is cancer of the male prostate gland, which is the most common cancer affecting men. Approximately one out of six men in the United States will develop

prostate cancer in their lifetime. However, it grows slowly and does not have symptoms until it has spread, and the mortality rate is relatively low [82].

The early detection of prostate cancer is difficult due to lack of symptoms at early stages. Screening for prostate cancer is carried out primarily by prostate-specific antigen (PSA) tests. PSA is a protein produced by cells in the prostate gland and released into the blood. The screening test measures the level of PSA in human blood. Individuals with higher PSA levels have a greater risk of prostate cancer. It also serves as a tumor marker to follow the progress of diagnosed prostate cancer.

Medicare provides coverage of preventive prostate cancer screening tests for the early detection of prostate cancer. PSA has been a common screening test among older men, including those with severe comorbidity[83]. The introduction of prostate cancer screening reduced the incidence and mortality of advanced stage prostate cancer. However, there is convincing evidence that PSA-based screening leads to substantial over-diagnosis of prostate tumors, up to two-thirds of prostate cancer detected by PSA test are over-diagnosed [84]. Because PSA tests have a high rate of both false positive and false negative results, the risks of follow-up treatment are significant [85]. Higher than normal PSA levels may be due to other reasons including natural variation over time, prostatic infections and benign prostate hyperplasia [86]. In addition, the imperfect nature of PSA test could lead to stress and anxiety, unnecessary follow-up tests and subsequent invasive procedures, associated costs and quality of life decrements. Since all-cause mortality rate increases with age and prostate cancer grows slowly, the screening procedure loses its efficiency in older patients. From 1986 to 2005, one million men

received surgery, radiation therapy or both who would not have been treated without a PSA test. At least 5,000 among them died soon after surgery and 10,000 to 70,000 suffered serious complications [87, 88]. The U.S. Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial on prostate-cancer mortality concluded that PSA screening does not significantly reduce the rate of death from prostate cancer [89]. For patients with limited life expectancy, screening exposes them to immediate harms with little benefit. In addition, it imposes substantial psychological and financial costs[87].

Furthermore, agreement on prostate cancer screening guidelines is not unanimous in the U.S. The optimal screening policy for prostate cancer is highly debated among health care professionals and researchers. According to the USPSTF recommendation released in 2008, there is sufficient evidence that the associated harms of routine screening and treatment outweigh the overall benefits of PSA-based screening for prostate cancer in men 75 years or older. The USPSTF updated its recommendations in 2012 discouraging the use of PSA-based prostate cancer screening in asymptomatic men in all age groups. In 2017, the USPSTF are back to recommendations against PSA-based screening for prostate cancer in men age 70 years and older. It concluded that there is no reduction in prostate cancer-specific and all-cause mortality from PSA-based screening, and there are harms related to potentially unnecessary subsequent evaluation and treatments [88].

Similarly, the American Urological Association (AUA) recommended no routine screening of men after age 70 years in their 2013 guideline for early detection of prostate cancer. ACP also recommended against screening for prostate cancer in men older than

75 years or in adults with a life expectancy of less than 10 years through the Choosing Wisely. The ACS, American Society of Clinical Oncology (ASCO), American Academy of Family Physicians (AAFP), and American Geriatrics Society (AGS) all recommend against routine PSA-based screening for prostate cancer without considering life expectancy and the risks of testing [90]. Though CMS considered PSA-based screening as a potentially overused procedure for national coverage determination, it is covered for all Medicare beneficiaries [91].

The agencies shown in **Table 2** developed major clinical practice guidelines that recommend against PSA screening in asymptomatic men older than 75 years, or with less than a 10-year life expectancy.

Colorectal cancer screening for adults older than 75 years

Colorectal cancer is the third most common cancer and the second leading cause of cancer-related deaths in the U.S. for both men and women [92]. The lifetime risk of colorectal cancer is 5 percent among all Americans [93]. However, the incidence and mortality of colorectal cancer has been declining in the U.S. due to the routine preventive screening [92].

The most common symptom of colorectal cancer is blood in the stool. Screening for colorectal cancer could identify pre-cancerous adenomas that can be removed before they develop into cancer [92]. There are several different screening services to test for adenomas or colorectal cancer, each screening procedure can be used alone or in combination. Fecal occult blood test (FOBT) checks for hidden blood or DNA in the

stool. The flexible sigmoidoscopy uses a short tube to examine polyps in the rectum and lower colon. The barium enema is an X-ray examination of the large intestine to check for polyps or other abnormalities. CT colonography inserts a tube into the rectum and an X-ray scanner creates pictures. The colonoscopy uses a colonoscope to provide a direct visual inspection of the colon and rectum for adenomas or early cancer. The colonoscopy is considered to be a reference standard among all colorectal cancer screening tests. A positive result or abnormalities from alternative tests requires a follow-up colonoscopy to confirm diagnosis and remove lesions [94].

Medicare provides coverage of colorectal cancer screening for all beneficiaries aged 50 and older. Routine screening colonoscopies in patients over 75 is common. Medicare spent over \$100 million for screening colonoscopies in 2009, 40 percent of which was for patients over 75 [95].

The test provides the opportunity to detect precancerous polyps and reduce the incidence of cancer, but it takes a long time to show benefits from the procedure through a reduced incidence of cancer. Moreover, colonoscopy is associated with serious complications such as perforation, major bleeding, diverticulitis, severe abdominal pain and cardiovascular events [60]. Complications can lead to potential harmful subsequent procedures, surgery, and hospitalization. The risk of harm associated with screening begins to outweigh the benefit of early detection of colorectal cancer after the age of 75 [96].

The agencies shown in **Table 3** summarized the evidence on colorectal cancer screening. In 2008, the USPSTF recommends against routine screening for colorectal

cancer using a fecal occult blood test (FOBT), sigmoidoscopy, or colonoscopy in adults older than 75 years, (and against any screening for patients over 85, routine or not) [97]. In the Choosing Wisely Campaign, ACP also recommended against screening for colorectal cancer in adults older than 75 years or in adults with a life expectancy of less than 10 years.

Imaging studies for non-specific low back pain

Low back pain is the fifth most common reason for physician visits in the United States [27]. It is also among the most common causes of disability and lost productivity in the United States. Half of the U.S. adults have an episode of acute low back pain in a year and more than 80 percent of the population will experience low back pain in their lifetime, which is the most common cause of job-related disability and a leading contributor to missed work [98] [99]. According to the 2002 National Ambulatory Medical Care Survey, low back pain was the most frequent cause of pain reported by patients seeking outpatient medical care. Approximately 26 percent of patients surveyed reported experiencing low back pain within the last 3 months [99], and 2 percent of primary diagnoses for office visits during that year were for low back pain[100]. Total costs of low-back pain exceed \$100 billion per year [101]. Individuals with back pain incurred 60 percent higher health care costs per capita than those without back pain[102].

Physicians perform imaging tests such as plain radiography (X-ray), computed tomography (CT) scans, and magnetic resonance imaging (MRI) for low back pain to determine the presence of serious underlying conditions, such as cancer or spinal infection [103]. Imaging tests are commonly used, but ordering routine spine imaging

within the first six weeks has not been shown to improve clinical outcomes [104] [105]. Low back pain usually subsides in about a month; over 90 percent of patients with low back pain recover spontaneously within four weeks with no obvious improvements from imaging, while only 5 percent remain disabled for more than 3 months [106, 107]. The likelihood of identifying a serious underlying condition of lower back pain with imaging is rare [108]. Over 85 percent of patients seen at primary care practices have low back pain that cannot be attributed to a specific disease or an anatomic abnormality [109]. One study estimates that only 0.01 percent of patients with low back pain in primary care settings have spinal infection, and 0.7 percent of them have metastatic cancer [99] [110].

There is substantial evidence demonstrating little benefit for the potential harmful effects involved in imaging of the spine in patients with acute low back pain during the early phase of symptom onset. Lumbar radiography is responsible for the greatest proportion of total radiation exposure from medical imaging in the U.S. given its frequency of use [111]. Finding abnormalities that are not clinically relevant to the pain could divert attention and expose patients to unnecessary risks and harms that complicate recovery. X-ray is unhelpful for the initial routine management of low back pain unless red flags or more complicating factors are present [105] [112][113]. Red flags include severe progressive neurologic deficit, history of cancer, trauma, fracture, or infection, or when symptoms are present to indicate a serious underlying condition. Even when red flags are suspected, it should not be mandatory to order an X-ray in all cases [114][115]. X-rays and CT-scans result in potentially cancer-causing radiation exposure, which could increase cancer risks, and lead to further follow-up tests, spinal injections, and surgery with additional risks [116]. Over forty percent of patients with back pain receive imaging

within 1 year. Of these, 60 percent had imaging on the same day as the index diagnosis of back pain and 80 percent within 1 month of the diagnosis [117]. Medicare data indicate that almost one-third of patients identified with lumbar pain had diagnostic radiography within 28 days [67]. Studies reported that patients who had imaging also were more likely to seek follow-up care, non-specific back-pain sufferers who had an MRI within the first month after diagnosis didn't recover any faster, but they were eight times more likely to have surgery, and had a five-fold increase in medical costs compared with those who did not have early MRI [118] [31]. Patients who underwent lumbar radiography within 6 weeks' duration reported more pain and worse overall health status after 3 months than those who did not undergo radiography [109]. One study projected 1,200 new cancers based on the 2.2 million CT scans of the lower back performed in the U.S. in 2007 [119] [120].

Imaging is an important driver of low back pain costs and the costs can be substantial, not only because of the direct costs of the procedures, but also the downstream effects [121]. The inappropriate use of imaging is a large contributing factor to the high costs associated with low back pain. Reducing inappropriate imaging is critical for reducing the number of ineffective treatments and unnecessary costs [122]. CT scans and MRI for the lower back are typically over \$1000, while X-rays are approximately \$300. A study estimated the cost associated with unnecessary imaging for low back pain at \$300 million in 2013 [109] [123]. The total costs related to back pain, both direct and indirect, are estimated to be greater than \$100 billion per year in the U.S. [101].

The agencies shown in **Table 4** recommend against obtaining imaging studies in patients with non-specific low back pain within the first six weeks after diagnosis, unless red flags are present.

Data

This section describes the source and data entities used in this study.

Accurate estimation of overuse requires appropriate data. In this cross-sectional study, I used administrative data from a non-profit upper Midwest health plan providing coverage to 1.5 million members whose network includes 27,000 providers in Minnesota, Wisconsin, North Dakota and South Dakota in 2012. The health plan offers both commercial and government insurance products with varying deductible and co-insurance provision, including managed Medicare and managed Medicaid coverage.

Table 5 summarizes the government plan types with descriptions of each type.

I used health plan member year information to get basic demographics including member's age. Age was defined on the beginning or the end as of year 2012 depending on how the age range is defined for each low-value service. Enrollment information provides coverage history and product information. No more than a single month gap in continuous enrollment during each year of continuous enrollment is allowed.

I collected de-identified claims data from 1/1/2011 to 12/31/2012 for health plan enrollees at risk of receiving the five common low-value services in 2012 as specified in the previous section. Physician/professional claims were sent from the physician practice, while facility/hospital claims were sent from hospitals for the use of equipment and

hospital services. Claims in 2011 also were included if member is enrolled in that year. The detailed claim records contain all information needed to process an insurance claim including identification of provider. For each record, de-identified member ID, provider ID, claim ID, claim type, claim detail line number, claim reason code, diagnosis codes, and procedure codes are included in the data entities with description. Moreover, charges claimed and allowed after provider discounts are applied, amounts allowed by the plan, and amounts paid by the member (deductible, coinsurance, and copay) are included.

I used Johns Hopkins Adjusted Clinical Groups (ACG) data to measure member's health status in 2011 and 2012. The ACG system measures the morbidity burden of patient populations based on disease patterns, age and gender found on insurance claims or other computerized medical records. I used the expected health care utilization band based on a cluster of diagnosis codes from ACG data to identify the health risk level of each enrollee. I also used U.S. Census data and American Community Survey data to capture enrollees' neighborhood socioeconomic status (e.g. race, education, and poverty level) at block, block group or Census tract levels. The Census and American Community Survey information provide broad social, economic, housing, and demographic profiles. I used the merged data to measure these neighborhood characteristics.

In addition, each member at risk of receiving selected low-value health care services was attributed to a servicing provider or a primary care provider as discussed in a later section. Information regarding the attributed provider characteristics was available through administrative files.

Study Sample

The aim of this section is to describe the measure construction for low-value services, developing claim-based algorithms, operational definitions, and inclusion/exclusion criteria of the study sample.

Since there are no publicly tested and widely accepted claim-based measure to identify low-value services based on Choosing Wisely recommendations, USPSTF and other sources, I conducted a review on the identified low-value scenarios from major repositories of quality of care measures (e.g., AHRQ National Quality Measures Clearinghouse, National Quality Forum, CMS Physician Quality Reporting System) and major measure developers (AMA Physician Consortium for Performance Improvement, National Committee for Quality Assurance). I drew measure definitions from established claims algorithms in the literature, a Washington State report that measured low-value care in state-based all payer claims database, and the National Committee for Quality Assurance's Healthcare Effectiveness Data and Information Set (HEDIS) [35]. These sources will be referred as "professional agencies" in this study.

Specifically, I adapted 2015 HEDIS-defined claims-based measures with small changes to optimize the measures and constructed the five cohorts at risk of receiving specified low-value services. I conservatively excluded enrollees for whom the select services might be appropriate (e.g., not clearly low-value). For all five cohorts, the denominators are patients at risk of overuse who meet age and gender-specific criteria, which mean *any* services would be low-value for them. For example, I use all men 75

years or over who should not receive a PSA test as the denominator for low-value prostate cancer screening.

I applied these measures to medical and hospital claims data with a sufficiently long temporal window of claims preceding a target service. In order to ensure I excluded individuals with a prior diagnosis or history indicating appropriate use of selected services, I included only members who were continuously enrolled in the prior year in addition to the study year. I used a combination of International Classification of Diseases, Ninth Revision (ICD-9) codes, Current Procedural Terminology (CPT) codes and HCPCS codes to exclude enrollees with a history of related disease in the one year baseline period prior to the service occurrence in a given study year. For example, when assessing whether the use of cervical cancer screening met the operational definition of low-value cervical cancer screening measure, I used claims data from 2011 to check for relevant diagnoses for women were at risk of receiving low-value screening in 2012.

The definition, diagnoses codes, procedure codes, inclusion and exclusion criteria for computing the numerator and denominator populations for the five services are summarized in **Table 6**. All codes used for measures construction are listed for each service in Appendix **Tables 14-17**.

Cervical cancer screening for young women

Professional agencies agreed that cervical cancer screening could result in more harm than benefits for adolescent females. They all recommend against any screening for

women younger than 21 years, and recommend against screening with HPV testing (alone or with cytology) prior to age 30.

Accordingly, I split the study population to two denominators, all eligible female enrollees age 13 years as of January 1 to 29 years as of December 31 of the measurement year, and a subset population, female enrollees age 13 years as of January 1 to 20 years as of December 31 of the measurement year. Enrollees must have been continuously enrolled during the measurement year and the year prior to the measurement year. No more than a single month gap in continuous enrollment during each year of continuous enrollment is allowed. To determine continuous enrollment for whom enrollment is verified monthly, the member must have greater than or equal to 11 months in coverage during the measurement year.

In order to distinguish between tests used to screen for cancer in asymptomatic women, I excluded women with any diagnosis of cervical cancer, HIV or immunodeficiency any time on or between January 1 of the year prior to the measurement year and December 31 of the measurement year.

First, I will calculate the percentage of females 13 to 29 years of age who were screened unnecessarily for cervical cancer. The numerator population includes all denominator patients receiving HPV tests during the measurement year. Secondly, I will use adolescent females 13 to 20 years of age as the denominator and calculate of the percentage of denominator patients using Pap tests during the measurement year. All codes used for measures construction are listed in the codebook (Appendix **Table 14**).

Prostate cancer screening for men 75 years and older

Although the most updated USPSTF in 2012 recommends against PSA-based screening in men of all ages, this recommendation is debated for men younger than 75. This study specifies an age range of 75 and older because all professional agencies agree with the clear lack of benefits of screening and treatment in men of this age group.

The denominator of this study sample are all eligible male enrollees 75 years or older as of January 1 of the measurement year. Enrollees must have been continuously enrolled during the measurement year and the year prior to the measurement year. No more than a single month gap in continuous enrollment during each year of continuous enrollment is allowed.

In order to distinguish between PSA tests used to screen for cancer in asymptomatic men and men who had a diagnosis for which PSA-based testing is clinically appropriate, I excluded men with prostate cancer diagnosis, dysplasia of the prostate, or prostatectomy on or between January 1 of the year prior to the measurement year and December 31 of the measurement year. I also excluded all denominator patients with any diagnosis of elevated PSA result ($>4.0\text{ng/mL}$) during the year prior to the measurement year.

I will calculate the percentage of men 75 years and older who were screened unnecessarily for prostate cancer using PSA-based screening. The numerator population includes all denominator patients receiving a PSA test during the measurement year. All codes used for measures construction are listed in the codebook (Appendix **Table 15**).

Colorectal cancer screening for adults older than 75 years

All professional agencies recommended against screening for colorectal cancer in adults older than 75 years or in adults with a life expectancy of less than 10 years.

The denominator of this study sample is restricted to all enrollees who were 76 years or older as of January 1 of the measurement year. Enrollees must have been continuously enrolled during the measurement year and the year prior to the measurement year. No more than a single month gap in continuous enrollment during each year of continuous enrollment is allowed.

In order to distinguish between preventive screening tests used to screen for cancer in asymptomatic men and diagnostic tests, I excluded men with colorectal cancer diagnosis, iron deficiency anemia, lower gastrointestinal bleeding, Crohn's Disease (i.e., regional enteritis), familial adenomatous polyposis, Lynch syndrome (i.e., hereditary non-polyposis colorectal cancer), inflammatory bowel disease, ulcerative colitis, abnormal imaging findings of gastrointestinal tract, changes in bowel habits, total colectomy or a personal or family history of colorectal cancer on or between January 1 of the year prior to the measurement year and December 31 of the measurement year.

I will calculate the percentage of members 76 years and older who were screened unnecessarily for colorectal cancer. The numerator population includes all denominator enrollees receiving one or more screenings for colorectal cancer during the measurement year, identified as any of the following: colonoscopy, flexible sigmoidoscopy, fecal occult blood test (guaiac or immunochemical), barium enema, CT colonography, fecal

DNA test. All codes used for measures construction are listed in the codebook (Appendix **Table 16**).

Imaging studies for non-specific low back pain

In contrast to preventive cancer screening measures, the study population for diagnostic imaging tests includes patients with the diagnosis. I used the nationally vetted HEDIS specification to measure low-value imaging studies for low back pain. The HEDIS specification captures the essence of the guidelines developed by major professional agencies. Conservatively, I used screening within four weeks instead of six weeks.

The denominator of this study sample are all enrollees age 18 years or older as of January 1 of the measurement year to 50 years as of December 31 of the measurement year, who had an outpatient visit, an observation visit, an emergency department visit, or osteopathic manipulative treatment with any primary diagnosis of low back pain. Enrollees must have been continuously enrolled during the measurement year and the year prior to the measurement year without any gap allowed.

The index date was defined as the earliest encounter during the measurement year with a primary diagnosis of low back pain. If the patient had more than one encounter, I included only the first encounter. In order to exclude patients with red flags who had a diagnosis for which imaging studies are clinically appropriate, I excluded patients with any low back pain diagnosis within six months prior to their index date. In addition, I excluded patients with any diagnosis of cancer, trauma, intravenous drug abuse,

neurologic impairment, HIV, or intraspinal abscess from January 1 of the year prior to the measurement year to 28 days after the index date.

I calculated the percentage of members with a diagnosis of low back pain who had an imaging study test within 28 days of the diagnosis. The numerator population is all denominator patients receiving imaging studies (plain X-ray, CT scan, and MRI) on the index date or within 28 days following the date. All codes used for measures construction are listed in the codebook (Appendix **Table 17**).

Conceptual Model

There are numerous factors that affect patients' use of health care services. A model developed by Zapka assessed factors at the patient level, the provider level, and the organization and practice setting levels interacting in a synergistic manner to impact provider's delivery and patients' utilization of preventive services [124, 125]. Taplin and colleagues used an ecological framework to consider the multilayered influences on the delivery of care and a variety of environmental factors influencing productive interactions between providers and patients [126]. A conceptual model of patient-centered care consists of multiple domains, including patient demographics and clinical characteristics, hospital, nurse and physician attributes influencing treatment choices and outcomes [127].

Conceptual model in this study is based on the theoretical frameworks of Zapka and Taplin to illustrate the multilevel environment in which patients and providers

collaboratively make decisions that affecting the use of low-value health services. **Figure 1** provides lists of example measurable factors within each level.

The individual enrollee's characteristics such as age, gender, health status, and insurance plan design will have a significant impact on enrollee's decisions to seek medical care and treatment. The enrollee's demographics represent their life experiences, providing social and cultural context for their decision-making. For example, Hispanic or Black enrollees may have faced historical prejudice or other cultural barriers in accessing care. Example health-related characteristics include health status, diagnosis history, comorbidities, and health utilization level.

In addition, individuals make their decisions in their local community environment; their population socio-demographics such as education and income of neighborhood will affect the enrollee's willingness to use and use patterns of health services. For example, financial resources, such as higher income or more health insurance benefits, help the enrollee overcome financial barriers to accessing the health care system. However, higher income individuals may have greater expectation to get more frequent preventive cancer screening.

Moreover, providers' demographics, specialty and clinic's location, organizational structure may also impact demand of health services. Specifically, I expect local providers to behave differently, due to the longstanding differences in efficiency of care delivery pattern. In addition, provider characteristics may interact with patient characteristics to influence utilization (e.g., specialty or gender of physician).

Finally, national and state environment including macroeconomic trends, evolving best practices of care, professional standards and norms, evidence-based guidelines, and their local implementation affect patient's choices and provider's treatment patterns. It is important to integrate the multilevel environment in order to capture the heterogeneity in patient and provider characteristics collaboratively affecting the treatment decisions.

Variables

The objective of this analysis is to understand how the variation in use of each service in the specified study population could be attributed to observed patient and physician characteristics. This section briefly summarized variables that could be collected from data (Table 7) and the imputation algorithm for missing values. The list of variables of interest with description is documented in Appendix **Table 18**.

On patient level, first I included member's age, gender and location as factors influencing overuse. Members age 85 or older were coded as 85 to reduce the re-identification risk. Since member's socioeconomic status is not available at the individual level, I created neighborhood-level characteristics for race/ethnicity, education level, and income/poverty rate from member address merged with U.S. Census data and American Community Survey data. Census data (race) were joined to geocoded address at block level. Other data from the American Community Survey were joined to geocoded address at block group and Census tract level, depending on the availability of the statistic. Addresses were stripped from the data prior to delivery of the research dataset. I classified neighborhoods as high poverty or low education based on the proportion of residents below the federal poverty level or with less than a high school

education. In addition, I used member's current year and prior year health status measured by the Johns Hopkins ACG resource utilization band. The banded indicator of aggregations of ACGs is based upon estimates of concurrent resource use. This variable is used to classify enrollees by health risk level (very healthy, healthy users, low health risk, moderate health risk, high health risk, very high health risk). Lastly, I included member's insurance type (managed Medicare, managed Medicaid, or commercial plan) to analyze product with various benefit design as a factor in health care utilization.

For provider level characteristics, I included physician demographics (age and gender), specialty, and credentialing level (physician or physician extender). I also controlled for urbanicity based on Primary and Secondary Rural Urban Commuting Area (RUCA) score of provider's servicing location as described in Appendix **Table 19**.

I found that not all providers had valid gender, age and urbanicity data. About 10 percent of gender and 20 percent of age were missing in provider demographics data. I used multiple imputation by chained equations (MICE) to impute missing provider demographics. MICE is a major method of addressing missing data. Multiple imputation fills in the missing values multiple times and creates multiple predictions for each missing value. It takes into account the uncertainty in the imputations to yield accurate standard errors. The chained equation approach assumes that the probability that a value is missing depends only on observed values and not on unobserved values. This method runs a series of regression models for each variable with missing data conditional upon the other variables in the data. Also, each variable can be modeled according to its distribution [128, 129]. In this study, first I imputed missing gender based on provider's

specialty and credentialing level. Because gender is a binary variable, I predicted gender using logistic regression. Because provider age is categorical, I modeled provider's missing age using an ordered logistic regression based on specialty, credentialing and imputed gender.

In addition, 34.9 percent RUCA of provider's Primary RUCA codes are missing. Because patient's location is a more relevant predictor for provider's location than other control variables, I filled in missing provider urbanicity based on the patterns of urbanicity among their patients. For each provider with a missing RUCA value, I looked at the urban/rural distribution of patients associated with the provider and imputed using their largest share of patient urbanicity.

Attribution of Patients to Providers

This study aims to examine the influence of provider's characteristics on the probability of receiving low-value health care services. Modeling provider characteristics requires patients to be linked to individual providers who managed their health care. This section describes the method for attributing health plan enrollees to providers using administrative claims data.

Attribution is the assignment of responsibility of each patient to a provider. In the study population using data from an Upper Midwest health plan, we presume that each health plan enrollee had a single primary care provider from the four states service area (MN, WI, ND, SD) who served as the coordinator of their care. Then creating attribution algorithms that assign responsibilities between patients and the coordinating providers. In

this study, I used one attribution rule for the three preventive cancer screenings and a different attribution rule for low back pain imaging studies.

Attribution for Cancer Screening

Most enrollees who seek preventive services visit their primary care providers (PCP). A previous study examined that stability of attribution rules [130]. For preventive services including cervical cancer screening, prostate cancer screening, colorectal cancer screening, I attributed enrollees to an in-network PCP based on their pattern of outpatient primary care service visits that occurred in a home or clinic setting. Primary care services visits were identified by evaluation and management (E&M) CPT codes (Appendix **Table 20**) in the measurement year. I ruled out out-of-network providers by participation status on claims. I identified outpatient visits based on the outpatient location of professional claims detailed in Appendix **Table 21**. I did not attribute enrollees with preventive cancer screenings provided in nursing facilities or other settings.

Only PCPs with certain credentialing and specialty codes were considered for attribution (Appendix **Table 22**, Appendix **Table 23**). As shown in **Table 23**, providers with a specialty in general practice, family practice, internal medicine, pediatrics or obstetrics-gynecology were categorized as PCPs. Visits to other specialties were excluded from the PCP attribution method. Visits to physician extenders (physician assistants, nurse practitioners) with primary care specialties were retained in the attribution rule.

The attribution algorithm for preventive cancer screenings retrospectively assigned health plan enrollees to an eligible servicing provider who provided the plurality

of their primary care visits as detailed below. For professional claims, the servicing provider is the individual who performed the service. The plurality algorithm consists of five steps. First, I identified primary care E&M visits for each patient in the measurement year based upon criteria I described above. Second, I added up the total counts and costs of primary care E&M visits for each eligible provider and in total. Cost is defined as total allowed charges, including the amounts allowed by both the health plan and the member. Third, I calculated the percentage of counts and costs of each provider. Fourth, I selected the provider with the highest concentration of counts of visits. Attributed patients are health plan enrollees who had the most primary care E&M visits to one unique provider in the measurement year if the percentage of number of visits is 35 percent or greater. Enrollees who obtained less than 35 percent of their primary care E&M visits from a provider were dropped from the study. Fifth, any ties in comparing percentage of visit counts go to the provider with the largest total allowed costs share.

In **Figure 2**, I focused on enrollees who were attributed to an eligible provider after applied above attribution rules (approximately 60 percent, section a of the figure). To ensure the precision and stability of attribution, enrollees who were spread thinly across many providers and obtained less than 35 percent of their primary care E&M visits from one unique provider were not attributed for the study (section b). Enrollees without any qualifying E&M visits to primary care in the measurement year were excluded from the preventive screening analyses (section c).

Attribution for Low Back Pain Imaging

Responsibility of care is more straightforward for patients with low back pain diagnosis. I attributed patients to the servicing provider for the encounter with the first observed primary low back pain diagnosis in the measurement year. As shown in **Table 19**, this attributed provider could be one of a wide range of specialties (e.g., orthopedist, chiropractor, or other specialists). There are less than 10 percent of the low back pain patients not attributed to a provider; these patients were excluded from the analysis.

Statistical Approach

The purpose of this study was to estimate patient- and provider-level influence on the utilization of five specified health care services, measured by variables capturing patient and provider characteristics. Specifically, the outcome of interest is a binary dependent variable, defined as occurrence of a low-value health care service. In this section, I described the econometric models used to investigate whether patient- and provider-level factors result in variation in utilization of each service.

Multilevel mixed-effects models have been widely used in health services research to analyze data with a hierarchical or clustered structure. While fixed effects are estimated directly in the standard regression model, random effects are not directly estimated because of the nesting structure and intra-cluster correlation of the data. In this study, outcomes for enrollees attributed to the same provider may be correlated because they share the common provider. Accordingly, I applied a mixed-effects probit model with a provider-specific random intercept to account for this within-provider correlation.

Multilevel models also are known as hierarchical models. There are two hierarchical levels in my model. The lower level is patient characteristics, with enrollees nested within the higher level: their attributed providers. I allowed patient-level outcomes for each enrollee to depend on both patient-level and provider-level effects, and to be predicted by the provider-specific intercept. I also took into account the same heterogeneity and clustered standard errors at the provider-level to produce robust standard errors.

For each study sample, I estimated a model corresponding to the probability that the enrollee received that low-value service. The general format of the probit model with a random intercept is shown as follows:

$$Pr(Y_{ij} = 1) = Pr(X_{ij}\beta_1 + Z_j\beta_2 + u_j + \epsilon_{ij} > 0)$$

In this formula, Y_{ij} indicates whether the i_{th} enrollee, attributed to the j_{th} provider had the service in the measurement year. The outcome variable was coded as 1 for enrollee i who received selected low-value service in 2012, and 0 for otherwise in this sample. The conditional distribution of the outcome given the random effects is assumed to be Bernoulli. X_{ij} is a vector of associated characteristics of the enrollees and their neighborhood effects. The vector Z_j contains covariates that control for observed characteristics of enrollee's attributed provider. Both β_1 and β_2 are vectors of parameters to be estimated. The u_j are provider-specific random intercepts, are assumed to be uncorrelated with X and Z . The error terms ϵ_{ij} are assumed to be distributed standard normal with mean 0 and variable 1 and assumed to be independent of X_{ij} , Z_j and u_j .

I used the two-level random-intercept model to estimate the association between the patient and provider characteristics and utilization of low-value health care services. However, enrollee's health risk measures from the aggregated Johns Hopkins ACG data may be correlated with the outcome variable, which would create biased parameter estimates in regression results. I used health risk measures are based on prior-year experience to predict utilization in current year and to avoid issues of endogeneity. Alternative regression results are shown in the robustness checks section.

Claims Analysis

Prevalence Analysis

The prevalence analysis proceeded as shown in **Figure 3**. First, I identified the size of population at risk of overuse by applying the claim-based algorithms I developed in a previous section. The denominator was all enrollees at risk of receiving the specified low-value health care services during 2012, which means the service would be low-value for them after applying the appropriateness selection criteria. Second, I excluded duplicate claims that have already been processed by the health plan and claims with missing or incorrect information to obtain the number of services performed in each cohort during 2012. Third, I excluded disallowed claims. Some claims were disallowed due to enrollees, providers, or time periods that were not covered, and other services were rejected or sent back for more information after health plan adjudication. Fourth, I broke down allowed claims to "health plan allowed in full" and "coordination of benefits (COB)." COB indicates the claim was allowed partially or fully with another payer, including Medicare, secondary health plan, auto insurance, worker's compensation

liability, etc. Fifth, I categorized COB claims to obtain number of services allowed in full by Medicare, allowed in part by Medicare, allowed in full elsewhere, and allowed in part elsewhere.

Cost Analysis

The cost analysis proceeded in three steps as shown in **Figure 4**. First, I calculated the total and averaged claimed amount for each identified service during 2012. Second, I calculated the total amounts allowed by the health plan. Third, I broke down amount allowed by the health plan into “health plan allowed in full” and “COB”. I calculated the allowed amount per test and per capita of each service for denominator population.

A few observations have zero claimed amounts and some claims have positive claimed amounts but their allowed amounts are zero due to some particular billing reason codes. I categorized the zero allowed claims as duplicated claims, disallowed claims and “paid elsewhere” based on specific denial reason codes identified at the detail level which are necessary to evaluate inclusion of claims. Most zero allowed claims were due to duplicative, missing or incorrect information. They were denied because of original billing errors and were corrected and resubmitted under different claim IDs. Other zero allowed claims were fully adjudicated but denied because of eligibility. I first excluded all duplicate claims then included other zero-allowed claims when calculating service frequency but excluded both duplicate and other zero-allowed claims from the cost calculation.

In addition, a few claims have positive claim amounts but their allowed amounts are zero because the health plan did not fully cover all claims. Only the amounts allowed by the health plan can be captured in the database. For example, according to claims operations, when a patient has a Medicare Cost plan, the provider bills Medicare first. Medicare then sends all claims to the health plan when there is a member responsibility, regardless of whether the health plan has a liability for payment. Consequently, if Medicare paid in full, no additional payments by the health plans is required and thus the allowed amount is zero in the data. If Medicare denies the claim, the plan covers state mandated services and preventive health services, includes routine screening procedures. If Medicare pays on a primary basis and the health plan supplements Medicare benefits, this study observe only the part allowed by the health plan. When a member has other insurance with respective payment responsibilities and partially paid by the health plan, allowed amounts will be understated without accounting for this coordination of benefit. Therefore, I calculated unit cost per test based upon claims allowed in full by the health plan only.

CHAPTER 3. RESULTS

Prevalence

This section provides estimates of the number of enrollees at risk of receiving each specified health care service and the number of services performed during 2012. I refer to enrollees who underwent the services as Adverse Event Patients (AEPs), defined as recipients of any untoward medical occurrence in a patient which does not necessarily have a causal relationship with the service [131].

The results are shown in **Table 8**, 10,466 potentially low-value health care services were performed and claimed for studied services during 2012, the prevalence varied across services from 3.0 percent of at risk enrollees receiving colorectal cancer screening in adults older than 75 years old to 17.4 percent for non-specific low back pain imaging within four weeks of first diagnosis. Among the 10,466 performed low-value services, 93.2 percent of the services were allowed.

About 5.2 percent of females who were younger than 21 years old received a Pap test for cervical cancer screening during 2012. The allowed rate (86.4 percent) is comparatively low compared to females younger than 30 years who received a HPV test (94.6 percent). In sum, cervical cancer screening using Pap test or HPV test resulted in the largest number of services performed (N=3,515) and allowed (N=3,071) among the low-value services, but not representing the highest percentage (4.8 percent).

Another comparatively high overuse area is prostate cancer screening, which is the most commonly overused cancer screening. There were 2,935 low-value PSA tests

performed during 2012 on 2,522 Adverse Event Patients (AEPs) who were 75 years or older, representing 13.9 percent of the population at risk, and 94.6 percent of them were allowed. The upper limit of claim denials is 5.4 percent.

Prevalence of colorectal cancer screening overuse is low. Among 40,944 adults older than 75 years, only 3.0 percent had a low-value colorectal cancer screening. These claims largely used colonoscopy (1.5 percent) and fecal occult blood test (1.5 percent), and 94.3 percent were allowed.

There were 9,383 patients who had a new diagnosis of non-specific low back pain in 2012, 17.4 percent of them received an imaging test within four weeks of diagnosis, and 2,477 of the 2,612 tests (94.8 percent) were allowed. I reported imaging tests for low back pain with radiography, CT scan and MRI separately. Plain radiography accounted for 13.9 percent of the patients receiving low-value imaging, while 6.7 percent of patients received a low-value MRI. Less than 1 percent received a low-value CT scan. Some patients received more than one diagnostic imaging tests.

Costs

This section shows the total dollar amount allowed for the five low-value health care services and estimates the magnitude of the potential savings that could be achieved by eliminating overuse of those services. I did not attempt to assess ancillary costs such as the cost of follow-up treatments on false positive tests due to data limitation.

Summarized in **Table 9**, selected low-value services resulted in an excess claimed amount of \$4.15 million in a year, and \$1.38 million were allowed by the health plan.

Claimed and allowed costs varied widely among services. Though Pap test for cervical cancer screening is used more frequently than HPV test, the claimed and allowed cost per test is lower. These two low-value cervical cancer screening tests resulted in a total allowed costs of \$169,330. PSA-based screening in older men has been performed frequently but the test itself is comparatively less expensive than other services. The health plan's unit cost for PSA test was only \$27. The total costs allowed by the health plan was \$75,648.

In a similar elderly population, colorectal cancer screening triggered higher claimed and allowed costs. Although the service is used infrequently, colonoscopy is the most expensive procedure among all studied services, with an average claimed amount of \$2,442, and an average allowed amount of \$489. The total costs allowed by the health plan for colorectal cancer screening was \$395,165 in a year.

Among the low-value imaging tests for low back pain, MRI is the most expensive test, with an average claimed amount of \$1,870, and an average allowed cost of \$830. Additional imaging tests included X-Ray cost \$64 and CT scan cost \$327. From health plan's perspective, the total low-value expenditure for low back pain imaging tests totaled \$743,312. MRI tests totaled \$620,691, which accounts for the largest portion of costs among selected low-value services.

In 2012, the total count of health plan enrollees eligible for this study with continuous enrollment and full-service coverage is 941,975. The total allowed amount for potentially low-value utilization is \$1.38 million, resulting in a per member per year out-of-pocket premium cost of \$1.5 for all enrollees in the health plan. Some low cost but

highly overused services could still result in large overall cost, such as plain radiography for low back pain and PSA test for elderly. X-ray within four weeks of low back pain diagnosis was the most prevalent procedure and it accounted for \$100,802 in one year.

Multivariate Analysis

Descriptive Statistics

The descriptive statistics of explanatory variables included in the analysis are shown in **Table 10** and **Table 11**. Sample characteristics with percentage distribution of the five cohorts are shown in Appendix **Tables 24-27**.

In all five cohorts, although the means are similar in most variables between patient-level model and the full patient- and provider-level model, the population differs slightly because the full model excludes patients that were not attributed to a servicing provider. The percentage of AEPs among all enrollees is higher in the full model than patient-level model and the prevalence analysis reported in previous section. Because the attribution approach used to select study sample relied on primary care or diagnosis seeking patterns, these attributed enrollees were more likely to have those services than the full population, which includes enrollees that never sought care.

Among the conditions for which both males and females are at risk, 62 percent of the older adults at risk of receiving low-value colorectal cancer screening and 58 percent of patients with low back pain are female. On average, all enrollees' neighborhoods are primarily White and non-Hispanic (≥ 85 percent), have residents with at least a high school degree (≥ 90 percent), and have few households below the federal poverty level

(approximately 10 percent). In non-elderly cohorts at risk of receiving low-value cervical cancer screening and low back pain imaging, most (≥ 85 percent) of the population is assigned to a moderate health risk or better based on their prior-year utilization history. Over 80 percent of them live in urban areas, and enrolled in a commercial health plan. On the contrary, more than half of the elderly population (average age ≥ 80 years old) are assigned to a high or very high health risk category, over 30 percent of them live in rural areas, and over 80 percent enrolled in a managed Medicare plan. Medicaid enrollees over 75 years old are mainly beneficiaries who are eligible for both Medicare and Medicaid.

Regarding provider characteristics, the average age of provider does not vary much across cohorts (45 to 51 years old). However, older population were more likely to be attributed to an older provider, more than 50 percent of the providers for cohorts 75 years and over are over 50 years old. On the other hand, over 60 percent of young women and adults 18 to 50 years old with low back pain were attributed to provider younger than 50 years old. Over 70 percent of the providers for young women are female and adults are more likely to have a male provider. Provider's rural or urban location follows similar patterns as patient's urbanicity, except rural rate decreased in elderly population due to the lower attribution rate in rural area. The four study cohorts for cancer screening tests and procedure share similar provider credentialing (physician vs. physician extenders) and specialty characteristics. Services were managed primarily by primary care provider credentialed as a physician. Patients with low back pain have a higher proportion of diagnosis provided by a chiropractor or a physician extender.

Impact of Patient Characteristics

In addition to showing descriptive statistics measuring the explanatory variables in the study population, I estimated the association between the enrollee characteristics and utilization of low-value health care services to compare to the literature that uses only patient-level characteristics. The sample size for this analysis is not the same as population at risk in the prevalence analysis because some enrollees (14 to 23 percent) do not have Johns Hopkins ACG or Census and American Community Survey information.

I first estimated a probit model including only enrollee characteristics and without provider characteristics and the provider random intercept. From the probit coefficients I calculated marginal effects as the effect of an increase in the covariate to provide more intuitive measures of the influence, defined as the average percentage-point change in the predicted probability of the service would occur, based on a one-unit change in the explanatory variable. The partial effects of patient-level characteristics on the probability of receiving each service are shown in **Table 12** and include both marginal effects for continuous variables and incremental effects for discrete variables. The following discussion focuses on statistically significant ($p < 0.05$) and marginally significant ($p < 0.10$) effects.

The statistically significant partial effects vary across cohorts and services. For young women at risk of receiving low-value cervical cancer screening, a one-year increase in age increases the probability of getting a Pap test by 3.45 percentage points. The effect of age on the probability of receiving an HPV test is less, indicates a 0.39 percentage-point increase for a one-year increase in age. In contrast, for adults over 75

years and at risk of receiving low-value prostate cancer or colorectal cancer screening, a one-year increase in age decreases the probability of getting a PSA test by 1.29 percentage points and decreases the probability of colorectal cancer screening by 0.39 percentage points.

For patients with low back pain, female's probability of receiving a low-value imaging test within four weeks of diagnosis is marginally significantly higher than for males. Males 75 years and older living in rural areas have 2.86 percentage points lower probability of using low-value PSA tests than those living in urban areas.

Block, block group or census tract level neighborhood impacts have comparatively small marginal effects in percentage-point changes. Enrollees living in areas with a greater proportion in poverty are less likely to have an imaging test within four weeks of low back pain diagnosis. A one-percent increase in proportion of household with income below federal poverty limit decreases the probability of getting a low-value imaging test for low back pain by 0.24 percentage points. In addition, enrollees in higher education neighborhoods are less likely to receive low-value Pap test and colorectal cancer screening. Enrollees in White/non-Hispanic neighborhoods are more likely to receive Pap tests and less likely to receive low-value colorectal cancer screening, but the percentage-point change is very small.

Also, the probability of cancer screening varied by insurance plan types. Young women in commercial plans have significantly lower probability of getting Pap tests compare to Medicaid enrollees. For the elderly population at risk of receiving prostate cancer or colorectal cancer screening, there was a significantly higher probability of

receiving low-value screenings among Medicare enrollees, and a lower probability among commercial enrollees.

In addition to enrollee's socio-demographics, patient's health status is significantly associated with the probability of receiving low-value health care services. I found an inverted U-shaped correlation between prior year health status and probability of utilization in cancer screening cohorts. As shown in **Figure 5**, I used very healthy people as the referent value, defined as enrollees without expected health care utilization based on a cluster of diagnosis codes in prior year. Enrollee's probability of receiving the low-value service peaked in either moderate or high health risk category in all five cohorts, which are significantly different from very healthy enrollees. Enrollees in these two categories were significantly more likely to receive low-value cancer screening procedures than enrollees in the healthy, low or very high health risk category. When the member moves from high health risk to very health risk category in the prior year, their probability of receiving low-value Pap tests, PSA tests, and colorectal cancer screening decreased.

Full Model with Patient and Provider Characteristic

Patient Characteristics

The full model controls for both patient characteristics and provider-level characteristics. **Table 13** shows the marginal effects and standard errors for the explanatory variables on the probability of using each procedure. Some enrollees (11 to

37 percent) were excluded from the full model because they were not attributed to a provider.

I compared patient-level marginal effects in the full model with the patient only model. First, enrollee's age remains significant for the cancer screening cohorts and marginal effects increased after controlling for provider-level characteristics and random intercept. A one-year age increase in young women increase the probability of getting a Pap test by 4.03 percentage points and an HPV test by 0.44 percentage points. A one-year age increase in adults over 75 years old decrease the probability of getting a PSA test by 1.65 percentage points and a colorectal cancer screening procedure by 0.46 percentage points. Gender effect is not significant anymore in the full model.

Secondly, neighborhood effects are consistent with patient-level estimates with small marginal value. The probability of low-value cervical cancer screening using Pap test increased in neighborhoods with a higher proportion of White and non-Hispanic, and decreased in more highly educated neighborhoods. Low-value colorectal cancer screening utilization declined in higher education neighborhoods and use of low back pain imaging declined for residents of lower-income neighborhoods.

Third, impact of insurance plan type on utilization is significant in elderly population. As expected, men 75 years or older enrolled in a Medicare plan were 6.76 percentage point more likely to undergo a low-value PSA test, relative to Medicaid enrollees. Those enrolled in a commercial plan were 4.75 percentage points less likely to receive the screening. Consistently, adults over 75 years in Medicare plan were slightly

more likely to use colorectal cancer screening (1.05 percentage points), while commercial plan enrollees were 0.59 percentage point less likely to use the low-value service.

Fourth, after adjustment for provider-level characteristics, some of enrollee's health status lost significance and the curve slightly changed, but the inverted U-shape pattern remains in **Figure 6**. The peak of prostate cancer screening utilization changed from moderate health risk enrollees to those in low health risk category, indicating low health risk enrollees' probability of receiving a PSA test is 12.99 percentage points higher than very healthy users. The peak of Pap test and low back pain imaging use remain the same in the high health risk enrollees, respectively represents a 3.27 percentage point increase in younger women, and a 4.81 percentage point increase in patients with a low back pain diagnosis. Women younger than 30 years old with moderate health risk in prior year have 1.10 percentage point higher probability of receiving a HPV test than those with no diagnosis in prior year, which is consistent with the patient characteristics-only model results. Health status factors in colorectal cancer screening cohort become not statistically significant anymore.

Provider characteristics

The results show the association between provider characteristics and health care services utilization. First, I found older providers have a higher probability of performing low-value cancer screening. Providers 50 to 59 years old and over 60 years old have, respectively, 2.75 and 3.04 percentage point higher probability performing PSA tests than providers under 40 years old. Providers over 60 years old have 0.91 percentage point higher probability of performing colorectal cancer screening than providers under 40

years old. Providers 40 to 49 years old have 0.89 percentage point higher probability performing Pap tests than those younger than 40.

Second, female providers' probability of performing cervical cancer and colorectal cancer screening is higher. Female providers have 1.39 higher percentage point of probability performing Pap tests, 0.77 higher percentage point of probability performing HPV tests, and 0.55 higher percentage point of probability performing colorectal cancer screening procedures than male providers. In contrast, male providers' probability of performing early low back imaging studies is 2.53 percentage points higher than female providers.

Third, I excluded patient urbanicity from the full model due to high correlation with provider urbanicity. I found rural providers have 1.41 percentage point higher probability of performing low-value Pap tests than urban providers, and 1.13 percentage point higher probability of performing low-value colorectal cancer screening procedures.

Fourth, physicians were more likely to order tests for older adults. Physicians have respectively 4.61 percentage points and 0.89 percentage point higher probability of performing prostate and colorectal cancer screening, respectively, than physician extenders. When I take into consideration physician's specific specialties for cervical cancer screening and low back pain imaging, I found that obstetricians and gynecologists have 3.10 percentage point higher probability of performing Pap tests than primary care providers. Specialty effects are especially significant in low back pain imaging management. A patient has a 35.42 percentage point higher probability of undergoing early imaging tests if the first provider who saw the low back pain patients is an

orthopedist rather than a primary care provider, while a chiropractor's probability of referring imaging tests is 14.21 percentage points lower than primary care providers.

Robustness Checks

In this section, I conducted robustness checks to strengthen the association reported in previous section. For parsimony, regression results of alternative models are summarized in the Appendix **Tables 28-32**.

Imputed missing provider demographics reduced models' precision. I restricted the study sample to the subset of enrollees whose providers' age, gender, and urbanicity are known and re-estimated models for all cohorts. The sample size reduced by 6 to 30 percent and the results were consistent with results from imputed models. However, provider age is sensitive to imputation. The marginally significant effects in providers 40 to 49 years old for Pap test and providers 60 years or older for colorectal cancer screening become not significant in the smaller sample without imputation. In addition, higher marginal effects of performing prostate cancer screening by 50 to 59 years old and 60+ years old providers become marginally significant. In addition, I found providers 50 to 59 years old and over 60 years old respectively have 3.17 and 3.74 percentage point lower probability recommending imaging tests for non-specific low back pain within four weeks of diagnosis than those younger than 40. In sum, though some marginally significant effects in provider age disappeared in the robustness check, findings in the study remained robust.

In addition, I compared the full model containing all variables of interest with sub-models containing various combinations of parameters. I estimated several different specifications including enrollee's current year health status vs. prior year health status, enrollee's urbanicity vs. provider's urbanicity, percentage of households with income below federal poverty level vs. median household income in the neighborhood, and remove provider's specialty to account for the high correlation with provider's credentialing.

First, I re-estimated the model with patient current year health risks and found that patient current year health status is highly correlated with prostate cancer screening, colorectal cancer screening, and low back pain imaging utilization, which did not converge in the patient-level model. In the younger and healthier population, the marginal effects become higher in Pap tests and the curve remains unchanged. Women in high and very high risk categories have higher marginal effects in the probability of receiving HPV tests in the current year. In the full model controlled for provider characteristics, none of the cohorts was estimable except men 75 years or older. The main model suggested men in low health risk category in prior year have the highest probability receiving PSA tests and this model suggested men in high health risk category in current year have the highest probability receiving the screening.

Second, the marginal effects were unchanged when I used patient urbanicity instead of provider urbanicity. Enrollees in rural areas have statistically significant higher probability receiving low-value Pap tests and colorectal cancer screening procedures.

Third, a robust check using median household income in the neighborhood yielded the same results as poverty rate. Residents of lower income neighborhoods are less likely to have an imaging test within four weeks of low back pain diagnosis.

Fourth, results were extremely close to those presented in full model when I excluded provider's specialty from the model, except provider's credentialing become significant and physicians have 14.99 percentage point higher probability recommending early imaging tests for non-specific low back pain than physician extenders. These different parameterizations confirmed the statistically significant results presenting in previous section.

Lastly, I estimated several alternate models to test the robustness of the results found in the main model. I ran fixed effects standard probit model and fixed effects probit model with clustered standard errors at the provider-level for each cohort of interest. In these analyses, p-values and marginal effects corresponded to the main models.

CHAPTER 4. DISCUSSION

Conclusion

Identify measures and data source

The Choosing Wisely Campaign, along with the USPSTF and other efforts have drawn more attention from academia and public in recent years. Their recommendations endorsed by professional agencies provide an opportunity to identify low-value health care services. An essential first step in reducing overuse is to identify these services from appropriate datasets and document the analytic algorithms.

The prevalence of low-value services and potential correlates of overuse have been examined previously has been estimated using electronic health records (EHR) and Medicare claims data. However, a large proportion of previous studies are outdated using the data collected in 1990's and early 2000's. Results from this study indicate that private health insurance administrative data provide an important alternative perspective to measure the use of low-value health care services.

In all scenarios, this study used services reliably measurable through administrative claims and applicable to private health plan enrollees and conservatively excluded enrollees for whom the select services which are not clearly low-value. These measures represent important areas for quality improvement by assessing the use of services identified as low-value for specific populations.

Prevalence and Cost

This study examined prevalence and costs related to the selected services in the U.S. using administrative claims data. The rates of overuse varied widely by services, which is consistent with previous literature. Korenstein et al. reported the overuse rates ranged from 1 to 89 percent among 22 years' publications on different services. Rates ranged from 5 to 28 percent for imaging in low back pain, 8 to 61 percent for colonoscopy, and from 16 to 80 percent for PSA test [31]. As reported by the Good Stewardship Working Group, 2.9 percent of girls aged 10-21 were performed Pap tests and 16.7 percent of adults aged 18-55 were ordered unnecessary imaging studies for acute low back pain [29]. The results show the prevalence range from 3.0 percent for colorectal cancer screening to 17.8 percent for low back pain imaging. However, the rates estimated in this study were lower compared to national estimates reported by other studies [13, 16]. With exception of low back pain imaging and PSA test, some services were not frequently performed, although experts questioned them frequently. Only five percent of women under 21 are receiving Pap tests. Possibly because this recommendation already became a part of most providers' and organizations' standards of care. Even for low back pain, tests were largely performed by plain radiography. Because this study used claims data from a health plan located in a geographic area with a reputation for efficient delivery and coordinated care, estimated use of selected services maybe more conservative compared to national rates reported by other studies using comparative selection criteria. For example, Minnesota's state-wide initiative for ordering appropriate high-tech diagnostic imaging reduces overall prevalence of imaging tests use by prompting health plans to ensure that only appropriate imaging scans are

ordered [132]. In addition, there may be some scenarios where providing the service was the appropriate clinical choice given the patient's specific situation that administrative claims data could not completely capture. However, these cases should be rare.

Prevalence rate reported in this study could be interpreted as a lower bound estimate.

Additionally, this study reported the dollar amounts that the health plan allowed, a total of \$1.38 million could have been saved by eliminating studied low-value services. Savings on enrollee's per-member, per year premium that this health plan could achieve is relatively small. However, there are some low-cost but frequently delivered services such as plain radiography in low back pain and the PSA test for older adults. These two tests still accounted for substantial overall costs in 2012. For instance, X-ray for low back pain within six weeks of diagnosis was the most prevalent performed low-value service – the payer allowed about \$100,000 in one year. This study reported conservative estimates of the direct cost of the low-value services. These estimates did not account for the costs of additional testing or follow-up procedures that resulted from ambiguous or false positive initial results. For example, if a patient requires a biopsy as the follow-up test, physicians may charge a significant amount of dollars for anesthesia, and there would be an additional pathology fee.

This study provided a baseline assessment of prevalence and associated potential cost savings that could be achieved by eliminating the selected commonly used low-value health care services. The results suggest that prevalence and costs of selected services may be lower than previously estimated, and that private health insurance claims data could provide an important alternative perspective on health care resources utilization.

Patient and Provider Characteristics

This study demonstrated that health claims could monitor the utilization of low-value health care services. These data include enrollees in all age groups with health insurance coverage type information. These data could capture claims for services linked to specific patient and provider characteristics, regardless of where the patients obtain the services.

Previous studies found statistically significant differences across health plans in utilization rates of six preventive care services [69]. Patients' demographics and socioeconomic status are also known to impact prevalence and cost of health services use [62]. This study incorporated both government and commercial plan products using health plan administrative data. Results from this study examined variation in the use of selected low-value services at individual level and identified significant correlates of overuse across the levels of patient and provider with their relative contribution.

Results indicate that, in general, increased probabilities of overuse are associated with government health plans, worse health status in the prior year, lower-education neighborhoods, and areas with a smaller proportion of population under federal poverty line. Probabilities of low-value cervical cancer screening increased with age for women under 30, but probabilities for prostate and colorectal cancer screening declined with age for those over 75.

These results are consistent with medical guidelines. In addition, Colla et al. used self-reported health status and found that overuse of 11 low-value services was correlated

with worse health status [41]. This study used more refined algorithms in Johns Hopkins ACG system to capture enrollee's prior year health status, specified the enrollee's health risk by their expected resource utilization categories. Enrollees under moderate and high health risk were more likely to receive low-value care, but the probability decreased for very high risk category. In addition, coverage type has significant influence on enrollees using low-value preventive services, government plan enrollees were more likely to get low-value prostate and colorectal cancer screenings. Among them, Medicare beneficiaries have higher probability of obtaining a low-value screening than Medicaid enrollees. Colla reported areas with higher proportions of minority groups (Hispanic, black) and population under federal poverty limit are less likely to use low-value services. This study found patients from lower-income neighborhoods had fewer low-value low back pain imaging tests, which could be due to difficulty accessing care and less exposure to the health care system.

Because there is limited research controlling for provider-level factors, this study expands on prior literature by using health plan claims data to capture additional provider characteristics associated with overuse. Results show overuse of preventive screening to be positively associated with females, older providers, specialists, and providers with physician credentialing, possibly because females and older providers were more conservative and more likely to stick to performance conventions in cancer screening [133]. In contrary, older providers were less likely to order diagnostic imaging tests for low back pain patients. A possible explanation could be younger providers rely more on imaging tests to make a diagnosis. Another significant indicator of low-value services use is specialist. Comparing to primary care providers, OB/gynecologists were more likely to

order low-value cervical cancer screening, and orthopedists were more likely to order low-value low back pain imaging. Colla and colleagues reported primary care providers were more aware of the Choosing Wisely campaign than specialists [134]. However, primary care provider may refer low back pain patients to an orthopedist, which generated increased specialist costs. According to a 2013 study, family physicians had a lower rate of appropriate low back MRI ordering than other specialties. Among the subspecialties, neurosurgeons were most likely to order appropriately (76 percent), whereas less than half of referrals by neurologists and orthopedic surgeons were appropriate [67]. In this study, chiropractors had a much lower probability of ordering low-value imaging tests, presumably they were more likely to disapprove low-value imaging tests.

Conclusions from this study provide a great insight into what specific attributes most influence the delivery of low-value services. It would provide implication of when services are inappropriately delivered and why certain physicians or clinics inappropriately and more frequently use than other providers.

Implication for practice and policy

Identifying and measuring low-value health services are prerequisites for reducing overuse and controlling excess health care expenditures. This study provided a starting point for further evaluation of the predictors of low-value care utilization. The studied services represent tests or procedures with longstanding agreement on their low value. Findings from this study highlighted the inherent challenges in defining and assessing low-value care as well as in implementing effective policies and payment mechanisms to promote high-value care use. It would be a collaborative, multi-faceted endeavor, engaging all stakeholders, including providers, patients, payers, policymakers, and the media to bring about a culture change and to inform action on greater value in health care. The goal of this study is to lay the groundwork for practice and policy agenda to reduce future utilization of low-value services and to improve the quality of health care delivered.

Provider-based efforts

As measuring and reducing low-value services is a goal shared by providers, patients and payers, overuse is also driven by multiple factors. Major drivers that promote overuse reported in prior studies include financial and payment incentives, malpractice concerns, time constraints, clinical performance measures and quality standards of care, patient preferences and demand [13, 67]. Studies found that some providers insist using more tests regardless of clinical scenario or patient risk status [135]. Also, nearly half primary care providers reported that they still order unnecessary tests or procedures on patients, while they know they were overusing [13]. Provider-based effort is a key component to combat overuse.

The Choosing Wisely campaign represents a physician-driven effort in identifying and reducing low-value care. It has the weight of physician societies behind the identification of low-value services. Based on a survey, approximately two-thirds of providers were aware of this national campaign; nearly all of them agreed it's a legitimate source of information on unnecessary tests and procedures [14]. The recommendations should be translated into measurable quality indicators and adopted in actual practice. This study made a critical step to translate a list of low-value services into claim-based quality measures. Work is ongoing to incorporate these lists and guidelines into CMS, PQRS and NCQA quality-measurement efforts, reimbursement standards, and specialty recognition programs [136]. The priority could be de-adopting services when clinical nuance is not needed to identify as low-value. For example, age-delimited screening guidelines provide a clear, easy-to-implement standard of care. The USPSTF recommended against prostate cancer screening for men ages 75 and older in 2008. The recommendation led to 8 percent decline in annual PSA testing rates among men ages 75 and older in 2009 and 2010, which highlighted the potential of guidelines to reduce the use of low-value health services [87]. I encourage providers to develop and validate more quality measures and interventions for wider implementation of Choosing Wisely recommendations.

Some physicians with limited experience or insufficient time to spend with patients also reported to over-testing and treatment. They worry about malpractice liability and order too many tests for fear of overlooking diagnostic information [137]. It is likely due to inadequate education and awareness of guidelines at the point of care. The Choosing Wisely campaign could help providers to review relevant scientific evidence

and comply with clinical guidelines and performance standards. Evidence-based appropriateness guidelines and clinical decision-support tools could be embedded into electronic health records, to aid providers in their decision-making.

The EHR-based technology-driven tools created a shared decision-making environment through targeting clinical situations in which services are low-value. For example, Computerized Physician Order Entry (CPOE) has been proven to reduce low-value tests at Cleveland Clinic. Evidence-based decision rules were pre-established into the existing workflow of providers at the point of ordering an advanced imaging test. If the provider cannot specify an appropriate evidence-based decision rule, the test cannot be ordered [138]. A private health plan in Minnesota developed a decision support tool for medical group practices to use in their electronic medical record systems. The tool could provide feedback and make recommendations on diagnostic procedures. The tool helped the health plan to avoid 7,000 inappropriate imaging tests [139]. Eight practices incorporated the U.S. Oncology Network's recommendation for lung cancer into an EHR decision-support system, after which patients had lower drug costs and similar one-year survival as patients without the decision-support system [140]. At the point of order, it assists physicians in performing a comprehensive medical history review and determining if further services are necessary. It could also help busy physicians to adhere to the professional standards and avoid ordering unnecessary testing through real-time clinical decision supports.

Some of overuse appears to be driven by financial incentives that reward the provision of costly procedures. Providers historically have been financially incentivized

to deliver more rather than less care. In the fee-for-service system, providers receive payment for volume, regardless of appropriateness. In the Medicare Physician Fee Schedule, payment for imaging tests and minor procedures often far exceed the resource costs, making them highly profitable [22]. This economic incentive influences provider's decision depends on whether or not the service is covered by a payer and how profitable to deliver it.

It is expected to reduce overuse through value-based physician payment mechanisms. Global or bundled payment models could reduce incentives of overuse and allow great provider discretion in providing services within the most clinically appropriate levels. Pay-for-performance, in which providers receive financial rewards or penalties based on their performance on a set of quality measures could reduce patients' out-of-pocket costs of preventive care but has limited potential to reduce the provision of low-value services, due to the small number of quality measures available to identify low-value services. While translating more recommendations into measurable specification of low-value services, reducing overuse could play a more important role in provider payment reform and value-based purchasing.

Patient-based efforts

Longstanding social cultural perspective leading to patient demand is another important driver for overuse. There is a cultural assumption that more services equal to better care. Professional and cultural biases favor delivering a health care service even if there is doubt about its potential benefits. Patients have lack of knowledge on the risks and harms involved with low-value services. On the other hand, providers fear of patients'

dissatisfaction or unmet expectations. For example, patients with low back pain have higher levels of satisfaction when they received routine imaging tests, although clinical outcomes were not different from those patients who did not receive imaging [109].

Consumer education efforts are critical. The Choosing Wisely campaign is an important step to promote conversations between providers and patients on the overuse of low-value health services. Whereas professional agencies long have promoted practice guidelines, guidelines generally were disseminated within the confines of teaching hospitals, peer-reviewed journals, and academic conferences. The Choosing Wisely campaign involved a more public process, collaborating with Consumer Reports to create educational materials on low-value care specifically directed toward patients, presenting accessible information on websites and magazines to amplify the campaign's key messages. It would help patients to understand the risks and benefits of certain services and to switch from the perception that more care is always better. It also would encourage patients to ask more questions and discuss with health care providers. As a patient becomes an active part of the care system, providers could make more informed decision regarding choosing care. It allows physicians to say no and still maintain a high level of patient satisfaction. Finally, it helps to promote more efficient use of health care resources.

Payer-based efforts

This study demonstrated how a private sector health insurance plan could monitor the use of services that have been designated as low-value. About seven percent of claims were rejected for studied services. The payer incorporated both government and

commercial plan products. Medicare did not deny many claims and government plan enrollees were more likely to get overuse. There are significant gaps between guidelines and actual clinical practice. The results could provide guidance for payers and policymakers to facilitate effective payment policies.

At the payer level, simply stopping the provision of coverage for low-value services could have a dramatic effect on overuse. For example, payers can restrict the frequency with which a service is prescribed or remove the service from their coverage criteria. Most insurers pay for a colonoscopy only every four years, unless there is a medical reason for more frequent screenings. However, Medicare's coverage and reimbursement rules make it hard to track the appropriateness of services provided. While Medicare is obligated to follow the medical guidelines to cover new preventive services, it has no mandate to deny coverage for newly non-recommended services. Only four of the 39 quality measures in the 2011 HEDIS that commonly are used by government and commercial payers to assess care quality and overuse [22]. This highlights the importance of translating evidence of low-value care into payment policy by developing quality measures.

The patient's type of health plan influences provider's advice to patients. Commercial payers, who bear the majority of low-value services costs analyzed in this study, could use estimates of low-value services utilization as an external benchmark for their own quality improvement work. Payment models reward volume of services, commercial payers could use these data to aid in developing incentive structures and reforming payment mechanisms for providers and patients to discourage use of low-value

services. For example, there are ongoing efforts to provide fair compensation without excessive incentives for advance imaging to address financial incentives [106]. Some health plans require pre-authorization for outpatient imaging services, including MRI and CT scans. However, the denial of claims for low-value services or a pre-authorization requirement might risk a return to the managed care backlash of the 1990s.

Value-based insurance benefit designs are gaining prominence as an efficient way to facilitate effective care and lower out-of-pocket costs. It increases patient's out-of-pocket costs for services with uncertain benefits (low-value) and reduce cost-sharing for services which clinical benefits exceed the cost (high-value). The goal of value-based insurance design is encouraging patients to consider the value of care by shifting costs to the patient for low-value services. However, assigning deductible or copayments rates is challenging because the discretion needed on individual level. Research shown increasing patient cost-sharing could reduce use of both low-value and high-value care [141]. Patient cost-sharing in commercial insurance could only reduce use of low-value care if they have enough information and support to make good decisions. In addition, preventive services must be covered in full under Affordable Care Act since 2010.

Revising reimbursement schedules may prompt resistance from consumers and providers. Partnership between payers and the Choosing Wisely campaign provides another way to increase patient accountability for those demanding low-value services by encouraging enrollees to talk to their providers about the type and value of care they are receiving. Third-party payers are collaborating in creating high-impact lists of low-value services, and estimate the volume and cost of services.

In conclusion, this analysis suggests that Choosing Wisely recommendations combined with provider and patient education might be insufficient to reduce overuse. Nevertheless, results from this study have the potential to begin conversations leading to attitudes and behavioral changes among providers and patients about resource use and support shared decision-making. The findings provide solid scientific evidence to foster researcher's further academic inquiry, but do not automatically suggest a readily intervention on regulatory policies or payment reforms.

By examining patient and provider-level correlates of use of selected low-value services, this study provides implications of what specific attributes most influence the overuse; when services were inappropriately delivered; which providers inappropriately and more frequently use than other providers. Health plans could identify clinics and physicians with high levels of overuse, and target their quality and costs efforts on those providers. Informed clinical and policy interventions could be developed, together with benefit designs and reimbursement changes.

In general, this issue of overuse involves stakeholders at all levels, including federal, state, and local governments; public and private insurers; health care delivery organizations; employers; patients and consumers, etc. If guidance on low-value care were adopted broadly, many elements could work together with the shared objectives of controlling health care costs and improving health care quality, to achieve a continuously learning health care system.

Limitations

Limitation of Data

This study has several limitations. The main limitation is the reliance on administrative claims to measure use of low-value services. Administrative claims have some inherent limitations common to all analyses using this type of data. As claims data are collected for the purpose of payment, not research, there are limits to the degree to which claims data can accurately capture an individual's medical and pharmacy history. While they are excellent for understanding “real world” patterns of health outcomes, these data may not provide the clinical nuance needed to identify certain scenarios of low-value care. This retrospective study looked back for only one year’s medical history. Any medical diagnoses or use of health services that occurred prior to the study period could not be observed. The patient’s entire past medical history and all laboratory results are not available in claims data. It is difficult to determine clinically low-value care and measure utilization without clinical information that accurately captures the decision making of providers. For example, because the patient’s first outpatient or emergency visit occurs after the onset of low back pain, it is likely that some patients with long-term, untreated chronic back pain were marked as receiving low-value imaging tests may in fact have received care appropriately. Even after restricting the analysis to relatively unambiguous measures, data demands are substantial.

Medical record data capture the clinical circumstances that led to ordering a service and provide detailed information on the clinical context to determine whether the service was low-value. However, challenges are not unique to claims-based analyses

alone, and in fact, it is hard to assess appropriateness of health services even from medical records. Appropriateness under certain circumstances has to be reviewed and determined on an individual basis according to disease history, clinical symptoms, previous screening results, predicted intervention risks, family history, life expectancy, and patient preference. A service that is low-value in some clinical circumstances might be high-value in others. The clinical heterogeneity makes it challenging to develop measures for identifying low-value services. Negative diagnosis history is not sufficient to make the exclusion criteria. Guidelines developed by professional agencies generally do not precisely define the overuse measures and applicable population. For example, they differ as to how they define “non-specific” low back pain and low back pain with “red flags”. There are also ambiguous definitions indicated by terms “low-risk”, “average-risk”, “asymptomatic” or “routine” describing the population or intensities. Consequently, these nuances in specification or exclusion criteria (e.g. starting/ending age and interval for screening, red flag symptoms in diagnostic imaging) would produce conflicting results and impede researchers from further investigation.

These data deficiencies present fundamental obstacles for identifying and measuring all low-value services specified by professional agencies. This study made a diligent effort to mitigate the impact by providing justification in identification criteria. I focused on services that were most likely to be clinically low-value and believe they are highly conservative starting points to estimate prevalence of each service, associated spending, and correlates of utilization.

Limitation on Costs

While estimates of prevalence could be an upper bound on how many low-value services had taken place, the actual costs are larger than reported in this study. As noted, this study was not able to capture full extent of how much money was unnecessarily paid for these low-value services, because claims spending estimates did not include downstream services that result from initial services.

Another limitation on costs to this study is the lack of information on Medicare payments in private health plan claims data. Among the estimated \$4.2 million of claimed unnecessary annual expenditure, only one-third of them were allowed. The understated allowed amounts were due to the limitation of commercial claims data on aging populations. For services performed on Medicare Cost enrollees, the costs were zero if Medicare paid in full. For enrollees covered by more than one plan, only the portion of costs allowed by the health plan from which the data was obtained are presented in this study.

Limitation on Model

Although this study controlled for known patient and provider characteristics, a limitation exists in this study is that not all potential factors affecting overuse in the conceptual model were adjusted in the analytic model. In real clinical practice, provider and patient engage in a more complicated circumstance of decision-making. Previous studies reported that physician characteristics associated with overuse include doctor's perception and desire to satisfy patient's expectation [142, 143]. Other studies focused on

system-level interventions to reduce overuse. Decision support systems and shared decision-making with patients has been shown to reduce unnecessary tests, improve physician-patient's communication, and their knowledge and adherence to clinical guidelines [144-146]. In addition, organization and practice-level variables were not incorporated due to the inability to capture the information through claims data. Another important variable not included in the model due to lack of data is the enrollment in high deductible health plan (HDHP). Nonetheless, the association of health plan product and use of low-value care are statistically significant.

Limitation on Generalizability

This study is also subject to a set of limitations associated with generalizability. I found patient- and provider level correlates and their relative contribution widely varied for the five selected cohorts. The results cannot be generalized to all services designated as overuse. Given the clinical nuance, not all of the recommendations can be readily measured using administrative data. The studied low-value services may not be sufficient but would be a step to call for including more measures.

The results from Minnesota may not be nationally generalizable. Previous studies suggest substantial regional variations in low-value care [147]. Commercial data are not distributed evenly across regions, prevalence rates could vary more than threefold between different Hospital Referral Regions [135]. For example, colonoscopy is the most expensive preventive cancer screening test. According to the Healthcare Blue Book from Consumer Reports, colonoscopy pricing frequently varies by over 300 percent nationally depending on where to receive care [148]. In addition, some low-risk patients may have

been treated as high-risk in areas with more intense health care delivery. This could be due to regional provider practice patterns, capacity to adapt to change, practice organization characteristics, or other unmeasured provider and patient factors.

Data in this study were collected from a region with a high reputation for efficient care delivery, so the use of low-value services may not be representative of the overall use in the U.S. The rates of low-value services may be higher in other geographic locations where there are fewer large multispecialty group practices with extensive quality assurance programs in place. In addition, the estimated associated costs could be more conservative than nationally due to state-level efforts. Further research is needed to understand the mechanisms behind this regional difference.

Directions for Future Research

This study identified five measurable low-value services from administrative claims data. A critical next step in reducing overuse is to perform separate analyses of more low-value services. Prior studies are limited because they consolidated a list of different low-value services in one model and did not specifically identify individual services. As reported in this study, different services could have different attributes contributing to the variation of overuse. Correlates and their relative contribution are not generalizable to all low-value services. This study builds on and improves the literature by modeling individual services separately. However, I analyzed only five measures of low-value services. The volume of low-value services and associated health care spending may appear small in one health plan. Selected services account for just a small subset of hundreds of low-value services identified by professional agencies. A study using Medicare data reported 3 to 12 percent of Medicare beneficiaries older than 75 underwent PSA screening in 2008 to 2009, if this test were eliminated, it would have reduced overall Medicare spending by only 0.01 to 0.03 percent [40]. However, there are many more low-value services that need to be evaluated, including those major, substantial, revenue-generating services for providers. There are a limited number of low-value services that could be readily measured easily using administrative claims data. A large clinical database from electronic medical records would support a more extensive assessment with an additional set of indicators. It could also expand the current set of five measures to look at down-stream costs of additional testing and procedures. I hope this study will inspire follow-up research to include a broader set of low-value services with

expanded data. The potential impact of reduction in low-value services could be even larger.

Additionally, I am interested in what clinic-level and organizational factors are associated with low-value care. Potential measurable clinic characteristics include: (1) clinic size (number of FTE physicians, e.g. MD or DO, number of FTE physician extenders, e.g. physician assistants, registered nurses, licensed practical nurses, and MD trainees). (2) Ownership of practice (hospital-owned, physician-owned, other-owned). (3) Type of practice (primary care only, single specialty, e.g. gynecology only, multi-specialty, e.g. primary care and gynecology, neither). (4) Specialties in the practice (e.g. gynecology, urology, gastroenterology). (5) Volume of services (e.g. how many PSA tests ordered per month per clinic). (6) EHR capabilities (e.g. number of years since adoption of EHR, computerized physician order entry). Ultimately, this will allow further study to examine the practice patterns determinants of overuse and develop interventions at the practice level.

This study used data from 2012 and prior. Choosing Wisely campaign and other initiatives become influential since 2012. Another direction for future research is to examine the effects of the Choosing Wisely initiatives and related programs on use of the specified services with longitudinal data. It would be interesting to assess impacts of the local implementation on these recommendations. Allowing time for adequate dissemination, I will be glad to see the initiatives make a difference for the benefit of patients, and the national health care system.

Tables

Table 1 Agencies Recommend against Low-value Cervical Cancer Screening

Source	Guideline	Year
American Cancer Society (ACS) American Society for Colposcopy and Cervical Pathology (ASCCP) American Society for Clinical Pathology (ASCP)	Cervical cancer screening should begin at age 21 years. Women aged younger than 21 years should not be screened regardless of the age of sexual initiation or other risk factors. HPV testing should not be used to screen women aged 21 to 29 years, either as a stand-alone test or as a co-test with cytology.	2012
United States Preventive Services Task Force (USPSTF)	The USPSTF recommends against screening for cervical cancer in women younger than age 21 years. The USPSTF recommends against screening for cervical cancer with HPV testing, alone or in combination with cytology, in women younger than age 30 years.	2012
American Congress of Obstetricians and Gynecologists (ACOG)	Women aged <21 years should not be screened regardless of age at sexual initiation and other behavior-related risk factors. HPV co-testing should not be performed in women aged <30 years.	2012
National Physicians Alliance (NPA)	Don't perform Pap tests on patients younger than 21 years	2011
American Academy of Family Physicians (AAFP)	Don't perform Pap tests on women younger than 21	2012
American Academy of Family Physicians (AAFP)	Do not screen women younger than 30 years of age for cervical cancer with HPV testing, alone or in combination with cytology.	2013
National Committee for Quality Assurance (NCQA)	Adolescent females 16-20 years of age should not be screened for cervical cancer	2014
Institute for Clinical Systems Improvement (ICSI)	Recommend against cervical cancer screening regardless of age of onset of sexual activity for women <21 years old	2012

Table 2 Agencies Recommend against Low-value Prostate Cancer Screening

Source	Guideline	Year
USPSTF	Recommends against prostate-specific antigen (PSA)-based screening for prostate cancer.	2012
AAFP	Do not routinely screen for prostate cancer using a prostate-specific antigen (PSA) test or digital rectal exam.	2012
American College of Physicians (ACP)	Do not screen for prostate cancer in men older than 75 years or with a life expectancy of less than 10 years.	2012
American Urological Association (AUA)	Not recommend routine PSA screening in men age 70+ years or any men with less than a 10-15 year life expectancy	2013
National Committee for Quality Assurance (NCQA)	Recommends against prostate cancer screening using prostate-specific antigen (PSA)-based testing in Men 70 years and older	2015

Table 3 Agencies Recommend against Low-value Colorectal Cancer Screening

Source	Guideline	Year
USPSTF	Recommends against routine screening for colorectal cancer in adults ages 76 to 85 years.	2008
USPSTF	Recommends against screening for colorectal cancer in adults older than age 85 years.	2008
American College of Physicians (ACP)	Do not screen for colorectal cancer in adults older than 75 years or in adults with a life expectancy of less than 10 years.	2012
National Committee for Quality Assurance (NCQA)	Recommend against colorectal cancer screening in adults 86 years and older.	2015

Table 4 Agencies Recommend against Low-value Low Back Pain Imaging

Source	Guideline	Year
American Association of Neurological Surgeons (AANS) Congress of Neurological Surgeons (CNS)	Do not obtain imaging (plain radiographs, magnetic resonance imaging, computed tomography [CT], or other advanced imaging) of the spine in patients with non-specific acute low back pain and without red flags.	2014
American College of Physicians (ACP)	Do not obtain imaging studies in patients with non-specific low back pain.	2012
American College of Physicians (ACP) American Pain Society (APS)	Clinicians should not routinely obtain imaging or other diagnostic tests in patients with nonspecific low back pain.	2007
American Society of Anesthesiologists (ASA)	Avoid imaging studies (MRI, CT or X-rays) for acute low back pain without specific indications.	2014
North American Spine Society (NASS)	Do not recommend advanced imaging (e.g., MRI) of the spine within the first six weeks in patients with non-specific acute low back pain in the absence of red flags.	2013
American Academy of Physical Medicine and Rehabilitation (AAPMR)	Do not order an imaging study for back pain without performing a thorough physical examination.	2014
National Institute for Health and Care Excellence (NICE)	Do not offer X-ray of the lumbar spine for the management of non-specific low back pain.	2009

National Physicians Alliance (NPA)	Don't do imaging for low back pain within the first 6 weeks unless red flags are present	2011
National Committee for Quality Assurance (NCQA)	Use of imaging studies (plain x-ray, CT scan, MRI) within 28 days of the primary diagnosis of low back pain	2013
Institute for Clinical Systems Improvement (ICSI)	Clinicians should not recommend imaging (including computed tomography, magnetic resonance imaging and x-ray) for patients with non-specific low back pain Clinicians should not recommend imaging (including computed tomography, magnetic resonance imaging and x-ray) for patients in the first six weeks of radicular pain	2012

Table 5 Government Plan Types and Description

Plan Type	Product	Description
Medicare	Medicare Advantage (Part C)	A type of Medicare health plan offered by a private company that contracts with Medicare to provide Part A and Part B benefits.
	Medicare Cost	A plan provides options to use in-network providers with lower costs or use out-of-network providers covered under original Medicare Part A and Part B benefits.
	Medicare Special Needs Plan (SNP)	A Medicare Advantage plan for people with specific conditions
Medicaid	Prepaid Medical Assistance Plan (PMAP)	Federal-funded plan for low-income families, children, pregnant women, and people with disabilities.
	MinnesotaCare (MNcare)	A state-funded plan for residents who do not have access to affordable health care coverage.
	Special Needs Basic Care (SNBC)	A plan for people with disabilities ages 18-64.
	Minnesota Senior Health Options (MSHO)	A state program for people over age 65 who are dual-eligible for Medical Assistance and Medicare Parts A and B.
	Minnesota Senior Care Plus (MSC+)	A federal and state-funded plan for low-income seniors over age 65.

Table 6 Definitions for Overuse Measures with Study Sample Inclusion and Exclusion Criteria

Measure	Service Definition	Denominator	Denominator Exclusions	Numerator
Cervical cancer screening for young women	Females 13 to 29 years of age who were screened unnecessarily for cervical cancer	All female enrollees age 13 years as 1/1/2012 to 20 years as of 12/31/2012	<ul style="list-style-type: none"> • All denominator patients with any gap of more than one month in enrollment during 2012 • All denominator patients with any diagnosis from 1/1/2011 to 12/31/2012, identified as: <ul style="list-style-type: none"> • Cervical Cancer (<u>Cervical Cancer Codes</u>) • HIV (<u>HIV Codes</u>) • Immunodeficiency (<u>Disorders of the Immune System Codes</u>) 	All denominator patients receiving Pap tests (<u>Cervical Cytology Codes</u>) during 2012.
		All female enrollees age 13 years as 1/1/2012 to 29 years as of 12/31/2012		All denominator patients receiving HPV Tests (<u>HPV Tests Codes</u>) during 2012.
Prostate cancer screening for men 75 years and older	Men 75 years and older who were screened unnecessarily for prostate cancer using prostate-specific antigen (PSA)-based screening	All male enrollees 75 years or older as of 1/1/2012.	<ul style="list-style-type: none"> • All denominator patients with any gap of more than one month in enrollment during 2012 • All denominator patients with any diagnosis from 1/1/2011 to 12/31/2012, identified as: <ul style="list-style-type: none"> • Prostate Cancer (<u>Prostate Cancer Codes</u>) • Prostate Dysplasia (<u>Prostate Dysplasia Codes</u>) • Prostatectomy (<u>Prostatectomy Codes</u>) • All denominator patients with any diagnosis from 1/1/2011 to 12/31/2011, identified as: <ul style="list-style-type: none"> • Elevated PSA (<u>Elevated PSA Codes</u>) 	All denominator patients receiving PSA tests (<u>PSA Tests Codes</u>) during 2012.

<p>Colorectal cancer screening for adults older than 75 years</p>	<p>Members 76 years and older who were screened unnecessarily for colorectal cancer</p>	<p>All enrollees age 76 years or older as of 1/1/2012.</p>	<ul style="list-style-type: none"> • All denominator patients with any gap of more than one month in enrollment during 2012 • All denominator patients with any diagnosis from 1/1/2011 to 12/31/2012, identified as: <ul style="list-style-type: none"> • Colorectal Cancer (<u>Colorectal Cancer Codes</u>) • Iron deficiency anemia, lower gastrointestinal bleeding, Crohn's Disease, familial adenomatous polyposis, Lynch syndrome, inflammatory bowel disease, ulcerative colitis, abnormal findings of gastrointestinal tract, changes in bowel habits, or a personal or family history of colorectal cancer (<u>CRC Exclusions Codes</u>) 	<p>All denominator enrollees receiving colorectal cancer screening during 2012, identified as:</p> <ul style="list-style-type: none"> • Colonoscopy (<u>Colonoscopy Codes</u>) • Flexible sigmoidoscopy (<u>Flexible Sigmoidoscopy Codes</u>) • Fecal occult blood test (<u>FOBT Codes</u>) • Barium enema (<u>Barium Enema Codes</u>) • CT colonography (<u>CT Colonography Codes</u>) • Fecal DNA test (<u>Fecal DNA Codes</u>)
<p>Imaging studies for non-specific low back pain</p>	<p>Patients with a primary diagnosis of low back pain receiving an imaging study (plain x-ray, MRI, CT scan) within four weeks of the diagnosis.</p>	<p>All enrollees age 18 years as of 1/1/2012 to 50 years as of 12/31/2012 with any primary diagnosis of low back pain in 2012, identified as:</p> <ul style="list-style-type: none"> • Outpatient visit (<u>Outpatient Codes</u>), with a primary diagnosis of low back pain (<u>Low Back Pain Codes</u>) • Observation visit (<u>Observation Codes</u>), with a primary diagnosis of low back pain (<u>Low Back Pain Codes</u>) • ED visit (<u>ED Codes</u>), with a primary diagnosis of low back pain (<u>Low Back Pain Codes</u>) • Osteopathic Manipulative Treatment (<u>Osteopathic Manipulative Treatment Codes</u>), 	<ul style="list-style-type: none"> • All denominator patients with any gap in enrollment during 2012 • All denominator patients with any diagnosis of low back pain (<u>Low Back Pain Codes</u>) during the 180 days prior to the first primary diagnosis of low back pain in 2012. • All denominator patients with any diagnosis from 1/1/2011 to 28 days after the first primary diagnosis of low back pain in 2012, identified as: <ul style="list-style-type: none"> • Cancer (<u>Malignant Neoplasms Codes</u>, <u>Other Neoplasms Codes</u>, <u>History of Malignant Neoplasm Codes</u>) • Trauma (<u>Trauma Codes</u>) • Intravenous drug abuse (<u>IV Drug Abuse Codes</u>) • Neurologic Impairment 	<p>All denominator patients receiving imaging studies for low back pain (<u>Imaging Study Codes</u>) on the date of the first primary diagnosis of low back pain or within 28 days following the diagnosis during 2012.</p>

		<p>with a primary diagnosis of low back pain (<u>Low Back Pain Codes</u>)</p> <ul style="list-style-type: none"> • Physical Therapy (<u>Physical Therapy Codes</u>), with a primary diagnosis of low back pain (<u>Low Back Pain Codes</u>) 	<p>(<u>Neurologic Impairment Codes</u>)</p> <ul style="list-style-type: none"> • HIV (<u>HIV Codes</u>) • Intraspinal Abscess (<u>Intraspinal Abscess Codes</u>) 	
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Abbreviations: AAFP, American Academy of Family Physicians; AANS, American Association of Neurological Surgeons; AAP, American Academy of Pediatrics; ACOG, American Congress of Obstetricians and Gynecologists; ACP, American College of Physicians; ACR, American College of Radiology; ACS, American College of Surgeons; ACS/ASCCP/ASCP, American Cancer society, American Society for Colposcopy and Cervical Pathology, American Society of Clinical Pathology; AGS, American Geriatrics Society; ASA, American Society of Anesthesiologists; ASCO, American Society of Clinical Oncology; CT, Computerized Tomography; ICSI, Institute for Clinical Systems Improvement; NASS, North American Spine Society; NCQA, National Committee for Quality Assurance; NPA, National Physicians Alliance; USPSTF, U.S. Preventive Services Task Force.

Table 7 Summary of Variables and Data Sources

Level	Category	Variable	Data Source
Patient Characteristics	Demographic factors	Age, gender, race/ethnicity, location, etc.	Member
	Socioeconomic status	Income, education, occupation, etc.	Census
	Health-related factors	Utilization level, comorbid conditions, etc.	ACG
	Insurance plan design	Product type, deductible, out-of-pocket maximum, etc.	Enrollment, Plan design
Provider Characteristics	Demographic factors	Age, gender, etc.	Provider
	Specialty and training	Specialty, sub-specialty, degree, etc.	Provider
	Regional factors	Location, state, etc.	Provider

Table 8 Prevalence of Low-value Health Care Services

Health Care Services	Enrollee at risk	#Adverse event patient (AEP)	#Services performed and claimed	#Services allowed	#Services allowed in full by the health plan	%Enrollee performed and claimed	%Services performed and allowed
Cervical cancer screening for young women	54,146	2,587	3,515	3,153	3,071	4.78%	89.70%
Pap test for women under age 21	28,761	1,493	2,080	1,796	1,747	5.19%	86.35%
HPV test for women under age 30	54,146	1,254	1,435	1,357	1,324	2.32%	94.56%
Prostate cancer screening for men 75 years and older	18,168	2,522	2,935	2,795	2,747	13.88%	95.23%
Colorectal cancer screening for adults older than 75 years	40,944	1,237	1,404	1,324	1,265	3.02%	94.30%
Colonoscopy	40,944	593	670	637	596	1.45%	95.07%
Fecal occult blood test	40,944	604	640	599	590	1.48%	93.59%
Barium enema	40,944	46	51	51	47	0.11%	100.00%
CT colonography	40,944	2	2	2	2	0.00%	100.00%
Flexible sigmoidoscopy	40,944	35	41	35	30	0.09%	85.37%
Low back pain imaging within four weeks of diagnosis	9,383	1,629	2,612	2,477	2,304	17.36%	94.83%
X-ray	9,383	1,303	1,722	1,627	1,530	13.89%	94.48%
CT Scan	9,383	63	72	69	61	0.67%	95.83%
MRI	9,383	626	818	781	713	6.67%	95.48%
Total	941,975		10,466	9,749	9,387		93.15%

Table 9 Costs of Low-value Health Care Services

Health Care Services	\$Services performed and claimed	\$Services allowed	\$Allowed in part by the health plan	\$Allowed in full by the health plan	\$Claimed per test	\$Allowed per test	\$Allowed per capita (Premium impact)
Cervical cancer screening for young women	332,145	169,330	1,872	167,458	94.49	54.53	0.18
Pap test for women under age 21	147,750	74,318	591	73,727	71.03	42.20	0.08
HPV test for women under age 30	184,395	95,012	1,281	93,731	128.50	70.79	0.10
Prostate cancer screening for men 75 years and older	246,588	75,648	281	75,367	84.02	27.44	0.08
Colorectal cancer screening for adults older than 75 years	1,714,475	395,165	81,540	313,625	1,221.14	247.93	0.42
Colonoscopy	1,636,107	370,553	79,336	291,217	2,441.95	488.62	0.39
Fecal occult blood test	30,338	10,731	8	10,723	47.40	18.17	0.01
Barium enema	21,524	5,405	1,509	3,896	422.04	82.89	0.01
CT colonography	1,183	953	0	953	591.50	476.56	0.00
Flexible sigmoidoscopy	25,323	7,523	687	6,837	617.63	227.88	0.01
Low back pain imaging within four weeks of diagnosis	1,856,849	743,312	33,399	709,913	710.89	308.12	0.79
X-ray	241,684	100,802	2,991	97,811	140.35	63.93	0.11
CT Scan	85,135	21,818	1,838	19,980	1,182.42	327.55	0.02
MRI	1,530,030	620,691	28,569	592,122	1,870.45	830.47	0.66
Total	4,150,057	1,383,455	117,091	1,266,364			1.47

Table 10 Patient-level Model Summary Statistics

	Pap test for women under age 21	HPV test for women under age 30	Prostate cancer screening for men 75 years and older	Colorectal cancer screening for adults older than 75 years	Low back pain imaging within four weeks of diagnosis
Health care services					
Patient characteristics					
Age	16.39	20.19	80.25	82.12	36.71
Female	100.00%	100.00%	0.00%	61.12%	57.68%
Neighborhood effects					
Rural	15.44%	15.24%	32.70%	30.12%	18.73%
% White, non-Hispanic	84.97%	84.15%	90.77%	90.07%	86.21%
% High School Degree	59.43%	59.37%	62.60%	61.86%	60.73%
% Bachelor's degree or greater	32.71%	32.56%	28.60%	29.29%	31.26%
% households with income below FPL	9.63%	10.27%	10.52%	10.86%	9.64%
Plan type					
Medicaid	17.32%	16.73%	8.49%	13.74%	9.18%
Commercial	82.68%	83.24%	4.88%	4.51%	90.35%
Medicare	0.00%	0.02%	86.64%	81.74%	0.47%
Prior year health status					
Very healthy users	12.06%	11.64%	3.09%	2.14%	9.97%
Healthy users	18.75%	17.89%	2.84%	2.82%	12.11%
Low health risk	29.40%	23.82%	3.42%	3.22%	16.09%
Moderate health risk	32.82%	35.77%	42.57%	45.01%	48.67%
High health risk	6.28%	10.13%	26.99%	27.30%	11.54%
Very high health risk	0.69%	0.74%	21.08%	19.50%	1.63%
Observations	22,826	42,793	15,505	35,100	7,193
AEP	1,147	959	2,103	1,081	1,250
Prevalence	5.02%	2.24%	13.56%	3.08%	17.38%

Table 11 Full-model Summary Statistics

	Pap test for women under age 21	HPV test for women under age 30	Prostate cancer screening for men 75 years and older	Colorectal cancer screening for adults older than 75 years	Low back pain imaging within four weeks of diagnosis
Health care services					
Patient characteristics					
Age	16.37	20.29	80.25	82.10	36.74
Female	100.00%	100.00%	0.00%	62.08%	57.95%
Neighborhood effects					
% White, non-Hispanic	86.06%	84.97%	90.08%	89.26%	86.08%
% High School Degree	59.33%	59.39%	61.24%	60.69%	60.65%
% Bachelor's degree or greater	33.13%	32.76%	30.45%	30.92%	31.34%
% households with income below FPL	9.33%	10.06%	10.10%	10.42%	9.59%
Plan type					
Medicaid	17.82%	17.20%	8.27%	12.45%	9.15%
Commercial	82.18%	82.80%	3.28%	2.54%	90.35%
Medicare	0.00%	0.00%	88.45%	85.01%	0.50%
Prior year health status					
Very healthy users	8.30%	8.23%	1.18%	0.93%	9.80%
Healthy users	16.99%	16.68%	1.48%	1.50%	12.45%
Low health risk	30.50%	24.49%	2.60%	2.49%	16.05%
Moderate health risk	36.29%	39.07%	42.28%	44.77%	48.55%
High health risk	7.10%	10.70%	29.14%	29.29%	11.53%
Very high health risk	0.82%	0.84%	23.33%	21.03%	1.62%
Provider characteristics					
Age	45.45	45.11	51.06	50.23	45.42
40- years old	33.22%	35.31%	17.00%	18.80%	33.29%
40 to 49 years old	29.68%	28.81%	24.08%	26.03%	29.05%
50 to 59 years old	27.24%	26.04%	35.83%	34.54%	28.31%

60+ years old	9.86%	9.84%	23.09%	20.64%	9.35%
Female	71.56%	72.37%	19.68%	35.29%	29.21%
Rural	14.50%	14.07%	24.34%	22.97%	20.80%
Credentialing					
Physician extenders	28.11%	29.60%	11.71%	12.79%	59.25%
Physician	71.89%	70.40%	88.29%	87.21%	40.75%
Specialty					
Primary care provider	92.43%	83.60%	100.00%	99.16%	35.33%
Ob-gynecologist	7.57%	16.40%	0.00%	0.84%	0.00%
Orthopedist	0.00%	0.00%	0.00%	0.00%	2.23%
Chiropractor	0.00%	0.00%	0.00%	0.00%	49.11%
Other Specialist	0.00%	0.00%	0.00%	0.00%	13.33%
Observations	14,418	27,330	10,091	23,129	6,375
AEP	872	747	1,834	880	1,122
Prevalence	6.05%	2.73%	18.17%	3.80%	17.60%

Table 12 Marginal Effects (percentage-point change) of Patient Characteristics Associated with Probability of Overuse

Variables	Pap test for women under age 21		HPV test for women under age 30		Prostate cancer screening for men 75 years and older		Colorectal cancer screening for adults older than 75 years		Low back pain imaging within four weeks of diagnosis	
Patient Demographics										
Age (Year)	3.45	***	0.39	***	-1.29	***	-0.39	***	-0.03	
	(0.11)		(0.02)		(0.08)		(0.03)		(0.05)	
Female (Ref=Male)							0.24		1.56	*
							(0.19)		(0.93)	
Neighborhood Effects										
Rural (Ref=Urban)	0.61		-0.23		-2.86	***	0.28		0.38	
	(0.41)		(0.21)		(0.63)		(0.24)		(1.28)	
% White, non-Hispanic	0.02	**	0.00		-0.03		-0.01	**	-0.01	
	(0.01)		(0.00)		(0.02)		(0.01)		(0.03)	
% High school degree only	-0.07	*	-0.02		-0.03		-0.07	**	-0.05	
	(0.04)		(0.02)		(0.09)		(0.03)		(0.14)	
% Bachelor's degree or higher	-0.08	**	0.00		0.11		-0.03		-0.09	
	(0.03)		(0.02)		(0.07)		(0.02)		(0.12)	
% Income below FPL	0.02		0.00		-0.07		-0.01		-0.24	***
	(0.02)		(0.01)		(0.05)		(0.02)		(0.08)	
Plan Type (Ref=Medicaid)										
Commercial	-1.08	**	-0.03		-3.84	***	-0.91	***	1.28	
	(0.46)		(0.21)		(1.01)		(0.33)		(1.60)	
Medicare			4.71		7.05	***	1.37	***	-1.86	
			(7.03)		(0.82)		(0.24)		(6.19)	

Prior-year Health Status (Ref=Very healthy users)

Healthy users	1.48 *** (0.42)	0.58 *** (0.21)	5.61 *** (1.55)	0.32 (0.55)	0.65 (1.88)
Low health risk	2.32 *** (0.42)	1.07 *** (0.22)	10.42 *** (1.66)	1.26 ** (0.59)	-0.04 (1.76)
Moderate health risk	3.00 *** (0.38)	1.70 *** (0.20)	11.54 *** (0.89)	1.97 *** (0.40)	1.24 (1.55)
High health risk	4.90 *** (0.66)	1.21 *** (0.26)	11.45 *** (0.95)	2.33 *** (0.42)	3.71 * (2.03)
Very high health risk	3.31 * (1.79)	0.93 (0.78)	8.49 *** (0.97)	1.67 *** (0.43)	2.64 (3.96)
Observations	22,826	42,793	15,505	35,100	7,193

Percentage Points Change, (Standard Errors)

*** p<0.01, ** p<0.05, * p<0.1

Table 13 Marginal Effects (percentage-point change) of Provider Characteristics Associated with Probability of Overuse

Variables	Pap test for women under age 21		HPV test for women under age 30		Prostate cancer screening for men 75 years and older		Colorectal cancer screening for adults older than 75 years		Low back pain imaging within four weeks of diagnosis	
Patient Demographics										
Age (Year)	4.03	***	0.44	***	-1.65	***	-0.46	***	-0.04	
	(0.17)		(0.02)		(0.10)		(0.04)		(0.05)	
Female (Ref=Male)							0.23		0.92	
							(0.27)		(0.94)	
Neighborhood Effects										
% White, non-Hispanic	0.03	**	0.00		0.00		-0.01		0.00	
	(0.01)		(0.01)		(0.03)		(0.01)		(0.03)	
% High school degree only	-0.12	**	0.00		-0.07		-0.12	***	-0.08	
	(0.05)		(0.03)		(0.12)		(0.04)		(0.14)	
% Bachelor's degree or higher	-0.13	***	0.01		0.03		-0.09	***	-0.13	
	(0.05)		(0.02)		(0.10)		(0.03)		(0.12)	
% Income below FPL	0.03		-0.01		-0.10		-0.03		-0.25	***
	(0.03)		(0.01)		(0.06)		(0.02)		(0.09)	
Plan Type (Ref=Medicaid)										
Commercial	-0.89		0.02		-4.75	***	-0.59	**	1.43	
	(0.65)		(0.28)		(1.82)		(0.71)		(1.63)	
Medicare					6.76	***	1.05	***	1.69	
					(1.34)		(0.39)		(6.69)	
Prior-year Health Status (Ref=Very healthy users)										
Healthy users	0.59		0.12		9.03	**	-0.02		1.78	
	(0.76)		(0.37)		(3.90)		(1.37)		(1.89)	
Low health risk	1.03		0.48		12.99	***	0.42		0.80	
	(0.72)		(0.36)		(3.26)		(1.27)		(1.78)	
Moderate health risk	1.35	**	1.10	***	9.91	***	1.13		2.42	

	(0.69)	(0.34)	(2.46)	(1.08)	(1.53)
High health risk	3.27 ***	0.59	8.61 ***	1.27	4.81 **
	(0.98)	(0.41)	(2.48)	(1.08)	(2.04)
Very high health risk	0.78	0.71	5.44 **	0.75	-0.75
	(2.57)	(1.13)	(2.54)	(1.08)	(3.87)
Provider Characteristics					
Age (Ref=40- years old)					
40 to 49 years old	0.89 *	-0.05	0.62	-0.20	-0.72
	(0.48)	(0.26)	(1.33)	(0.40)	(1.29)
50 to 59 years old	0.73	-0.22	2.75 **	0.16	-1.27
	(0.50)	(0.26)	(1.31)	(0.39)	(1.29)
60+ years old	0.68	-0.06	3.04 **	0.91 *	-1.98
	(0.76)	(0.40)	(1.52)	(0.52)	(1.78)
Female (Ref=Male)	1.39 ***	0.77 ***	0.27	0.55 *	-2.53 **
	(0.46)	(0.24)	(1.20)	(0.33)	(1.13)
Rural (Ref=Urban)	1.41 **	-0.31	-0.28	1.13 ***	1.32
	(0.63)	(0.30)	(1.18)	(0.39)	(1.26)
Credentialing (Ref=Physician extenders)					
Physician	0.15	0.14	4.61 ***	0.89 **	1.06
	(0.44)	(0.23)	(1.31)	(0.38)	(1.62)
Specialty (Ref=PCP)					
Ob/gynecologist	3.10 ***	1.43 ***		-0.56	
	(0.67)	(0.31)		(1.36)	
Orthopedist					35.42 ***
					(4.65)
Chiropractor					-14.21 ***
					(1.72)
Other Specialist					2.75
					(1.79)
Observations	14,418	27,330	10,091	23,129	6,375
Number of groups	6,148	8,773	3,408	5,635	4,080

Percentage Points Change, (Standard Errors)

*** p<0.01, ** p<0.05, * p<0.1

Figures

Figure 1 Conceptual Model

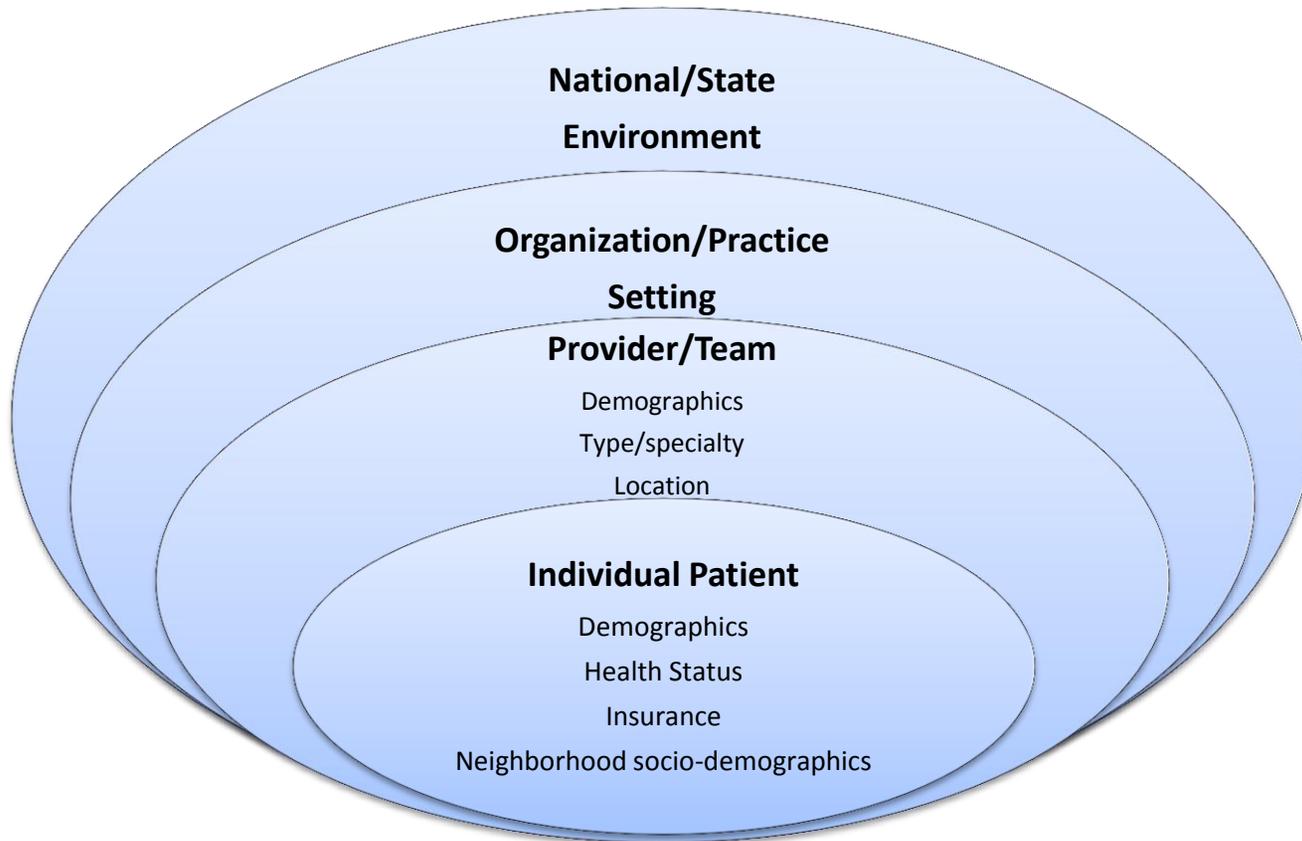


Figure 2 Attribution of Patients to Providers

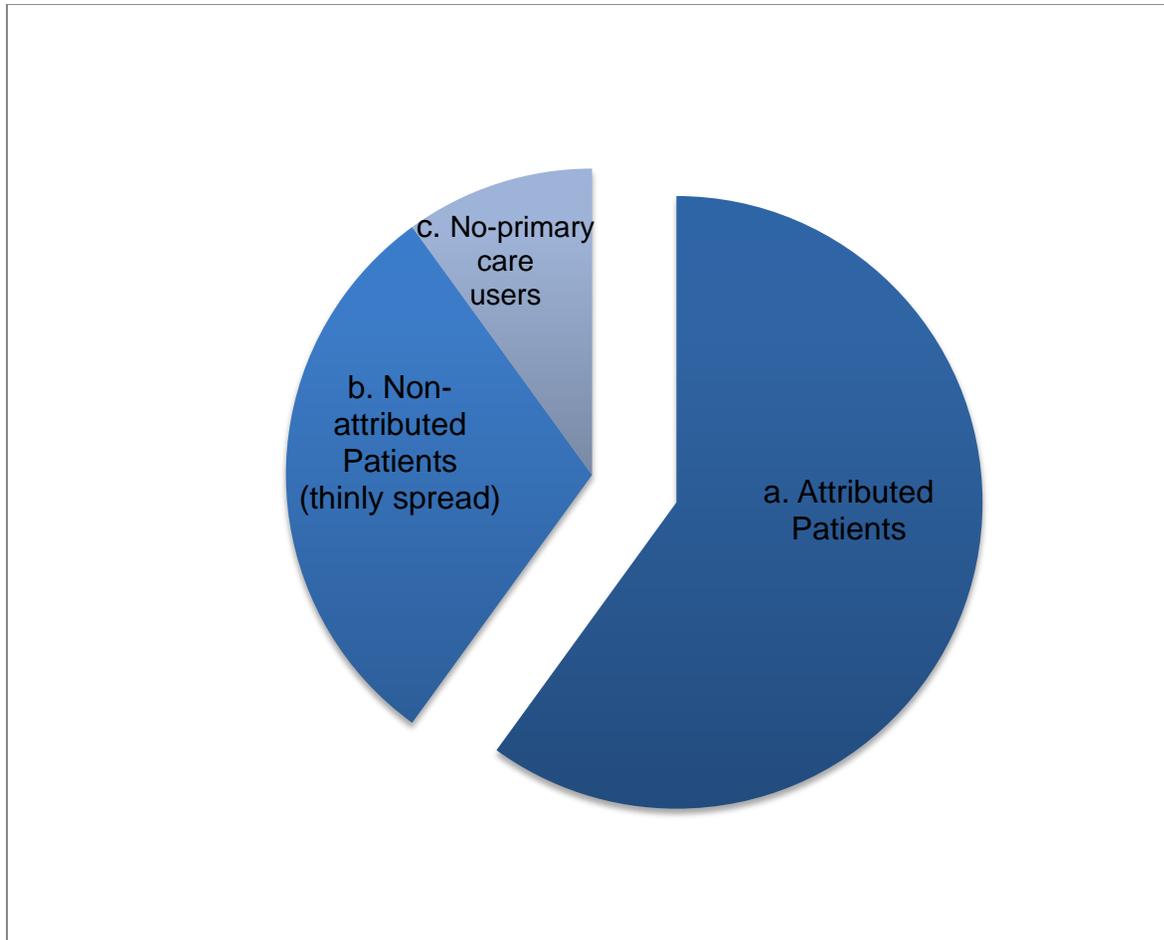


Figure 3 Medical Claims Breakdown

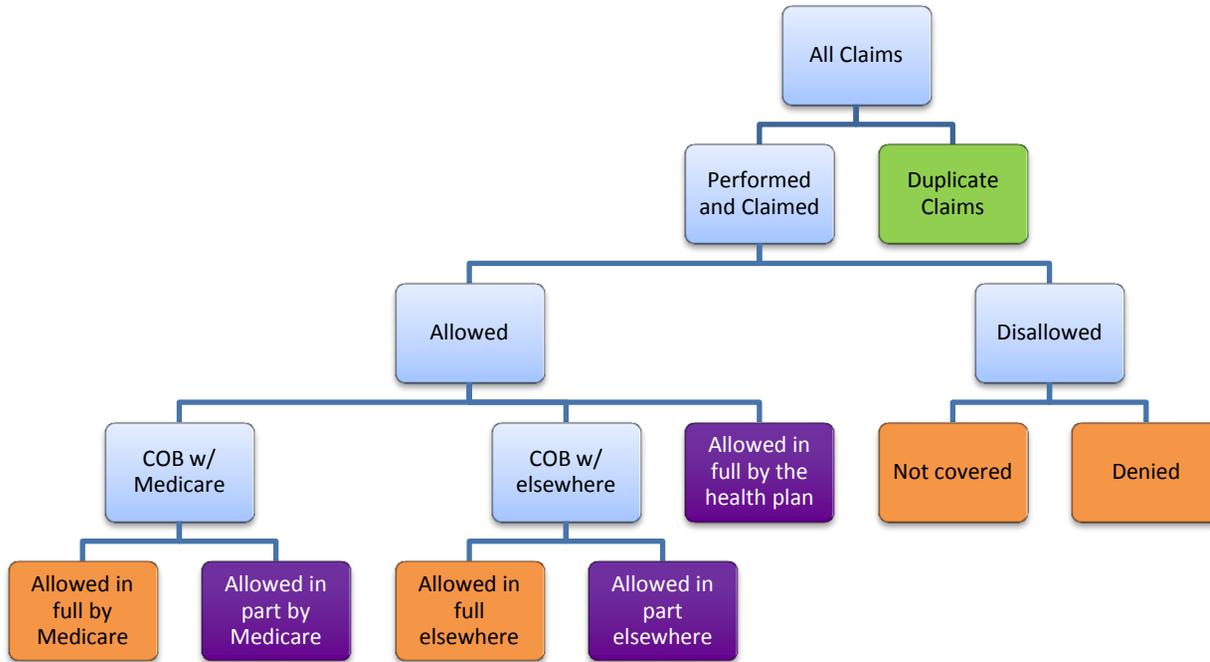


Figure 4 Prevalence and Costs of Low-value Services Breakdown

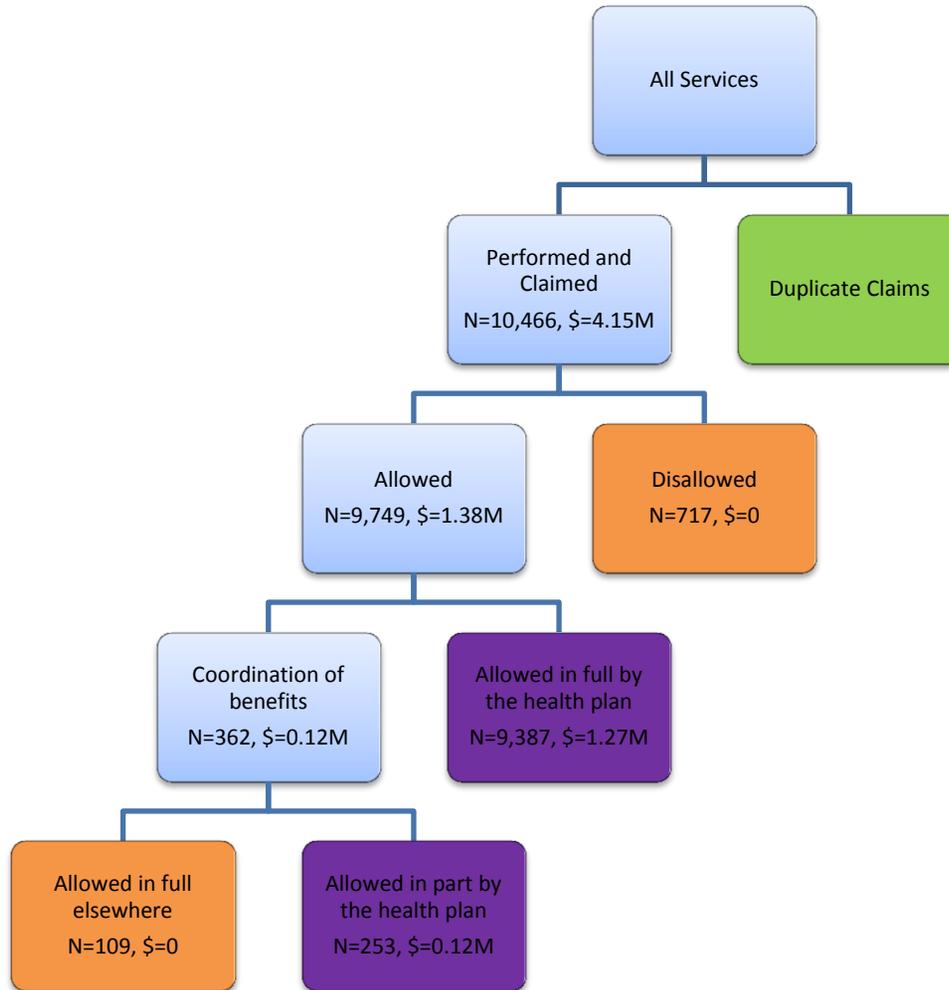


Figure 5 Patient-level Model Marginal Effects (percentage-point change) of Prior Year Health Status Associated with Probability of Overuse

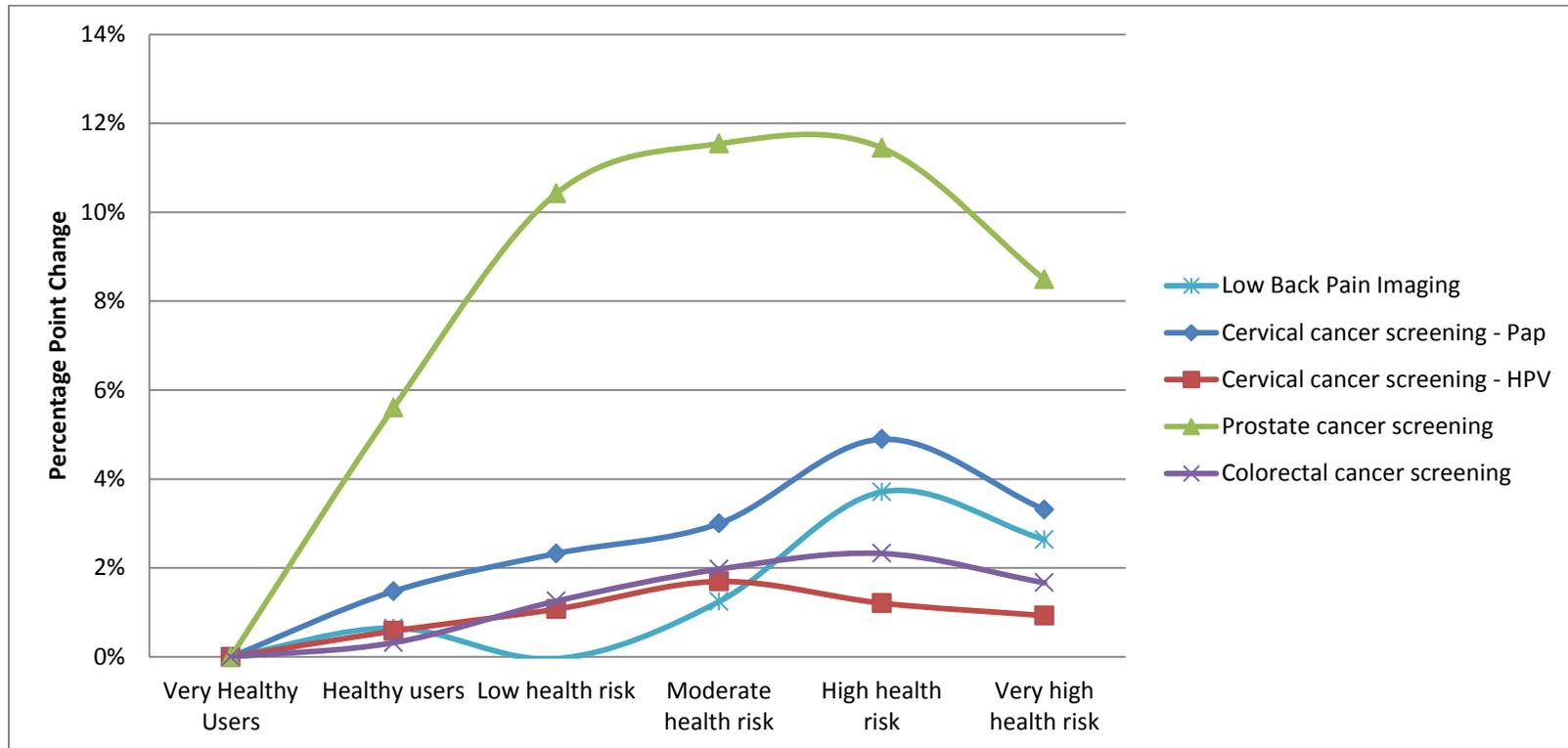
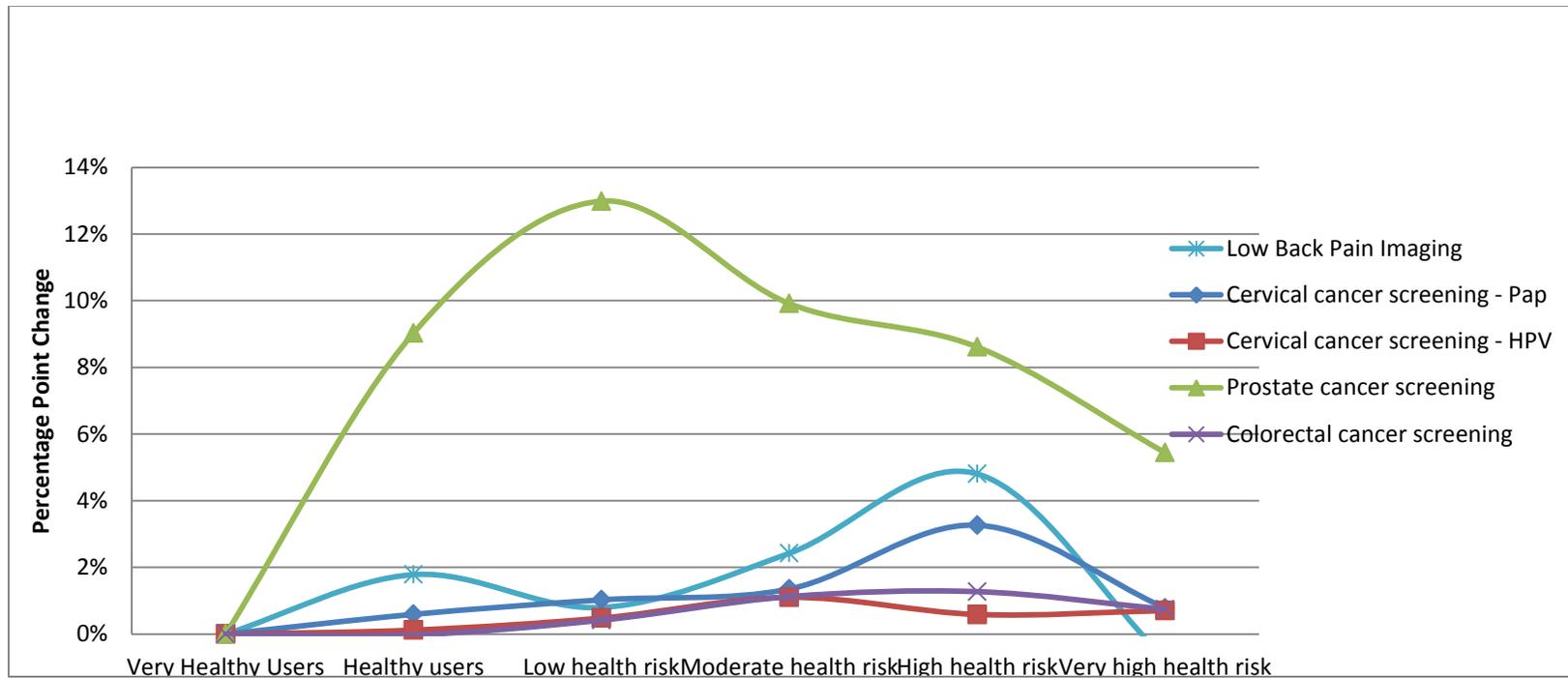


Figure 6 Full-model Marginal Effects (percentage-point change) of Prior Year Health Status Associated with Probability of Overuse



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Appendices

Table 14 Codebook - Cervical cancer screening for young women

Value Set Name	Code	Code System	Definition
HPV Tests	87620	CPT	Infectious agent detection by nucleic acid (DNA or RNA); papillomavirus, human, direct probe technique
HPV Tests	87621	CPT	Infectious agent detection by nucleic acid (DNA or RNA); papillomavirus, human, amplified probe technique
HPV Tests	87622	CPT	Infectious agent detection by nucleic acid (DNA or RNA); papillomavirus, human, quantification
HPV Tests	87624	CPT	Infectious agent detection by nucleic acid (DNA or RNA); Human Papillomavirus (HPV), high-risk types (eg, 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68)
HPV Tests	87625	CPT	Infectious agent detection by nucleic acid (DNA or RNA); Human Papillomavirus (HPV), types 16 and 18 only, includes type 45, if performed
Cervical Cytology	88141	CPT	Cytopathology, cervical or vaginal (any reporting system), requiring interpretation by physician
Cervical Cytology	88142	CPT	Cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation; manual screening under physician supervision
Cervical Cytology	88143	CPT	Cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation; with manual screening and rescreening under physician supervision
Cervical Cytology	88147	CPT	Cytopathology smears, cervical or vaginal; screening by automated system under physician supervision

Cervical Cytology	88148	CPT	Cytopathology smears, cervical or vaginal; screening by automated system with manual rescreening under physician supervision
Cervical Cytology	88150	CPT	Cytopathology, slides, cervical or vaginal; manual screening under physician supervision
Cervical Cytology	88152	CPT	Cytopathology, slides, cervical or vaginal; with manual screening and computer-assisted rescreening under physician supervision
Cervical Cytology	88153	CPT	Cytopathology, slides, cervical or vaginal; with manual screening and rescreening under physician supervision
Cervical Cytology	88154	CPT	Cytopathology, slides, cervical or vaginal; with manual screening and computer-assisted rescreening using cell selection and review under physician supervision
Cervical Cytology	88164	CPT	Cytopathology, slides, cervical or vaginal (the Bethesda System); manual screening under physician supervision
Cervical Cytology	88165	CPT	Cytopathology, slides, cervical or vaginal (the Bethesda System); with manual screening and rescreening under physician supervision
Cervical Cytology	88166	CPT	Cytopathology, slides, cervical or vaginal (the Bethesda System); with manual screening and computer-assisted rescreening under physician supervision
Cervical Cytology	88167	CPT	Cytopathology, slides, cervical or vaginal (the Bethesda System); with manual screening and computer-assisted rescreening using cell selection and review under physician supervision
Cervical Cytology	88174	CPT	Cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation; screening by automated system, under physician supervision
Cervical Cytology	88175	CPT	Cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation; with screening by automated system and manual rescreening or review, under physician supervision
Cervical Cytology	G0123	HCPCS	Screening cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation, screening by cytotechnologist under physician supervision

Cervical Cytology	G0124	HCPCS	Screening cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation, requiring interpretation by physician
Cervical Cytology	G0141	HCPCS	Screening cytopathology smears, cervical or vaginal, performed by automated system, with manual rescreening, requiring interpretation by physician
Cervical Cytology	G0143	HCPCS	Screening cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation, with manual screening and rescreening by cytotechnologist under physician supervision
Cervical Cytology	G0144	HCPCS	Screening cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation, with screening by automated system, under physician supervision
Cervical Cytology	G0145	HCPCS	Screening cytopathology, cervical or vaginal (any reporting system), collected in preservative fluid, automated thin layer preparation, with screening by automated system and manual rescreening under physician supervision
Cervical Cytology	G0147	HCPCS	Screening cytopathology smears, cervical or vaginal, performed by automated system under physician supervision
Cervical Cytology	G0148	HCPCS	Screening cytopathology smears, cervical or vaginal, performed by automated system with manual rescreening
Cervical Cytology	P3000	HCPCS	Screening Papanicolaou smear, cervical or vaginal, up to 3 smears, by technician under physician supervision
Cervical Cytology	P3001	HCPCS	Screening Papanicolaou smear, cervical or vaginal, up to 3 smears, requiring interpretation by physician
Cervical Cytology	Q0091	HCPCS	Screening Papanicolaou smear; obtaining, preparing and conveyance of cervical or vaginal smear to laboratory
Cervical Cancer	180.0	ICD9CM	Malignant neoplasm of cervix uteri, endocervix
Cervical Cancer	180.1	ICD9CM	Malignant neoplasm of cervix uteri, exocervix
Cervical Cancer	180.8	ICD9CM	Malignant neoplasm of other specified sites of cervix
Cervical Cancer	180.9	ICD9CM	Malignant neoplasm of cervix uteri, unspecified site
Cervical Cancer	233.1	ICD9CM	Carcinoma in situ of cervix uteri
Cervical Cancer	V10.41	ICD9CM	Personal history of malignant neoplasm, cervix uteri
HIV	042	ICD9CM	Human immunodeficiency virus [HIV] disease

HIV	V08	ICD9CM	Asymptomatic human immunodeficiency virus [HIV] infection status
Disorders of the Immune System	279.00	ICD9CM	Hypogammaglobulinemia, unspecified
Disorders of the Immune System	279.01	ICD9CM	Selective IgA immunodeficiency
Disorders of the Immune System	279.02	ICD9CM	Selective IgM immunodeficiency
Disorders of the Immune System	279.03	ICD9CM	Other selective immunoglobulin deficiencies
Disorders of the Immune System	279.04	ICD9CM	Congenital hypogammaglobulinemia
Disorders of the Immune System	279.05	ICD9CM	Immunodeficiency with increased IgM
Disorders of the Immune System	279.06	ICD9CM	Common variable immunodeficiency
Disorders of the Immune System	279.09	ICD9CM	Other deficiency of humoral immunity
Disorders of the Immune System	279.10	ICD9CM	Immunodeficiency with predominant T-cell defect, unspecified
Disorders of the Immune System	279.11	ICD9CM	DiGeorge's syndrome
Disorders of the Immune System	279.12	ICD9CM	Wiskott-Aldrich syndrome
Disorders of the Immune System	279.13	ICD9CM	Nezelof's syndrome
Disorders of the Immune System	279.19	ICD9CM	Other deficiency of cell-mediated immunity
Disorders of the Immune System	279.2	ICD9CM	Combined immunity deficiency
Disorders of the Immune System	279.3	ICD9CM	Unspecified immunity deficiency
Disorders of the Immune System	279.41	ICD9CM	Autoimmune lymphoproliferative syndrome
Disorders of the Immune System	279.49	ICD9CM	Autoimmune disease, not elsewhere classified
Disorders of the Immune System	279.50	ICD9CM	Graft-versus-host disease, unspecified

System			
Disorders of the Immune System	279.51	ICD9CM	Acute graft-versus-host disease
Disorders of the Immune System	279.52	ICD9CM	Chronic graft-versus-host disease
Disorders of the Immune System	279.53	ICD9CM	Acute on chronic graft-versus-host disease
Disorders of the Immune System	279.8	ICD9CM	Other specified disorders involving the immune mechanism
Disorders of the Immune System	279.9	ICD9CM	Unspecified disorder of immune mechanism

Table 15 Codebook - Prostate cancer screening for men 75 years and older

Value Set Name	Code	Code System	Definition
PSA Tests	84152	CPT	Prostate specific antigen (PSA); complexed (direct measurement)
PSA Tests	84153	CPT	Prostate specific antigen (PSA); total
PSA Tests	84154	CPT	Prostate specific antigen (PSA); free
PSA Tests	G0103	HCPCS	Prostate cancer screening; prostate specific antigen test (PSA)
Elevated PSA	790.93	ICD9CM	Elevated prostate specific antigen, (PSA)
Prostate Cancer	185	ICD9CM	Malignant neoplasm of prostate
Prostate Cancer	233.4	ICD9CM	Carcinoma in situ of prostate
Prostate Cancer	236.5	ICD9CM	Neoplasm of uncertain behavior of prostate
Prostate Cancer	V10.46	ICD9CM	Personal history of malignant neoplasm, prostate
Prostate Cancer	V16.42	ICD9CM	Family history of malignant neoplasm, prostate
Prostate Cancer	V84.03	ICD9CM	Genetic susceptibility to malignant neoplasm of prostate
Prostate Dysplasia	602.3	ICD9CM	Dysplasia of prostate

Table 16 Codebook - Colorectal cancer screening for adults older than 75 years

Value Set Name	Code	Code System	Definition
Colorectal Cancer	153.0	ICD9CM	Malignant neoplasm of colon,Hepatic flexure
Colorectal Cancer	153.1	ICD9CM	Malignant neoplasm of colon, Transverse colon
Colorectal Cancer	153.2	ICD9CM	Malignant neoplasm of colon, Descending colon
Colorectal Cancer	153.3	ICD9CM	Malignant neoplasm of colon, Sigmoid colon
Colorectal Cancer	153.4	ICD9CM	Malignant neoplasm of colon, Cecum
Colorectal Cancer	153.5	ICD9CM	Malignant neoplasm of colon, Appendix
Colorectal Cancer	153.6	ICD9CM	Malignant neoplasm of colon, Ascending colon
Colorectal Cancer	153.7	ICD9CM	Malignant neoplasm of colon, Splenic flexure
Colorectal Cancer	153.8	ICD9CM	Malignant neoplasm of colon, Other specified sites of large intestine
Colorectal Cancer	153.9	ICD9CM	Malignant neoplasm of colon, unspecified
Colorectal Cancer	154.0	ICD9CM	Malignant neoplasm of rectosigmoid junction
Colorectal Cancer	154.1	ICD9CM	Malignant neoplasm of rectum, rectosigmoid junction
Colorectal Cancer	197.5	ICD9CM	Secondary malignant neoplasm of respiratory and digestive systems, Large intestine and rectum
Colorectal Cancer	V10.05	ICD9CM	Personal history of malignant neoplasm, Large intestine
Colorectal Cancer	V10.06	ICD9CM	Personal history of malignant neoplasm, Rectum, rectosigmoid junction, and anus
Colorectal Cancer	G0213	HCPCS	PET imaging whole body; diagnosis; colorectal
Colorectal Cancer	G0214	HCPCS	PET imaging whole body; initial staging; colorectal
Colorectal Cancer	G0215	HCPCS	PET imaging whole body; restaging; colorectal cancer
Colorectal Cancer	G0231	HCPCS	PET, whole body, for recurrence of colorectal or colorectal metastatic cancer; gamma cameras only
CRC Exclusions	154.2	ICD9CM	Malignant neoplasm of Anal canal

CRC Exclusions	154.3	ICD9CM	Malignant neoplasm of Anus, unspecified
CRC Exclusions	209.10	ICD9CM	Malignant carcinoid tumor of the large intestine, unspecified portion
CRC Exclusions	209.11	ICD9CM	Malignant carcinoid tumor of the appendix
CRC Exclusions	209.12	ICD9CM	Malignant carcinoid tumor of the cecum
CRC Exclusions	209.13	ICD9CM	Malignant carcinoid tumor of the ascending colon
CRC Exclusions	209.14	ICD9CM	Malignant carcinoid tumor of the transverse colon
CRC Exclusions	209.15	ICD9CM	Malignant carcinoid tumor of the descending colon
CRC Exclusions	209.16	ICD9CM	Malignant carcinoid tumor of the sigmoid colon
CRC Exclusions	209.17	ICD9CM	Malignant carcinoid tumor of the rectum
CRC Exclusions	280	ICD9CM	Iron deficiency anemias
CRC Exclusions	280.0	ICD9CM	Secondary to blood loss (chronic)
CRC Exclusions	280.1	ICD9CM	Secondary to inadequate dietary iron intake
CRC Exclusions	280.8	ICD9CM	Other specified iron deficiency anemias
CRC Exclusions	280.9	ICD9CM	Iron deficiency anemia, unspecified
CRC Exclusions	555	ICD9CM	Regional enteritis
CRC Exclusions	555.0	ICD9CM	Small intestine
CRC Exclusions	555.1	ICD9CM	Large intestine
CRC Exclusions	555.2	ICD9CM	Small intestine with large intestine
CRC Exclusions	555.9	ICD9CM	Unspecified site
CRC Exclusions	556	ICD9CM	Ulcerative colitis
CRC Exclusions	556.0	ICD9CM	Ulcerative (chronic) enterocolitis
CRC Exclusions	556.1	ICD9CM	Ulcerative (chronic) ileocolitis
CRC Exclusions	556.2	ICD9CM	Ulcerative (chronic) proctitis
CRC Exclusions	556.3	ICD9CM	Ulcerative (chronic) proctosigmoiditis
CRC Exclusions	556.4	ICD9CM	Pseudopolyposis of colon
CRC Exclusions	556.5	ICD9CM	Left-sided ulcerative (chronic) colitis

CRC Exclusions	556.6	ICD9CM	Universal ulcerative (chronic) colitis
CRC Exclusions	556.8	ICD9CM	Other ulcerative colitis
CRC Exclusions	556.9	ICD9CM	Ulcerative colitis, unspecified
CRC Exclusions	558.4	ICD9CM	Eosinophilic gastroenteritis and colitis
CRC Exclusions	558.41	ICD9CM	Eosinophilic gastroenteritis
CRC Exclusions	558.42	ICD9CM	Eosinophilic colitis
CRC Exclusions	558.9	ICD9CM	Other and unspecified noninfectious gastroenteritis and colitis
CRC Exclusions	562.02	ICD9CM	Diverticulosis of small intestine with hemorrhage
CRC Exclusions	562.03	ICD9CM	Diverticulitis of small intestine with hemorrhage
CRC Exclusions	562.12	ICD9CM	Diverticulosis of colon with hemorrhage
CRC Exclusions	562.13	ICD9CM	Diverticulitis of colon with hemorrhage
CRC Exclusions	578.1	ICD9CM	Blood in stool
CRC Exclusions	578.9	ICD9CM	Hemorrhage of gastrointestinal tract, unspecified
CRC Exclusions	787.99	ICD9CM	Other symptoms involving digestive system em
CRC Exclusions	793.4	ICD9CM	Nonspecific (abnormal) findings on radiological and other examination of body structure, Gastrointestinal tract
CRC Exclusions	793.6	ICD9CM	Nonspecific (abnormal) findings on radiological and other examination of body structure, Abdominal area, including retroperitoneum
CRC Exclusions	V12.72	ICD9CM	Diseases of digestive system, Colonic polyps
CRC Exclusions	V16.0	ICD9CM	Gastrointestinal tract
CRC Exclusions	V18.51	ICD9CM	Family history of Colonic polyps conditions
CRC Exclusions	V84.09	ICD9CM	Genetic susceptibility to other malignant neoplasm
Colonoscopy	44388	CPT	Colonoscopy through stoma; diagnostic, including collection of specimen(s) by brushing or washing, when performed (separate procedure)
Colonoscopy	44389	CPT	Colonoscopy through stoma; with biopsy, single or multiple
Colonoscopy	44390	CPT	Colonoscopy through stoma; with removal of foreign body(s)
Colonoscopy	44391	CPT	Colonoscopy through stoma; with control of bleeding, any method

Colonoscopy	44392	CPT	Colonoscopy through stoma; with removal of tumor(s), polyp(s), or other lesion(s) by hot biopsy forceps
Colonoscopy	44393	CPT	Colonoscopy through stoma; with ablation of tumor(s), polyp(s), or other lesion(s) not amenable to removal by hot biopsy forceps, bipolar cautery or snare technique
Colonoscopy	44394	CPT	Colonoscopy through stoma; with removal of tumor(s), polyp(s), or other lesion(s) by snare technique
Colonoscopy	44397	CPT	Colonoscopy through stoma; with transendoscopic stent placement (includes predilation)
Colonoscopy	44401	CPT	Colonoscopy through stoma; with ablation of tumor(s), polyp(s), or other lesion(s) (includes pre-and post-dilation and guide wire passage, when performed)
Colonoscopy	44402	CPT	Colonoscopy through stoma; with endoscopic stent placement (including pre- and post-dilation and guide wire passage, when performed)
Colonoscopy	44403	CPT	Colonoscopy through stoma; with endoscopic mucosal resection
Colonoscopy	44404	CPT	Colonoscopy through stoma; with directed submucosal injection(s), any substance
Colonoscopy	44405	CPT	Colonoscopy through stoma; with transendoscopic balloon dilation
Colonoscopy	44406	CPT	Colonoscopy through stoma; with endoscopic ultrasound examination, limited to the sigmoid, descending, transverse, or ascending colon and cecum and adjacent structures
Colonoscopy	44407	CPT	Colonoscopy through stoma; with transendoscopic ultrasound guided intramural or transmural fine needle aspiration/biopsy(s), includes endoscopic ultrasound examination limited to the sigmoid, descending, transverse, or ascending colon and cecum and adjacent structures
Colonoscopy	44408	CPT	Colonoscopy through stoma; with decompression (for pathologic distention) (eg, volvulus, megacolon), including placement of decompression tube, when performed
Colonoscopy	45355	CPT	Colonoscopy, rigid or flexible, transabdominal via colotomy, single or multiple
Colonoscopy	45378	CPT	Colonoscopy, flexible; diagnostic, including collection of specimen(s) by brushing or washing, when performed (separate procedure)
Colonoscopy	45379	CPT	Colonoscopy, flexible; with removal of foreign body(s)
Colonoscopy	45380	CPT	Colonoscopy, flexible; with biopsy, single or multiple

Colonoscopy	45381	CPT	Colonoscopy, flexible; with directed submucosal injection(s), any substance
Colonoscopy	45382	CPT	Colonoscopy, flexible; with control of bleeding, any method
Colonoscopy	45383	CPT	Colonoscopy, flexible, proximal to splenic flexure; with ablation of tumor(s), polyp(s), or other lesion(s) not amenable to removal by hot biopsy forceps, bipolar cautery or snare technique
Colonoscopy	45384	CPT	Colonoscopy, flexible; with removal of tumor(s), polyp(s), or other lesion(s) by hot biopsy forceps
Colonoscopy	45385	CPT	Colonoscopy, flexible; with removal of tumor(s), polyp(s), or other lesion(s) by snare technique
Colonoscopy	45386	CPT	Colonoscopy, flexible; with transendoscopic balloon dilation
Colonoscopy	45387	CPT	Colonoscopy, flexible, proximal to splenic flexure; with transendoscopic stent placement (includes predilation)
Colonoscopy	45388	CPT	Colonoscopy, flexible; with ablation of tumor(s), polyp(s), or other lesion(s) (includes pre- and post-dilation and guide wire passage, when performed)
Colonoscopy	45389	CPT	Colonoscopy, flexible; with endoscopic stent placement (includes pre- and post-dilation and guide wire passage, when performed)
Colonoscopy	45390	CPT	Colonoscopy, flexible; with endoscopic mucosal resection
Colonoscopy	45391	CPT	Colonoscopy, flexible; with endoscopic ultrasound examination limited to the rectum, sigmoid, descending, transverse, or ascending colon and cecum, and adjacent structures
Colonoscopy	45392	CPT	Colonoscopy, flexible; with transendoscopic ultrasound guided intramural or transmural fine needle aspiration/biopsy(s), includes endoscopic ultrasound examination limited to the rectum, sigmoid, descending, transverse, or ascending colon and cecum, and adjacent structures
Colonoscopy	45393	CPT	Colonoscopy, flexible; with decompression (for pathologic distention) (eg, volvulus, megacolon), including placement of decompression tube, when performed
Colonoscopy	45398	CPT	Colonoscopy, flexible; with band ligation(s) (eg, hemorrhoids)
Colonoscopy	G0105	HCPCS	Colorectal cancer screening; colonoscopy on individual at high risk
Colonoscopy	G0121	HCPCS	Colorectal cancer screening; colonoscopy on individual not meeting criteria for high risk

FOBT	82270	CPT	Blood, occult, by peroxidase activity (eg, guaiac), qualitative; feces, consecutive collected specimens with single determination, for colorectal neoplasm screening (ie, patient was provided 3 cards or single triple card for consecutive collection)
FOBT	82274	CPT	Blood, occult, by fecal hemoglobin determination by immunoassay, qualitative, feces, 1-3 simultaneous determinations
FOBT	G0328	HCPCS	Colorectal cancer screening; fecal occult blood test, immunoassay, 1-3 simultaneous determinations
Flexible sigmoidoscopy	45330	CPT	Sigmoidoscopy, flexible; diagnostic, including collection of specimen(s) by brushing or washing, when performed (separate procedure)
Flexible sigmoidoscopy	45331	CPT	Sigmoidoscopy, flexible; with biopsy, single or multiple
Flexible sigmoidoscopy	45332	CPT	Sigmoidoscopy, flexible; with removal of foreign body(s)
Flexible sigmoidoscopy	45333	CPT	Sigmoidoscopy, flexible; with removal of tumor(s), polyp(s), or other lesion(s) by hot biopsy forceps
Flexible sigmoidoscopy	45334	CPT	Sigmoidoscopy, flexible; with control of bleeding, any method
Flexible sigmoidoscopy	45335	CPT	Sigmoidoscopy, flexible; with directed submucosal injection(s), any substance
Flexible sigmoidoscopy	45337	CPT	Sigmoidoscopy, flexible; with decompression (for pathologic distention) (eg, volvulus, megacolon), including placement of decompression tube, when performed
Flexible sigmoidoscopy	45338	CPT	Sigmoidoscopy, flexible; with removal of tumor(s), polyp(s), or other lesion(s) by snare technique
Flexible sigmoidoscopy	45339	CPT	Sigmoidoscopy, flexible; with ablation of tumor(s), polyp(s), or other lesion(s) not amenable to removal by hot biopsy forceps, bipolar cautery or snare technique
Flexible sigmoidoscopy	45340	CPT	Sigmoidoscopy, flexible; with transendoscopic balloon dilation
Flexible sigmoidoscopy	45341	CPT	Sigmoidoscopy, flexible; with endoscopic ultrasound examination
Flexible sigmoidoscopy	45342	CPT	Sigmoidoscopy, flexible; with transendoscopic ultrasound guided intramural or transmural fine needle aspiration/biopsy(s)
Flexible sigmoidoscopy	45345	CPT	Sigmoidoscopy, flexible; with transendoscopic stent placement (includes predilation)
Flexible sigmoidoscopy	45346	CPT	Sigmoidoscopy, flexible; with ablation of tumor(s), polyp(s), or other lesion(s) (includes pre- and post-dilation and guide wire passage, when performed)

Flexible sigmoidoscopy	45347	CPT	Sigmoidoscopy, flexible; with placement of endoscopic stent (includes pre- and post-dilation and guide wire passage, when performed)
Flexible sigmoidoscopy	45349	CPT	Sigmoidoscopy, flexible; with endoscopic mucosal resection
Flexible sigmoidoscopy	45350	CPT	Sigmoidoscopy, flexible; with band ligation(s) (eg, hemorrhoids)
Flexible sigmoidoscopy	G0104	HCPCS	Colorectal cancer screening; flexible sigmoidoscopy
Barium enema	74270	CPT	Radiologic examination, colon; contrast (eg, barium) enema, with or without KUB
Barium enema	74280	CPT	Radiologic examination, colon; air contrast with specific high density barium, with or without glucagon
Barium enema	G0106	HCPCS	Colorectal cancer screening; alternative to G0104, screening sigmoidoscopy, barium enema
Barium enema	G0120	HCPCS	Colorectal cancer screening; alternative to G0105, screening colonoscopy, barium enema
Barium enema	G0122	HCPCS	Colorectal cancer screening; barium enema
Fecal DNA	S3890	HCPCS	DNA analysis, fecal, for colorectal cancer screening
CT colonography	74263	CPT	Computed tomographic (CT) colonography, screening, including image postprocessing

Table 17 Codebook - Imaging studies for non-specific low back pain

Value Set Name	Code	Code System	Definition
Physical Therapy	97110	CPT	Therapeutic procedure, 1 or more areas, each 15 minutes; therapeutic exercises to develop strength and endurance, range of motion and flexibility
Physical Therapy	97112	CPT	Therapeutic procedure, 1 or more areas, each 15 minutes; neuromuscular reeducation of movement, balance, coordination, kinesthetic sense, posture, and/or proprioception for sitting and/or standing activities
Physical Therapy	97113	CPT	Therapeutic procedure, 1 or more areas, each 15 minutes; aquatic therapy with therapeutic exercises
Physical Therapy	97124	CPT	Therapeutic procedure, 1 or more areas, each 15 minutes; massage, including effleurage, petrissage and/or tapotement (stroking, compression, percussion)
Physical Therapy	97140	CPT	Manual therapy techniques (eg, mobilization/ manipulation, manual lymphatic drainage, manual traction), 1 or more regions, each 15 minutes
Outpatient	99201	CPT	Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: A problem focused history; A problem focused examination; Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are self limited or minor. Typically, 10 minutes are spent face-to-face with the patient and/or family.

Outpatient	99202	CPT	Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: An expanded problem focused history; An expanded problem focused examination; Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of low to moderate severity. Typically, 20 minutes are spent face-to-face with the patient and/or family.
Outpatient	99203	CPT	Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: A detailed history; A detailed examination; Medical decision making of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate severity. Typically, 30 minutes are spent face-to-face with the patient and/or family.
Outpatient	99204	CPT	Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Typically, 45 minutes are spent face-to-face with the patient and/or family.

Outpatient	99205	CPT	Office or other outpatient visit for the evaluation and management of a new patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Typically, 60 minutes are spent face-to-face with the patient and/or family.
Outpatient	99211	CPT	Office or other outpatient visit for the evaluation and management of an established patient, that may not require the presence of a physician or other qualified health care professional. Usually, the presenting problem(s) are minimal. Typically, 5 minutes are spent performing or supervising these services.
Outpatient	99212	CPT	Office or other outpatient visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A problem focused history; A problem focused examination; Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are self limited or minor. Typically, 10 minutes are spent face-to-face with the patient and/or family.
Outpatient	99213	CPT	Office or other outpatient visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: An expanded problem focused history; An expanded problem focused examination; Medical decision making of low complexity. Counseling and coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of low to moderate severity. Typically, 15 minutes are spent face-to-face with the patient and/or family.

Outpatient	99214	CPT	Office or other outpatient visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A detailed history; A detailed examination; Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Typically, 25 minutes are spent face-to-face with the patient and/or family
Outpatient	99215	CPT	Office or other outpatient visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A comprehensive history; A comprehensive examination; Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Typically, 40 minutes are spent face-to-face with the patient and/or family.
Outpatient	99241	CPT	Office consultation for a new or established patient, which requires these 3 key components: A problem focused history; A problem focused examination; and Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are self limited or minor. Typically, 15 minutes are spent face-to-face with the patient and/or family.

Outpatient	99242	CPT	Office consultation for a new or established patient, which requires these 3 key components: An expanded problem focused history; An expanded problem focused examination; and Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of low severity. Typically, 30 minutes are spent face-to-face with the patient and/or family.
Outpatient	99243	CPT	Office consultation for a new or established patient, which requires these 3 key components: A detailed history; A detailed examination; and Medical decision making of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate severity. Typically, 40 minutes are spent face-to-face with the patient and/or family.
Outpatient	99244	CPT	Office consultation for a new or established patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Typically, 60 minutes are spent face-to-face with the patient and/or family.
Outpatient	99245	CPT	Office consultation for a new or established patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Typically, 80 minutes are spent face-to-face with the patient and/or family.

Outpatient	99341	CPT	Home visit for the evaluation and management of a new patient, which requires these 3 key components: A problem focused history; A problem focused examination; and Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of low severity. Typically, 20 minutes are spent face-to-face with the patient and/or family.
Outpatient	99342	CPT	Home visit for the evaluation and management of a new patient, which requires these 3 key components: An expanded problem focused history; An expanded problem focused examination; and Medical decision making of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate severity. Typically, 30 minutes are spent face-to-face with the patient and/or family.
Outpatient	99343	CPT	Home visit for the evaluation and management of a new patient, which requires these 3 key components: A detailed history; A detailed examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. Typically, 45 minutes are spent face-to-face with the patient and/or family.

Outpatient	99344	CPT	Home visit for the evaluation and management of a new patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of high severity. Typically, 60 minutes are spent face-to-face with the patient and/or family.
Outpatient	99345	CPT	Home visit for the evaluation and management of a new patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the patient is unstable or has developed a significant new problem requiring immediate physician attention. Typically, 75 minutes are spent face-to-face with the patient and/or family.
Outpatient	99347	CPT	Home visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A problem focused interval history; A problem focused examination; Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are self limited or minor. Typically, 15 minutes are spent face-to-face with the patient and/or family.

Outpatient	99348	CPT	Home visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: An expanded problem focused interval history; An expanded problem focused examination; Medical decision making of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of low to moderate severity. Typically, 25 minutes are spent face-to-face with the patient and/or family.
Outpatient	99349	CPT	Home visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A detailed interval history; A detailed examination; Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are moderate to high severity. Typically, 40 minutes are spent face-to-face with the patient and/or family.
Outpatient	99350	CPT	Home visit for the evaluation and management of an established patient, which requires at least 2 of these 3 key components: A comprehensive interval history; A comprehensive examination; Medical decision making of moderate to high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate to high severity. The patient may be unstable or may have developed a significant new problem requiring immediate physician attention. Typically, 60 minutes are spent face-to-face with the patient and/or family.
Outpatient	99381	CPT	Initial comprehensive preventive medicine evaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, new patient; infant (age younger than 1 year)

Outpatient	99382	CPT	Initial comprehensive preventive medicine evaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, new patient; early childhood (age 1 through 4 years)
Outpatient	99383	CPT	Initial comprehensive preventive medicine evaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, new patient; late childhood (age 5 through 11 years)
Outpatient	99384	CPT	Initial comprehensive preventive medicine evaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, new patient; adolescent (age 12 through 17 years)
Outpatient	99385	CPT	Initial comprehensive preventive medicine evaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, new patient; 18-39 years
Outpatient	99386	CPT	Initial comprehensive preventive medicine evaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, new patient; 40-64 years
Outpatient	99387	CPT	Initial comprehensive preventive medicine evaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, new patient; 65 years and older

Outpatient	99391	CPT	Periodic comprehensive preventive medicine reevaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, established patient; infant (age younger than 1 year)
Outpatient	99392	CPT	Periodic comprehensive preventive medicine reevaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, established patient; early childhood (age 1 through 4 years)
Outpatient	99393	CPT	Periodic comprehensive preventive medicine reevaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, established patient; late childhood (age 5 through 11 years)
Outpatient	99394	CPT	Periodic comprehensive preventive medicine reevaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, established patient; adolescent (age 12 through 17 years)
Outpatient	99395	CPT	Periodic comprehensive preventive medicine reevaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, established patient; 18-39 years
Outpatient	99396	CPT	Periodic comprehensive preventive medicine reevaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, established patient; 40-64 years

Outpatient	99397	CPT	Periodic comprehensive preventive medicine reevaluation and management of an individual including an age and gender appropriate history, examination, counseling/anticipatory guidance/risk factor reduction interventions, and the ordering of laboratory/diagnostic procedures, established patient; 65 years and older
Outpatient	99401	CPT	Preventive medicine counseling and/or risk factor reduction intervention(s) provided to an individual (separate procedure); approximately 15 minutes
Outpatient	99402	CPT	Preventive medicine counseling and/or risk factor reduction intervention(s) provided to an individual (separate procedure); approximately 30 minutes
Outpatient	99403	CPT	Preventive medicine counseling and/or risk factor reduction intervention(s) provided to an individual (separate procedure); approximately 45 minutes
Outpatient	99404	CPT	Preventive medicine counseling and/or risk factor reduction intervention(s) provided to an individual (separate procedure); approximately 60 minutes
Outpatient	99411	CPT	Preventive medicine counseling and/or risk factor reduction intervention(s) provided to individuals in a group setting (separate procedure); approximately 30 minutes
Outpatient	99412	CPT	Preventive medicine counseling and/or risk factor reduction intervention(s) provided to individuals in a group setting (separate procedure); approximately 60 minutes
Outpatient	99420	CPT	Administration and interpretation of health risk assessment instrument (eg, health hazard appraisal)
Outpatient	99429	CPT	Unlisted preventive medicine service
Outpatient	99455	CPT	Work related or medical disability examination by the treating physician that includes: Completion of a medical history commensurate with the patient's condition; Performance of an examination commensurate with the patient's condition; Formulation of a diagnosis, assessment of capabilities and stability, and calculation of impairment; Development of future medical treatment plan; and Completion of necessary documentation/certificates and report.

Outpatient	99456	CPT	Work related or medical disability examination by other than the treating physician that includes: Completion of a medical history commensurate with the patient's condition; Performance of an examination commensurate with the patient's condition; Formulation of a diagnosis, assessment of capabilities and stability, and calculation of impairment; Development of future medical treatment plan; and Completion of necessary documentation/certificates and report.
Outpatient	G0402	HCPCS	Initial preventive physical examination; face-to-face visit, services limited to new beneficiary during the first 12 months of Medicare enrollment
Outpatient	G0438	HCPCS	Annual wellness visit; includes a personalized prevention plan of service (PPS), initial visit
Outpatient	G0439	HCPCS	Annual wellness visit, includes a personalized prevention plan of service (PPS), subsequent visit
Outpatient	G0463	HCPCS	Hospital outpatient clinic visit for assessment and management of a patient
Outpatient	T1015	HCPCS	Clinic visit/encounter, all-inclusive
ED	99281	CPT	Emergency department visit for the evaluation and management of a patient, which requires these 3 key components: A problem focused history; A problem focused examination; and Straightforward medical decision making. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are self limited or minor.
ED	99282	CPT	Emergency department visit for the evaluation and management of a patient, which requires these 3 key components: An expanded problem focused history; An expanded problem focused examination; and Medical decision making of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of low to moderate severity.

ED	99283	CPT	Emergency department visit for the evaluation and management of a patient, which requires these 3 key components: An expanded problem focused history; An expanded problem focused examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of moderate severity.
ED	99284	CPT	Emergency department visit for the evaluation and management of a patient, which requires these 3 key components: A detailed history; A detailed examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of high severity, and require urgent evaluation by the physician or other qualified health care professionals but do not pose an immediate significant threat to life or physiologic function.
ED	99285	CPT	Emergency department visit for the evaluation and management of a patient, which requires these 3 key components within the constraints imposed by the urgency of the patient's clinical condition and/or mental status: A comprehensive history; A comprehensive examination; and Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the presenting problem(s) are of high severity and pose an immediate significant threat to life or physiologic function.

Observation	99217	CPT	Observation care discharge day management (This code is to be utilized to report all services provided to a patient on discharge from "observation status" if the discharge is on other than the initial date of "observation status." To report services to a patient designated as "observation status" or "inpatient status" and discharged on the same date, use the codes for Observation or Inpatient Care Services [including Admission and Discharge Services, 99234-99236 as appropriate.]
Observation	99218	CPT	Initial observation care, per day, for the evaluation and management of a patient which requires these 3 key components: A detailed or comprehensive history; A detailed or comprehensive examination; and Medical decision making that is straightforward or of low complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the problem(s) requiring admission to "observation status" are of low severity. Typically, 30 minutes are spent at the bedside and on the patient's hospital floor or unit.
Observation	99219	CPT	Initial observation care, per day, for the evaluation and management of a patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of moderate complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the problem(s) requiring admission to "observation status" are of moderate severity. Typically, 50 minutes are spent at the bedside and on the patient's hospital floor or unit.

Observation			
	99220	CPT	Initial observation care, per day, for the evaluation and management of a patient, which requires these 3 key components: A comprehensive history; A comprehensive examination; and Medical decision making of high complexity. Counseling and/or coordination of care with other physicians, other qualified health care professionals, or agencies are provided consistent with the nature of the problem(s) and the patient's and/or family's needs. Usually, the problem(s) requiring admission to "observation status" are of high severity. Typically, 70 minutes are spent at the bedside and on the patient's hospital floor or unit.
Osteopathic Manipulative Treatment	98925	CPT	Osteopathic manipulative treatment (OMT); 1-2 body regions involved
Osteopathic Manipulative Treatment	98926	CPT	Osteopathic manipulative treatment (OMT); 3-4 body regions involved
Osteopathic Manipulative Treatment	98927	CPT	Osteopathic manipulative treatment (OMT); 5-6 body regions involved
Osteopathic Manipulative Treatment	98928	CPT	Osteopathic manipulative treatment (OMT); 7-8 body regions involved
Osteopathic Manipulative Treatment	98929	CPT	Osteopathic manipulative treatment (OMT); 9-10 body regions involved
Osteopathic Manipulative Treatment	98940	CPT	Chiropractic manipulative treatment (CMT); spinal, 1-2 regions
Osteopathic Manipulative Treatment	98941	CPT	Chiropractic manipulative treatment (CMT); spinal, 3-4 regions
Osteopathic Manipulative Treatment	98942	CPT	Chiropractic manipulative treatment (CMT); spinal, 5 regions
Low Back Pain	721.3	ICD9CM	Lumbosacral spondylosis without myelopathy
Low Back Pain	722.10	ICD9CM	Displacement of lumbar intervertebral disc without myelopathy
Low Back Pain	722.32	ICD9CM	Schmorl's nodes, lumbar region
Low Back Pain	722.52	ICD9CM	Degeneration of lumbar or lumbosacral intervertebral disc
Low Back Pain	722.93	ICD9CM	Other and unspecified disc disorder, lumbar region
Low Back Pain	724.02	ICD9CM	Spinal stenosis, lumbar region, without neurogenic claudication
Low Back Pain	724.03	ICD9CM	Spinal stenosis, lumbar region, with neurogenic claudication
Low Back Pain	724.2	ICD9CM	Lumbago
Low Back Pain	724.3	ICD9CM	Sciatica
Low Back Pain	724.5	ICD9CM	Backache, unspecified
Low Back Pain	724.6	ICD9CM	Disorders of sacrum
Low Back Pain	724.70	ICD9CM	Unspecified disorder of coccyx

Low Back Pain	724.71	ICD9CM	Hypermobility of coccyx
Low Back Pain	724.79	ICD9CM	Other disorders of coccyx
Low Back Pain	738.5	ICD9CM	Other acquired deformity of back or spine
Low Back Pain	739.3	ICD9CM	Nonallopathic lesions, lumbar region
Low Back Pain	739.4	ICD9CM	Nonallopathic lesions, sacral region
Low Back Pain	846.0	ICD9CM	Sprain of lumbosacral (joint) (ligament)
Low Back Pain	846.1	ICD9CM	Sprain of sacroiliac ligament
Low Back Pain	846.2	ICD9CM	Sprain of sacrospinatus (ligament)
Low Back Pain	846.3	ICD9CM	Sprain of sacrotuberous (ligament)
Low Back Pain	846.8	ICD9CM	Sprain of other specified sites of sacroiliac region
Low Back Pain	846.9	ICD9CM	Sprain of unspecified site of sacroiliac region
Low Back Pain	847.2	ICD9CM	Sprain of lumbar
Malignant Neoplasms	140.0	ICD9CM	Malignant neoplasm of upper lip, vermilion border
Malignant Neoplasms	140.1	ICD9CM	Malignant neoplasm of lower lip, vermilion border
Malignant Neoplasms	140.3	ICD9CM	Malignant neoplasm of upper lip, inner aspect
Malignant Neoplasms	140.4	ICD9CM	Malignant neoplasm of lower lip, inner aspect
Malignant Neoplasms	140.5	ICD9CM	Malignant neoplasm of lip, unspecified, inner aspect
Malignant Neoplasms	140.6	ICD9CM	Malignant neoplasm of commissure of lip
Malignant Neoplasms	140.8	ICD9CM	Malignant neoplasm of other sites of lip
Malignant Neoplasms	140.9	ICD9CM	Malignant neoplasm of lip, unspecified, vermilion border
Malignant Neoplasms	141.0	ICD9CM	Malignant neoplasm of base of tongue
Malignant Neoplasms	141.1	ICD9CM	Malignant neoplasm of dorsal surface of tongue
Malignant Neoplasms	141.2	ICD9CM	Malignant neoplasm of tip and lateral border of tongue
Malignant Neoplasms	141.3	ICD9CM	Malignant neoplasm of ventral surface of tongue
Malignant Neoplasms	141.4	ICD9CM	Malignant neoplasm of anterior two-thirds of tongue, part unspecified
Malignant Neoplasms	141.5	ICD9CM	Malignant neoplasm of junctional zone of tongue
Malignant Neoplasms	141.6	ICD9CM	Malignant neoplasm of lingual tonsil

Malignant Neoplasms	141.8	ICD9CM	Malignant neoplasm of other sites of tongue
Malignant Neoplasms	141.9	ICD9CM	Malignant neoplasm of tongue, unspecified
Malignant Neoplasms	142.0	ICD9CM	Malignant neoplasm of parotid gland
Malignant Neoplasms	142.1	ICD9CM	Malignant neoplasm of submandibular gland
Malignant Neoplasms	142.2	ICD9CM	Malignant neoplasm of sublingual gland
Malignant Neoplasms	142.8	ICD9CM	Malignant neoplasm of other major salivary glands
Malignant Neoplasms	142.9	ICD9CM	Malignant neoplasm of salivary gland, unspecified
Malignant Neoplasms	143.0	ICD9CM	Malignant neoplasm of upper gum
Malignant Neoplasms	143.1	ICD9CM	Malignant neoplasm of lower gum
Malignant Neoplasms	143.8	ICD9CM	Malignant neoplasm of other sites of gum
Malignant Neoplasms	143.9	ICD9CM	Malignant neoplasm of gum, unspecified
Malignant Neoplasms	144.0	ICD9CM	Malignant neoplasm of anterior portion of floor of mouth
Malignant Neoplasms	144.1	ICD9CM	Malignant neoplasm of lateral portion of floor of mouth
Malignant Neoplasms	144.8	ICD9CM	Malignant neoplasm of other sites of floor of mouth
Malignant Neoplasms	144.9	ICD9CM	Malignant neoplasm of floor of mouth, part unspecified
Malignant Neoplasms	145.0	ICD9CM	Malignant neoplasm of cheek mucosa
Malignant Neoplasms	145.1	ICD9CM	Malignant neoplasm of vestibule of mouth
Malignant Neoplasms	145.2	ICD9CM	Malignant neoplasm of hard palate
Malignant Neoplasms	145.3	ICD9CM	Malignant neoplasm of soft palate
Malignant Neoplasms	145.4	ICD9CM	Malignant neoplasm of uvula
Malignant Neoplasms	145.5	ICD9CM	Malignant neoplasm of palate, unspecified
Malignant Neoplasms	145.6	ICD9CM	Malignant neoplasm of retromolar area
Malignant Neoplasms	145.8	ICD9CM	Malignant neoplasm of other specified parts of mouth
Malignant Neoplasms	145.9	ICD9CM	Malignant neoplasm of mouth, unspecified
Malignant Neoplasms	146.0	ICD9CM	Malignant neoplasm of tonsil
Malignant Neoplasms	146.1	ICD9CM	Malignant neoplasm of tonsillar fossa
Malignant Neoplasms	146.2	ICD9CM	Malignant neoplasm of tonsillar pillars (anterior) (posterior)

Malignant Neoplasms	146.3	ICD9CM	Malignant neoplasm of vallecula epiglottica
Malignant Neoplasms	146.4	ICD9CM	Malignant neoplasm of anterior aspect of epiglottis
Malignant Neoplasms	146.5	ICD9CM	Malignant neoplasm of junctional region of oropharynx
Malignant Neoplasms	146.6	ICD9CM	Malignant neoplasm of lateral wall of oropharynx
Malignant Neoplasms	146.7	ICD9CM	Malignant neoplasm of posterior wall of oropharynx
Malignant Neoplasms	146.8	ICD9CM	Malignant neoplasm of other specified sites of oropharynx
Malignant Neoplasms	146.9	ICD9CM	Malignant neoplasm of oropharynx, unspecified site
Malignant Neoplasms	147.0	ICD9CM	Malignant neoplasm of superior wall of nasopharynx
Malignant Neoplasms	147.1	ICD9CM	Malignant neoplasm of posterior wall of nasopharynx
Malignant Neoplasms	147.2	ICD9CM	Malignant neoplasm of lateral wall of nasopharynx
Malignant Neoplasms	147.3	ICD9CM	Malignant neoplasm of anterior wall of nasopharynx
Malignant Neoplasms	147.8	ICD9CM	Malignant neoplasm of other specified sites of nasopharynx
Malignant Neoplasms	147.9	ICD9CM	Malignant neoplasm of nasopharynx, unspecified site
Malignant Neoplasms	148.0	ICD9CM	Malignant neoplasm of postcricoid region of hypopharynx
Malignant Neoplasms	148.1	ICD9CM	Malignant neoplasm of pyriform sinus
Malignant Neoplasms	148.2	ICD9CM	Malignant neoplasm of aryepiglottic fold, hypopharyngeal aspect
Malignant Neoplasms	148.3	ICD9CM	Malignant neoplasm of posterior hypopharyngeal wall
Malignant Neoplasms	148.8	ICD9CM	Malignant neoplasm of other specified sites of hypopharynx
Malignant Neoplasms	148.9	ICD9CM	Malignant neoplasm of hypopharynx, unspecified site
Malignant Neoplasms	149.0	ICD9CM	Malignant neoplasm of pharynx, unspecified
Malignant Neoplasms	149.1	ICD9CM	Malignant neoplasm of waldeyer's ring
Malignant Neoplasms	149.8	ICD9CM	Malignant neoplasm of other sites within the lip and oral cavity
Malignant Neoplasms	149.9	ICD9CM	Malignant neoplasm of ill-defined sites within the lip and oral cavity
Malignant Neoplasms	150.0	ICD9CM	Malignant neoplasm of cervical esophagus
Malignant Neoplasms	150.1	ICD9CM	Malignant neoplasm of thoracic esophagus
Malignant Neoplasms	150.2	ICD9CM	Malignant neoplasm of abdominal esophagus
Malignant Neoplasms	150.3	ICD9CM	Malignant neoplasm of upper third of esophagus

Malignant Neoplasms	150.4	ICD9CM	Malignant neoplasm of middle third of esophagus
Malignant Neoplasms	150.5	ICD9CM	Malignant neoplasm of lower third of esophagus
Malignant Neoplasms	150.8	ICD9CM	Malignant neoplasm of other specified part of esophagus
Malignant Neoplasms	150.9	ICD9CM	Malignant neoplasm of esophagus, unspecified site
Malignant Neoplasms	151.0	ICD9CM	Malignant neoplasm of cardia
Malignant Neoplasms	151.1	ICD9CM	Malignant neoplasm of pylorus
Malignant Neoplasms	151.2	ICD9CM	Malignant neoplasm of pyloric antrum
Malignant Neoplasms	151.3	ICD9CM	Malignant neoplasm of fundus of stomach
Malignant Neoplasms	151.4	ICD9CM	Malignant neoplasm of body of stomach
Malignant Neoplasms	151.5	ICD9CM	Malignant neoplasm of lesser curvature of stomach, unspecified
Malignant Neoplasms	151.6	ICD9CM	Malignant neoplasm of greater curvature of stomach, unspecified
Malignant Neoplasms	151.8	ICD9CM	Malignant neoplasm of other specified sites of stomach
Malignant Neoplasms	151.9	ICD9CM	Malignant neoplasm of stomach, unspecified site
Malignant Neoplasms	152.0	ICD9CM	Malignant neoplasm of duodenum
Malignant Neoplasms	152.1	ICD9CM	Malignant neoplasm of jejunum
Malignant Neoplasms	152.2	ICD9CM	Malignant neoplasm of ileum
Malignant Neoplasms	152.3	ICD9CM	Malignant neoplasm of Meckel's diverticulum
Malignant Neoplasms	152.8	ICD9CM	Malignant neoplasm of other specified sites of small intestine
Malignant Neoplasms	152.9	ICD9CM	Malignant neoplasm of small intestine, unspecified site
Malignant Neoplasms	153.0	ICD9CM	Malignant neoplasm of hepatic flexure
Malignant Neoplasms	153.1	ICD9CM	Malignant neoplasm of transverse colon
Malignant Neoplasms	153.2	ICD9CM	Malignant neoplasm of descending colon
Malignant Neoplasms	153.3	ICD9CM	Malignant neoplasm of sigmoid colon
Malignant Neoplasms	153.4	ICD9CM	Malignant neoplasm of cecum
Malignant Neoplasms	153.5	ICD9CM	Malignant neoplasm of appendix vermiformis
Malignant Neoplasms	153.6	ICD9CM	Malignant neoplasm of ascending colon
Malignant Neoplasms	153.7	ICD9CM	Malignant neoplasm of splenic flexure

Malignant Neoplasms	153.8	ICD9CM	Malignant neoplasm of other specified sites of large intestine
Malignant Neoplasms	153.9	ICD9CM	Malignant neoplasm of colon, unspecified site
Malignant Neoplasms	154.0	ICD9CM	Malignant neoplasm of rectosigmoid junction
Malignant Neoplasms	154.1	ICD9CM	Malignant neoplasm of rectum
Malignant Neoplasms	154.2	ICD9CM	Malignant neoplasm of anal canal
Malignant Neoplasms	154.3	ICD9CM	Malignant neoplasm of anus, unspecified site
Malignant Neoplasms	154.8	ICD9CM	Malignant neoplasm of other sites of rectum, rectosigmoid junction, and anus
Malignant Neoplasms	155.0	ICD9CM	Malignant neoplasm of liver, primary
Malignant Neoplasms	155.1	ICD9CM	Malignant neoplasm of intrahepatic bile ducts
Malignant Neoplasms	155.2	ICD9CM	Malignant neoplasm of liver, not specified as primary or secondary
Malignant Neoplasms	156.0	ICD9CM	Malignant neoplasm of gallbladder
Malignant Neoplasms	156.1	ICD9CM	Malignant neoplasm of extrahepatic bile ducts
Malignant Neoplasms	156.2	ICD9CM	Malignant neoplasm of ampulla of vater
Malignant Neoplasms	156.8	ICD9CM	Malignant neoplasm of other specified sites of gallbladder and extrahepatic bile ducts
Malignant Neoplasms	156.9	ICD9CM	Malignant neoplasm of biliary tract, part unspecified site
Malignant Neoplasms	157.0	ICD9CM	Malignant neoplasm of head of pancreas
Malignant Neoplasms	157.1	ICD9CM	Malignant neoplasm of body of pancreas
Malignant Neoplasms	157.2	ICD9CM	Malignant neoplasm of tail of pancreas
Malignant Neoplasms	157.3	ICD9CM	Malignant neoplasm of pancreatic duct
Malignant Neoplasms	157.4	ICD9CM	Malignant neoplasm of islets of langerhans
Malignant Neoplasms	157.8	ICD9CM	Malignant neoplasm of other specified sites of pancreas
Malignant Neoplasms	157.9	ICD9CM	Malignant neoplasm of pancreas, part unspecified
Malignant Neoplasms	158.0	ICD9CM	Malignant neoplasm of retroperitoneum
Malignant Neoplasms	158.8	ICD9CM	Malignant neoplasm of specified parts of peritoneum
Malignant Neoplasms	158.9	ICD9CM	Malignant neoplasm of peritoneum, unspecified
Malignant Neoplasms	159.0	ICD9CM	Malignant neoplasm of intestinal tract, part unspecified
Malignant Neoplasms	159.1	ICD9CM	Malignant neoplasm of spleen, not elsewhere classified

Malignant Neoplasms	159.8	ICD9CM	Malignant neoplasm of other sites of digestive system and intra-abdominal organs
Malignant Neoplasms	159.9	ICD9CM	Malignant neoplasm of ill-defined sites within the digestive organs and peritoneum
Malignant Neoplasms	160.0	ICD9CM	Malignant neoplasm of nasal cavities
Malignant Neoplasms	160.1	ICD9CM	Malignant neoplasm of auditory tube, middle ear, and mastoid air cells
Malignant Neoplasms	160.2	ICD9CM	Malignant neoplasm of maxillary sinus
Malignant Neoplasms	160.3	ICD9CM	Malignant neoplasm of ethmoidal sinus
Malignant Neoplasms	160.4	ICD9CM	Malignant neoplasm of frontal sinus
Malignant Neoplasms	160.5	ICD9CM	Malignant neoplasm of sphenoidal sinus
Malignant Neoplasms	160.8	ICD9CM	Malignant neoplasm of other accessory sinuses
Malignant Neoplasms	160.9	ICD9CM	Malignant neoplasm of accessory sinus, unspecified
Malignant Neoplasms	161.0	ICD9CM	Malignant neoplasm of glottis
Malignant Neoplasms	161.1	ICD9CM	Malignant neoplasm of supraglottis
Malignant Neoplasms	161.2	ICD9CM	Malignant neoplasm of subglottis
Malignant Neoplasms	161.3	ICD9CM	Malignant neoplasm of laryngeal cartilages
Malignant Neoplasms	161.8	ICD9CM	Malignant neoplasm of other specified sites of larynx
Malignant Neoplasms	161.9	ICD9CM	Malignant neoplasm of larynx, unspecified
Malignant Neoplasms	162.0	ICD9CM	Malignant neoplasm of trachea
Malignant Neoplasms	162.2	ICD9CM	Malignant neoplasm of main bronchus
Malignant Neoplasms	162.3	ICD9CM	Malignant neoplasm of upper lobe, bronchus or lung
Malignant Neoplasms	162.4	ICD9CM	Malignant neoplasm of middle lobe, bronchus or lung
Malignant Neoplasms	162.5	ICD9CM	Malignant neoplasm of lower lobe, bronchus or lung
Malignant Neoplasms	162.8	ICD9CM	Malignant neoplasm of other parts of bronchus or lung
Malignant Neoplasms	162.9	ICD9CM	Malignant neoplasm of bronchus and lung, unspecified
Malignant Neoplasms	163.0	ICD9CM	Malignant neoplasm of parietal pleura
Malignant Neoplasms	163.1	ICD9CM	Malignant neoplasm of visceral pleura
Malignant Neoplasms	163.8	ICD9CM	Malignant neoplasm of other specified sites of pleura

Malignant Neoplasms	163.9	ICD9CM	Malignant neoplasm of pleura, unspecified
Malignant Neoplasms	164.0	ICD9CM	Malignant neoplasm of thymus
Malignant Neoplasms	164.1	ICD9CM	Malignant neoplasm of heart
Malignant Neoplasms	164.2	ICD9CM	Malignant neoplasm of anterior mediastinum
Malignant Neoplasms	164.3	ICD9CM	Malignant neoplasm of posterior mediastinum
Malignant Neoplasms	164.8	ICD9CM	Malignant neoplasm of other parts of mediastinum
Malignant Neoplasms	164.9	ICD9CM	Malignant neoplasm of mediastinum, part unspecified
Malignant Neoplasms	165.0	ICD9CM	Malignant neoplasm of upper respiratory tract, part unspecified
Malignant Neoplasms	165.8	ICD9CM	Malignant neoplasm of other sites within the respiratory system and intrathoracic organs
Malignant Neoplasms	165.9	ICD9CM	Malignant neoplasm of ill-defined sites within the respiratory system
Malignant Neoplasms	170.0	ICD9CM	Malignant neoplasm of bones of skull and face, except mandible
Malignant Neoplasms	170.1	ICD9CM	Malignant neoplasm of mandible
Malignant Neoplasms	170.2	ICD9CM	Malignant neoplasm of vertebral column, excluding sacrum and coccyx
Malignant Neoplasms	170.3	ICD9CM	Malignant neoplasm of ribs, sternum, and clavicle
Malignant Neoplasms	170.4	ICD9CM	Malignant neoplasm of scapula and long bones of upper limb
Malignant Neoplasms	170.5	ICD9CM	Malignant neoplasm of short bones of upper limb
Malignant Neoplasms	170.6	ICD9CM	Malignant neoplasm of pelvic bones, sacrum, and coccyx
Malignant Neoplasms	170.7	ICD9CM	Malignant neoplasm of long bones of lower limb
Malignant Neoplasms	170.8	ICD9CM	Malignant neoplasm of short bones of lower limb
Malignant Neoplasms	170.9	ICD9CM	Malignant neoplasm of bone and articular cartilage, site unspecified
Malignant Neoplasms	171.0	ICD9CM	Malignant neoplasm of connective and other soft tissue of head, face, and neck
Malignant Neoplasms	171.2	ICD9CM	Malignant neoplasm of connective and other soft tissue of upper limb, including shoulder
Malignant Neoplasms	171.3	ICD9CM	Malignant neoplasm of connective and other soft tissue of lower limb, including hip
Malignant Neoplasms	171.4	ICD9CM	Malignant neoplasm of connective and other soft tissue of thorax
Malignant Neoplasms	171.5	ICD9CM	Malignant neoplasm of connective and other soft tissue of abdomen

Malignant Neoplasms	171.6	ICD9CM	Malignant neoplasm of connective and other soft tissue of pelvis
Malignant Neoplasms	171.7	ICD9CM	Malignant neoplasm of connective and other soft tissue of trunk, unspecified
Malignant Neoplasms	171.8	ICD9CM	Malignant neoplasm of other specified sites of connective and other soft tissue
Malignant Neoplasms	171.9	ICD9CM	Malignant neoplasm of connective and other soft tissue, site unspecified
Malignant Neoplasms	172.0	ICD9CM	Malignant melanoma of skin of lip
Malignant Neoplasms	172.1	ICD9CM	Malignant melanoma of skin of eyelid, including canthus
Malignant Neoplasms	172.2	ICD9CM	Malignant melanoma of skin of ear and external auditory canal
Malignant Neoplasms	172.3	ICD9CM	Malignant melanoma of skin of other and unspecified parts of face
Malignant Neoplasms	172.4	ICD9CM	Malignant melanoma of skin of scalp and neck
Malignant Neoplasms	172.5	ICD9CM	Malignant melanoma of skin of trunk, except scrotum
Malignant Neoplasms	172.6	ICD9CM	Malignant melanoma of skin of upper limb, including shoulder
Malignant Neoplasms	172.7	ICD9CM	Malignant melanoma of skin of lower limb, including hip
Malignant Neoplasms	172.8	ICD9CM	Malignant melanoma of other specified sites of skin
Malignant Neoplasms	172.9	ICD9CM	Melanoma of skin, site unspecified
Malignant Neoplasms	173.00	ICD9CM	Unspecified malignant neoplasm of skin of lip
Malignant Neoplasms	173.01	ICD9CM	Basal cell carcinoma of skin of lip
Malignant Neoplasms	173.02	ICD9CM	Squamous cell carcinoma of skin of lip
Malignant Neoplasms	173.09	ICD9CM	Other specified malignant neoplasm of skin of lip
Malignant Neoplasms	173.10	ICD9CM	Unspecified malignant neoplasm of eyelid, including canthus
Malignant Neoplasms	173.11	ICD9CM	Basal cell carcinoma of eyelid, including canthus
Malignant Neoplasms	173.12	ICD9CM	Squamous cell carcinoma of eyelid, including canthus
Malignant Neoplasms	173.19	ICD9CM	Other specified malignant neoplasm of eyelid, including canthus
Malignant Neoplasms	173.20	ICD9CM	Unspecified malignant neoplasm of skin of ear and external auditory canal
Malignant Neoplasms	173.21	ICD9CM	Basal cell carcinoma of skin of ear and external auditory canal
Malignant Neoplasms	173.22	ICD9CM	Squamous cell carcinoma of skin of ear and external auditory canal
Malignant Neoplasms	173.29	ICD9CM	Other specified malignant neoplasm of skin of ear and external auditory canal
Malignant Neoplasms	173.30	ICD9CM	Unspecified malignant neoplasm of skin of other and unspecified parts of face

Malignant Neoplasms	173.31	ICD9CM	Basal cell carcinoma of skin of other and unspecified parts of face
Malignant Neoplasms	173.32	ICD9CM	Squamous cell carcinoma of skin of other and unspecified parts of face
Malignant Neoplasms	173.39	ICD9CM	Other specified malignant neoplasm of skin of other and unspecified parts of face
Malignant Neoplasms	173.40	ICD9CM	Unspecified malignant neoplasm of scalp and skin of neck
Malignant Neoplasms	173.41	ICD9CM	Basal cell carcinoma of scalp and skin of neck
Malignant Neoplasms	173.42	ICD9CM	Squamous cell carcinoma of scalp and skin of neck
Malignant Neoplasms	173.49	ICD9CM	Other specified malignant neoplasm of scalp and skin of neck
Malignant Neoplasms	173.50	ICD9CM	Unspecified malignant neoplasm of skin of trunk, except scrotum
Malignant Neoplasms	173.51	ICD9CM	Basal cell carcinoma of skin of trunk, except scrotum
Malignant Neoplasms	173.52	ICD9CM	Squamous cell carcinoma of skin of trunk, except scrotum
Malignant Neoplasms	173.59	ICD9CM	Other specified malignant neoplasm of skin of trunk, except scrotum
Malignant Neoplasms	173.60	ICD9CM	Unspecified malignant neoplasm of skin of upper limb, including shoulder
Malignant Neoplasms	173.61	ICD9CM	Basal cell carcinoma of skin of upper limb, including shoulder
Malignant Neoplasms	173.62	ICD9CM	Squamous cell carcinoma of skin of upper limb, including shoulder
Malignant Neoplasms	173.69	ICD9CM	Other specified malignant neoplasm of skin of upper limb, including shoulder
Malignant Neoplasms	173.70	ICD9CM	Unspecified malignant neoplasm of skin of lower limb, including hip
Malignant Neoplasms	173.71	ICD9CM	Basal cell carcinoma of skin of lower limb, including hip
Malignant Neoplasms	173.72	ICD9CM	Squamous cell carcinoma of skin of lower limb, including hip
Malignant Neoplasms	173.79	ICD9CM	Other specified malignant neoplasm of skin of lower limb, including hip
Malignant Neoplasms	173.80	ICD9CM	Unspecified malignant neoplasm of other specified sites of skin
Malignant Neoplasms	173.81	ICD9CM	Basal cell carcinoma of other specified sites of skin
Malignant Neoplasms	173.82	ICD9CM	Squamous cell carcinoma of other specified sites of skin
Malignant Neoplasms	173.89	ICD9CM	Other specified malignant neoplasm of other specified sites of skin
Malignant Neoplasms	173.90	ICD9CM	Unspecified malignant neoplasm of skin, site unspecified
Malignant Neoplasms	173.91	ICD9CM	Basal cell carcinoma of skin, site unspecified
Malignant Neoplasms	173.92	ICD9CM	Squamous cell carcinoma of skin, site unspecified
Malignant Neoplasms	173.99	ICD9CM	Other specified malignant neoplasm of skin, site unspecified

Malignant Neoplasms	174.0	ICD9CM	Malignant neoplasm of nipple and areola of female breast
Malignant Neoplasms	174.1	ICD9CM	Malignant neoplasm of central portion of female breast
Malignant Neoplasms	174.2	ICD9CM	Malignant neoplasm of upper-inner quadrant of female breast
Malignant Neoplasms	174.3	ICD9CM	Malignant neoplasm of lower-inner quadrant of female breast
Malignant Neoplasms	174.4	ICD9CM	Malignant neoplasm of upper-outer quadrant of female breast
Malignant Neoplasms	174.5	ICD9CM	Malignant neoplasm of lower-outer quadrant of female breast
Malignant Neoplasms	174.6	ICD9CM	Malignant neoplasm of axillary tail of female breast
Malignant Neoplasms	174.8	ICD9CM	Malignant neoplasm of other specified sites of female breast
Malignant Neoplasms	174.9	ICD9CM	Malignant neoplasm of breast (female), unspecified
Malignant Neoplasms	175.0	ICD9CM	Malignant neoplasm of nipple and areola of male breast
Malignant Neoplasms	175.9	ICD9CM	Malignant neoplasm of other and unspecified sites of male breast
Malignant Neoplasms	176.0	ICD9CM	Kaposi's sarcoma, skin
Malignant Neoplasms	176.1	ICD9CM	Kaposi's sarcoma, soft tissue
Malignant Neoplasms	176.2	ICD9CM	Kaposi's sarcoma, palate
Malignant Neoplasms	176.3	ICD9CM	Kaposi's sarcoma, gastrointestinal sites
Malignant Neoplasms	176.4	ICD9CM	Kaposi's sarcoma, lung
Malignant Neoplasms	176.5	ICD9CM	Kaposi's sarcoma, lymph nodes
Malignant Neoplasms	176.8	ICD9CM	Kaposi's sarcoma, other specified sites
Malignant Neoplasms	176.9	ICD9CM	Kaposi's sarcoma, unspecified site
Malignant Neoplasms	179	ICD9CM	Malignant neoplasm of uterus, part unspecified
Malignant Neoplasms	180.0	ICD9CM	Malignant neoplasm of endocervix
Malignant Neoplasms	180.1	ICD9CM	Malignant neoplasm of exocervix
Malignant Neoplasms	180.8	ICD9CM	Malignant neoplasm of other specified sites of cervix
Malignant Neoplasms	180.9	ICD9CM	Malignant neoplasm of cervix uteri, unspecified site
Malignant Neoplasms	181	ICD9CM	Malignant neoplasm of placenta
Malignant Neoplasms	182.0	ICD9CM	Malignant neoplasm of corpus uteri, except isthmus
Malignant Neoplasms	182.1	ICD9CM	Malignant neoplasm of isthmus

Malignant Neoplasms	182.8	ICD9CM	Malignant neoplasm of other specified sites of body of uterus
Malignant Neoplasms	183.0	ICD9CM	Malignant neoplasm of ovary
Malignant Neoplasms	183.2	ICD9CM	Malignant neoplasm of fallopian tube
Malignant Neoplasms	183.3	ICD9CM	Malignant neoplasm of broad ligament of uterus
Malignant Neoplasms	183.4	ICD9CM	Malignant neoplasm of parametrium
Malignant Neoplasms	183.5	ICD9CM	Malignant neoplasm of round ligament of uterus
Malignant Neoplasms	183.8	ICD9CM	Malignant neoplasm of other specified sites of uterine adnexa
Malignant Neoplasms	183.9	ICD9CM	Malignant neoplasm of uterine adnexa, unspecified site
Malignant Neoplasms	184.0	ICD9CM	Malignant neoplasm of vagina
Malignant Neoplasms	184.1	ICD9CM	Malignant neoplasm of labia majora
Malignant Neoplasms	184.2	ICD9CM	Malignant neoplasm of labia minora
Malignant Neoplasms	184.3	ICD9CM	Malignant neoplasm of clitoris
Malignant Neoplasms	184.4	ICD9CM	Malignant neoplasm of vulva, unspecified site
Malignant Neoplasms	184.8	ICD9CM	Malignant neoplasm of other specified sites of female genital organs
Malignant Neoplasms	184.9	ICD9CM	Malignant neoplasm of female genital organ, site unspecified
Malignant Neoplasms	185	ICD9CM	Malignant neoplasm of prostate
Malignant Neoplasms	186.0	ICD9CM	Malignant neoplasm of undescended testis
Malignant Neoplasms	186.9	ICD9CM	Malignant neoplasm of other and unspecified testis
Malignant Neoplasms	187.1	ICD9CM	Malignant neoplasm of prepuce
Malignant Neoplasms	187.2	ICD9CM	Malignant neoplasm of glans penis
Malignant Neoplasms	187.3	ICD9CM	Malignant neoplasm of body of penis
Malignant Neoplasms	187.4	ICD9CM	Malignant neoplasm of penis, part unspecified
Malignant Neoplasms	187.5	ICD9CM	Malignant neoplasm of epididymis
Malignant Neoplasms	187.6	ICD9CM	Malignant neoplasm of spermatic cord
Malignant Neoplasms	187.7	ICD9CM	Malignant neoplasm of scrotum
Malignant Neoplasms	187.8	ICD9CM	Malignant neoplasm of other specified sites of male genital organs
Malignant Neoplasms	187.9	ICD9CM	Malignant neoplasm of male genital organ, site unspecified

Malignant Neoplasms	188.0	ICD9CM	Malignant neoplasm of trigone of urinary bladder
Malignant Neoplasms	188.1	ICD9CM	Malignant neoplasm of dome of urinary bladder
Malignant Neoplasms	188.2	ICD9CM	Malignant neoplasm of lateral wall of urinary bladder
Malignant Neoplasms	188.3	ICD9CM	Malignant neoplasm of anterior wall of urinary bladder
Malignant Neoplasms	188.4	ICD9CM	Malignant neoplasm of posterior wall of urinary bladder
Malignant Neoplasms	188.5	ICD9CM	Malignant neoplasm of bladder neck
Malignant Neoplasms	188.6	ICD9CM	Malignant neoplasm of ureteric orifice
Malignant Neoplasms	188.7	ICD9CM	Malignant neoplasm of urachus
Malignant Neoplasms	188.8	ICD9CM	Malignant neoplasm of other specified sites of bladder
Malignant Neoplasms	188.9	ICD9CM	Malignant neoplasm of bladder, part unspecified
Malignant Neoplasms	189.0	ICD9CM	Malignant neoplasm of kidney, except pelvis
Malignant Neoplasms	189.1	ICD9CM	Malignant neoplasm of renal pelvis
Malignant Neoplasms	189.2	ICD9CM	Malignant neoplasm of ureter
Malignant Neoplasms	189.3	ICD9CM	Malignant neoplasm of urethra
Malignant Neoplasms	189.4	ICD9CM	Malignant neoplasm of paraurethral glands
Malignant Neoplasms	189.8	ICD9CM	Malignant neoplasm of other specified sites of urinary organs
Malignant Neoplasms	189.9	ICD9CM	Malignant neoplasm of urinary organ, site unspecified
Malignant Neoplasms	190.0	ICD9CM	Malignant neoplasm of eyeball, except conjunctiva, cornea, retina, and choroid
Malignant Neoplasms	190.1	ICD9CM	Malignant neoplasm of orbit
Malignant Neoplasms	190.2	ICD9CM	Malignant neoplasm of lacrimal gland
Malignant Neoplasms	190.3	ICD9CM	Malignant neoplasm of conjunctiva
Malignant Neoplasms	190.4	ICD9CM	Malignant neoplasm of cornea
Malignant Neoplasms	190.5	ICD9CM	Malignant neoplasm of retina
Malignant Neoplasms	190.6	ICD9CM	Malignant neoplasm of choroid
Malignant Neoplasms	190.7	ICD9CM	Malignant neoplasm of lacrimal duct
Malignant Neoplasms	190.8	ICD9CM	Malignant neoplasm of other specified sites of eye
Malignant Neoplasms	190.9	ICD9CM	Malignant neoplasm of eye, part unspecified

Malignant Neoplasms	191.0	ICD9CM	Malignant neoplasm of cerebrum, except lobes and ventricles
Malignant Neoplasms	191.1	ICD9CM	Malignant neoplasm of frontal lobe
Malignant Neoplasms	191.2	ICD9CM	Malignant neoplasm of temporal lobe
Malignant Neoplasms	191.3	ICD9CM	Malignant neoplasm of parietal lobe
Malignant Neoplasms	191.4	ICD9CM	Malignant neoplasm of occipital lobe
Malignant Neoplasms	191.5	ICD9CM	Malignant neoplasm of ventricles
Malignant Neoplasms	191.6	ICD9CM	Malignant neoplasm of cerebellum nos
Malignant Neoplasms	191.7	ICD9CM	Malignant neoplasm of brain stem
Malignant Neoplasms	191.8	ICD9CM	Malignant neoplasm of other parts of brain
Malignant Neoplasms	191.9	ICD9CM	Malignant neoplasm of brain, unspecified
Malignant Neoplasms	192.0	ICD9CM	Malignant neoplasm of cranial nerves
Malignant Neoplasms	192.1	ICD9CM	Malignant neoplasm of cerebral meninges
Malignant Neoplasms	192.2	ICD9CM	Malignant neoplasm of spinal cord
Malignant Neoplasms	192.3	ICD9CM	Malignant neoplasm of spinal meninges
Malignant Neoplasms	192.8	ICD9CM	Malignant neoplasm of other specified sites of nervous system
Malignant Neoplasms	192.9	ICD9CM	Malignant neoplasm of nervous system, part unspecified
Malignant Neoplasms	193	ICD9CM	Malignant neoplasm of thyroid gland
Malignant Neoplasms	194.0	ICD9CM	Malignant neoplasm of adrenal gland
Malignant Neoplasms	194.1	ICD9CM	Malignant neoplasm of parathyroid gland
Malignant Neoplasms	194.3	ICD9CM	Malignant neoplasm of pituitary gland and craniopharyngeal duct
Malignant Neoplasms	194.4	ICD9CM	Malignant neoplasm of pineal gland
Malignant Neoplasms	194.5	ICD9CM	Malignant neoplasm of carotid body
Malignant Neoplasms	194.6	ICD9CM	Malignant neoplasm of aortic body and other paraganglia
Malignant Neoplasms	194.8	ICD9CM	Malignant neoplasm of other endocrine glands and related structures
Malignant Neoplasms	194.9	ICD9CM	Malignant neoplasm of endocrine gland, site unspecified
Malignant Neoplasms	195.0	ICD9CM	Malignant neoplasm of head, face, and neck
Malignant Neoplasms	195.1	ICD9CM	Malignant neoplasm of thorax

Malignant Neoplasms	195.2	ICD9CM	Malignant neoplasm of abdomen
Malignant Neoplasms	195.3	ICD9CM	Malignant neoplasm of pelvis
Malignant Neoplasms	195.4	ICD9CM	Malignant neoplasm of upper limb
Malignant Neoplasms	195.5	ICD9CM	Malignant neoplasm of lower limb
Malignant Neoplasms	195.8	ICD9CM	Malignant neoplasm of other specified sites
Malignant Neoplasms	196.0	ICD9CM	Secondary and unspecified malignant neoplasm of lymph nodes of head, face, and neck
Malignant Neoplasms	196.1	ICD9CM	Secondary and unspecified malignant neoplasm of intrathoracic lymph nodes
Malignant Neoplasms	196.2	ICD9CM	Secondary and unspecified malignant neoplasm of intra-abdominal lymph nodes
Malignant Neoplasms	196.3	ICD9CM	Secondary and unspecified malignant neoplasm of lymph nodes of axilla and upper limb
Malignant Neoplasms	196.5	ICD9CM	Secondary and unspecified malignant neoplasm of lymph nodes of inguinal region and lower limb
Malignant Neoplasms	196.6	ICD9CM	Secondary and unspecified malignant neoplasm of intrapelvic lymph nodes
Malignant Neoplasms	196.8	ICD9CM	Secondary and unspecified malignant neoplasm of lymph nodes of multiple sites
Malignant Neoplasms	196.9	ICD9CM	Secondary and unspecified malignant neoplasm of lymph nodes, site unspecified
Malignant Neoplasms	197.0	ICD9CM	Secondary malignant neoplasm of lung
Malignant Neoplasms	197.1	ICD9CM	Secondary malignant neoplasm of mediastinum
Malignant Neoplasms	197.2	ICD9CM	Secondary malignant neoplasm of pleura
Malignant Neoplasms	197.3	ICD9CM	Secondary malignant neoplasm of other respiratory organs
Malignant Neoplasms	197.4	ICD9CM	Secondary malignant neoplasm of small intestine including duodenum
Malignant Neoplasms	197.5	ICD9CM	Secondary malignant neoplasm of large intestine and rectum
Malignant Neoplasms	197.6	ICD9CM	Secondary malignant neoplasm of retroperitoneum and peritoneum
Malignant Neoplasms	197.7	ICD9CM	Malignant neoplasm of liver, secondary
Malignant Neoplasms	197.8	ICD9CM	Secondary malignant neoplasm of other digestive organs and spleen
Malignant Neoplasms	198.0	ICD9CM	Secondary malignant neoplasm of kidney
Malignant Neoplasms	198.1	ICD9CM	Secondary malignant neoplasm of other urinary organs
Malignant Neoplasms	198.2	ICD9CM	Secondary malignant neoplasm of skin

Malignant Neoplasms	198.3	ICD9CM	Secondary malignant neoplasm of brain and spinal cord
Malignant Neoplasms	198.4	ICD9CM	Secondary malignant neoplasm of other parts of nervous system
Malignant Neoplasms	198.5	ICD9CM	Secondary malignant neoplasm of bone and bone marrow
Malignant Neoplasms	198.6	ICD9CM	Secondary malignant neoplasm of ovary
Malignant Neoplasms	198.7	ICD9CM	Secondary malignant neoplasm of adrenal gland
Malignant Neoplasms	198.81	ICD9CM	Secondary malignant neoplasm of breast
Malignant Neoplasms	198.82	ICD9CM	Secondary malignant neoplasm of genital organs
Malignant Neoplasms	198.89	ICD9CM	Secondary malignant neoplasm of other specified sites
Malignant Neoplasms	199.0	ICD9CM	Disseminated malignant neoplasm without specification of site
Malignant Neoplasms	199.1	ICD9CM	Other malignant neoplasm without specification of site
Malignant Neoplasms	199.2	ICD9CM	Malignant neoplasm associated with transplant organ
Malignant Neoplasms	200.00	ICD9CM	Reticulosarcoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.01	ICD9CM	Reticulosarcoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.02	ICD9CM	Reticulosarcoma, intrathoracic lymph nodes
Malignant Neoplasms	200.03	ICD9CM	Reticulosarcoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.04	ICD9CM	Reticulosarcoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.05	ICD9CM	Reticulosarcoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.06	ICD9CM	Reticulosarcoma, intrapelvic lymph nodes
Malignant Neoplasms	200.07	ICD9CM	Reticulosarcoma, spleen
Malignant Neoplasms	200.08	ICD9CM	Reticulosarcoma, lymph nodes of multiple sites
Malignant Neoplasms	200.10	ICD9CM	Lymphosarcoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.11	ICD9CM	Lymphosarcoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.12	ICD9CM	Lymphosarcoma, intrathoracic lymph nodes
Malignant Neoplasms	200.13	ICD9CM	Lymphosarcoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.14	ICD9CM	Lymphosarcoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.15	ICD9CM	Lymphosarcoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.16	ICD9CM	Lymphosarcoma, intrapelvic lymph nodes

Malignant Neoplasms	200.17	ICD9CM	Lymphosarcoma, spleen
Malignant Neoplasms	200.18	ICD9CM	Lymphosarcoma, lymph nodes of multiple sites
Malignant Neoplasms	200.20	ICD9CM	Burkitt's tumor or lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.21	ICD9CM	Burkitt's tumor or lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.22	ICD9CM	Burkitt's tumor or lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	200.23	ICD9CM	Burkitt's tumor or lymphoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.24	ICD9CM	Burkitt's tumor or lymphoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.25	ICD9CM	Burkitt's tumor or lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.26	ICD9CM	Burkitt's tumor or lymphoma, intrapelvic lymph nodes
Malignant Neoplasms	200.27	ICD9CM	Burkitt's tumor or lymphoma, spleen
Malignant Neoplasms	200.28	ICD9CM	Burkitt's tumor or lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	200.30	ICD9CM	Marginal zone lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.31	ICD9CM	Marginal zone lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.32	ICD9CM	Marginal zone lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	200.33	ICD9CM	Marginal zone lymphoma, intraabdominal lymph nodes
Malignant Neoplasms	200.34	ICD9CM	Marginal zone lymphoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.35	ICD9CM	Marginal zone lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.36	ICD9CM	Marginal zone lymphoma, intrapelvic lymph nodes
Malignant Neoplasms	200.37	ICD9CM	Marginal zone lymphoma, spleen
Malignant Neoplasms	200.38	ICD9CM	Marginal zone lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	200.40	ICD9CM	Mantle cell lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.41	ICD9CM	Mantle cell lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.42	ICD9CM	Mantle cell lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	200.43	ICD9CM	Mantle cell lymphoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.44	ICD9CM	Mantle cell lymphoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.45	ICD9CM	Mantle cell lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.46	ICD9CM	Mantle cell lymphoma, intrapelvic lymph nodes

Malignant Neoplasms	200.47	ICD9CM	Mantle cell lymphoma, spleen
Malignant Neoplasms	200.48	ICD9CM	Mantle cell lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	200.50	ICD9CM	Primary central nervous system lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.51	ICD9CM	Primary central nervous system lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.52	ICD9CM	Primary central nervous system lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	200.53	ICD9CM	Primary central nervous system lymphoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.54	ICD9CM	Primary central nervous system lymphoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.55	ICD9CM	Primary central nervous system lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.56	ICD9CM	Primary central nervous system lymphoma, intrapelvic lymph nodes
Malignant Neoplasms	200.57	ICD9CM	Primary central nervous system lymphoma, spleen
Malignant Neoplasms	200.58	ICD9CM	Primary central nervous system lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	200.60	ICD9CM	Anaplastic large cell lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.61	ICD9CM	Anaplastic large cell lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.62	ICD9CM	Anaplastic large cell lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	200.63	ICD9CM	Anaplastic large cell lymphoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.64	ICD9CM	Anaplastic large cell lymphoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.65	ICD9CM	Anaplastic large cell lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.66	ICD9CM	Anaplastic large cell lymphoma, intrapelvic lymph nodes
Malignant Neoplasms	200.67	ICD9CM	Anaplastic large cell lymphoma, spleen
Malignant Neoplasms	200.68	ICD9CM	Anaplastic large cell lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	200.70	ICD9CM	Large cell lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.71	ICD9CM	Large cell lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.72	ICD9CM	Large cell lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	200.73	ICD9CM	Large cell lymphoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.74	ICD9CM	Large cell lymphoma, lymph nodes of axilla and upper limb

Malignant Neoplasms	200.75	ICD9CM	Large cell lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.76	ICD9CM	Large cell lymphoma, intrapelvic lymph nodes
Malignant Neoplasms	200.77	ICD9CM	Large cell lymphoma, spleen
Malignant Neoplasms	200.78	ICD9CM	Large cell lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	200.80	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	200.81	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, lymph nodes of head, face, and neck
Malignant Neoplasms	200.82	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, intrathoracic lymph nodes
Malignant Neoplasms	200.83	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, intra-abdominal lymph nodes
Malignant Neoplasms	200.84	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	200.85	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	200.86	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, intrapelvic lymph nodes
Malignant Neoplasms	200.87	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, spleen
Malignant Neoplasms	200.88	ICD9CM	Other named variants of lymphosarcoma and reticulosarcoma, lymph nodes of multiple sites
Malignant Neoplasms	201.00	ICD9CM	Hodgkin's paragranuloma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.01	ICD9CM	Hodgkin's paragranuloma, lymph nodes of head, face, and neck
Malignant Neoplasms	201.02	ICD9CM	Hodgkin's paragranuloma, intrathoracic lymph nodes
Malignant Neoplasms	201.03	ICD9CM	Hodgkin's paragranuloma, intra-abdominal lymph nodes
Malignant Neoplasms	201.04	ICD9CM	Hodgkin's paragranuloma, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.05	ICD9CM	Hodgkin's paragranuloma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.06	ICD9CM	Hodgkin's paragranuloma, intrapelvic lymph nodes

Malignant Neoplasms	201.07	ICD9CM	Hodgkin's paragranuloma, spleen
Malignant Neoplasms	201.08	ICD9CM	Hodgkin's paragranuloma, lymph nodes of multiple sites
Malignant Neoplasms	201.10	ICD9CM	Hodgkin's granuloma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.11	ICD9CM	Hodgkin's granuloma, lymph nodes of head, face, and neck
Malignant Neoplasms	201.12	ICD9CM	Hodgkin's granuloma, intrathoracic lymph nodes
Malignant Neoplasms	201.13	ICD9CM	Hodgkin's granuloma, intra-abdominal lymph nodes
Malignant Neoplasms	201.14	ICD9CM	Hodgkin's granuloma, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.15	ICD9CM	Hodgkin's granuloma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.16	ICD9CM	Hodgkin's granuloma, intrapelvic lymph nodes
Malignant Neoplasms	201.17	ICD9CM	Hodgkin's granuloma, spleen
Malignant Neoplasms	201.18	ICD9CM	Hodgkin's granuloma, lymph nodes of multiple sites
Malignant Neoplasms	201.20	ICD9CM	Hodgkin's sarcoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.21	ICD9CM	Hodgkin's sarcoma, lymph nodes of head, face, and neck
Malignant Neoplasms	201.22	ICD9CM	Hodgkin's sarcoma, intrathoracic lymph nodes
Malignant Neoplasms	201.23	ICD9CM	Hodgkin's sarcoma, intra-abdominal lymph nodes
Malignant Neoplasms	201.24	ICD9CM	Hodgkin's sarcoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.25	ICD9CM	Hodgkin's sarcoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.26	ICD9CM	Hodgkin's sarcoma, intrapelvic lymph nodes
Malignant Neoplasms	201.27	ICD9CM	Hodgkin's sarcoma, spleen
Malignant Neoplasms	201.28	ICD9CM	Hodgkin's sarcoma, lymph nodes of multiple sites
Malignant Neoplasms	201.40	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.41	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, lymph nodes of head, face, and neck
Malignant Neoplasms	201.42	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, intrathoracic lymph nodes
Malignant Neoplasms	201.43	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, intra-abdominal lymph nodes

Malignant Neoplasms	201.44	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.45	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.46	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, intrapelvic lymph nodes
Malignant Neoplasms	201.47	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, spleen
Malignant Neoplasms	201.48	ICD9CM	Hodgkin's disease, lymphocytic-histiocytic predominance, lymph nodes of multiple sites
Malignant Neoplasms	201.50	ICD9CM	Hodgkin's disease, nodular sclerosis, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.51	ICD9CM	Hodgkin's disease, nodular sclerosis, lymph nodes of head, face, and neck
Malignant Neoplasms	201.52	ICD9CM	Hodgkin's disease, nodular sclerosis, intrathoracic lymph nodes
Malignant Neoplasms	201.53	ICD9CM	Hodgkin's disease, nodular sclerosis, intra-abdominal lymph nodes
Malignant Neoplasms	201.54	ICD9CM	Hodgkin's disease, nodular sclerosis, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.55	ICD9CM	Hodgkin's disease, nodular sclerosis, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.56	ICD9CM	Hodgkin's disease, nodular sclerosis, intrapelvic lymph nodes
Malignant Neoplasms	201.57	ICD9CM	Hodgkin's disease, nodular sclerosis, spleen
Malignant Neoplasms	201.58	ICD9CM	Hodgkin's disease, nodular sclerosis, lymph nodes of multiple sites
Malignant Neoplasms	201.60	ICD9CM	Hodgkin's disease, mixed cellularity, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.61	ICD9CM	Hodgkin's disease, mixed cellularity, lymph nodes of head, face, and neck
Malignant Neoplasms	201.62	ICD9CM	Hodgkin's disease, mixed cellularity, intrathoracic lymph nodes
Malignant Neoplasms	201.63	ICD9CM	Hodgkin's disease, mixed cellularity, intra-abdominal lymph nodes
Malignant Neoplasms	201.64	ICD9CM	Hodgkin's disease, mixed cellularity, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.65	ICD9CM	Hodgkin's disease, mixed cellularity, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.66	ICD9CM	Hodgkin's disease, mixed cellularity, intrapelvic lymph nodes
Malignant Neoplasms	201.67	ICD9CM	Hodgkin's disease, mixed cellularity, spleen

Malignant Neoplasms	201.68	ICD9CM	Hodgkin's disease, mixed cellularity, lymph nodes of multiple sites
Malignant Neoplasms	201.70	ICD9CM	Hodgkin's disease, lymphocytic depletion, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.71	ICD9CM	Hodgkin's disease, lymphocytic depletion, lymph nodes of head, face, and neck
Malignant Neoplasms	201.72	ICD9CM	Hodgkin's disease, lymphocytic depletion, intrathoracic lymph nodes
Malignant Neoplasms	201.73	ICD9CM	Hodgkin's disease, lymphocytic depletion, intra-abdominal lymph nodes
Malignant Neoplasms	201.74	ICD9CM	Hodgkin's disease, lymphocytic depletion, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.75	ICD9CM	Hodgkin's disease, lymphocytic depletion, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.76	ICD9CM	Hodgkin's disease, lymphocytic depletion, intrapelvic lymph nodes
Malignant Neoplasms	201.77	ICD9CM	Hodgkin's disease, lymphocytic depletion, spleen
Malignant Neoplasms	201.78	ICD9CM	Hodgkin's disease, lymphocytic depletion, lymph nodes of multiple sites
Malignant Neoplasms	201.90	ICD9CM	Hodgkin's disease, unspecified type, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	201.91	ICD9CM	Hodgkin's disease, unspecified type, lymph nodes of head, face, and neck
Malignant Neoplasms	201.92	ICD9CM	Hodgkin's disease, unspecified type, intrathoracic lymph nodes
Malignant Neoplasms	201.93	ICD9CM	Hodgkin's disease, unspecified type, intra-abdominal lymph nodes
Malignant Neoplasms	201.94	ICD9CM	Hodgkin's disease, unspecified type, lymph nodes of axilla and upper limb
Malignant Neoplasms	201.95	ICD9CM	Hodgkin's disease, unspecified type, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	201.96	ICD9CM	Hodgkin's disease, unspecified type, intrapelvic lymph nodes
Malignant Neoplasms	201.97	ICD9CM	Hodgkin's disease, unspecified type, spleen
Malignant Neoplasms	201.98	ICD9CM	Hodgkin's disease, unspecified type, lymph nodes of multiple sites
Malignant Neoplasms	202.00	ICD9CM	Nodular lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.01	ICD9CM	Nodular lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	202.02	ICD9CM	Nodular lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	202.03	ICD9CM	Nodular lymphoma, intra-abdominal lymph nodes
Malignant Neoplasms	202.04	ICD9CM	Nodular lymphoma, lymph nodes of axilla and upper limb

Malignant Neoplasms	202.05	ICD9CM	Nodular lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.06	ICD9CM	Nodular lymphoma, intrapelvic lymph nodes
Malignant Neoplasms	202.07	ICD9CM	Nodular lymphoma, spleen
Malignant Neoplasms	202.08	ICD9CM	Nodular lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	202.10	ICD9CM	Mycosis fungoides, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.11	ICD9CM	Mycosis fungoides, lymph nodes of head, face, and neck
Malignant Neoplasms	202.12	ICD9CM	Mycosis fungoides, intrathoracic lymph nodes
Malignant Neoplasms	202.13	ICD9CM	Mycosis fungoides, intra-abdominal lymph nodes
Malignant Neoplasms	202.14	ICD9CM	Mycosis fungoides, lymph nodes of axilla and upper limb
Malignant Neoplasms	202.15	ICD9CM	Mycosis fungoides, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.16	ICD9CM	Mycosis fungoides, intrapelvic lymph nodes
Malignant Neoplasms	202.17	ICD9CM	Mycosis fungoides, spleen
Malignant Neoplasms	202.18	ICD9CM	Mycosis fungoides, lymph nodes of multiple sites
Malignant Neoplasms	202.20	ICD9CM	Sezary's disease, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.21	ICD9CM	Sezary's disease, lymph nodes of head, face, and neck
Malignant Neoplasms	202.22	ICD9CM	Sezary's disease, intrathoracic lymph nodes
Malignant Neoplasms	202.23	ICD9CM	Sezary's disease, intra-abdominal lymph nodes
Malignant Neoplasms	202.24	ICD9CM	Sezary's disease, lymph nodes of axilla and upper limb
Malignant Neoplasms	202.25	ICD9CM	Sezary's disease, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.26	ICD9CM	Sezary's disease, intrapelvic lymph nodes
Malignant Neoplasms	202.27	ICD9CM	Sezary's disease, spleen
Malignant Neoplasms	202.28	ICD9CM	Sezary's disease, lymph nodes of multiple sites
Malignant Neoplasms	202.30	ICD9CM	Malignant histiocytosis, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.31	ICD9CM	Malignant histiocytosis, lymph nodes of head, face, and neck
Malignant Neoplasms	202.32	ICD9CM	Malignant histiocytosis, intrathoracic lymph nodes
Malignant Neoplasms	202.33	ICD9CM	Malignant histiocytosis, intra-abdominal lymph nodes
Malignant Neoplasms	202.34	ICD9CM	Malignant histiocytosis, lymph nodes of axilla and upper limb

Malignant Neoplasms	202.35	ICD9CM	Malignant histiocytosis, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.36	ICD9CM	Malignant histiocytosis, intrapelvic lymph nodes
Malignant Neoplasms	202.37	ICD9CM	Malignant histiocytosis, spleen
Malignant Neoplasms	202.38	ICD9CM	Malignant histiocytosis, lymph nodes of multiple sites
Malignant Neoplasms	202.40	ICD9CM	Leukemic reticuloendotheliosis, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.41	ICD9CM	Leukemic reticuloendotheliosis, lymph nodes of head, face, and neck
Malignant Neoplasms	202.42	ICD9CM	Leukemic reticuloendotheliosis, intrathoracic lymph nodes
Malignant Neoplasms	202.43	ICD9CM	Leukemic reticuloendotheliosis, intra-abdominal lymph nodes
Malignant Neoplasms	202.44	ICD9CM	Leukemic reticuloendotheliosis, lymph nodes of axilla and upper arm
Malignant Neoplasms	202.45	ICD9CM	Leukemic reticuloendotheliosis, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.46	ICD9CM	Leukemic reticuloendotheliosis, intrapelvic lymph nodes
Malignant Neoplasms	202.47	ICD9CM	Leukemic reticuloendotheliosis, spleen
Malignant Neoplasms	202.48	ICD9CM	Leukemic reticuloendotheliosis, lymph nodes of multiple sites
Malignant Neoplasms	202.50	ICD9CM	Letterer-siwe disease, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.51	ICD9CM	Letterer-siwe disease, lymph nodes of head, face, and neck
Malignant Neoplasms	202.52	ICD9CM	Letterer-siwe disease, intrathoracic lymph nodes
Malignant Neoplasms	202.53	ICD9CM	Letterer-siwe disease, intra-abdominal lymph nodes
Malignant Neoplasms	202.54	ICD9CM	Letterer-siwe disease, lymph nodes of axilla and upper limb
Malignant Neoplasms	202.55	ICD9CM	Letterer-siwe disease, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.56	ICD9CM	Letterer-siwe disease, intrapelvic lymph nodes
Malignant Neoplasms	202.57	ICD9CM	Letterer-siwe disease, spleen
Malignant Neoplasms	202.58	ICD9CM	Letterer-siwe disease, lymph nodes of multiple sites
Malignant Neoplasms	202.60	ICD9CM	Malignant mast cell tumors, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.61	ICD9CM	Malignant mast cell tumors, lymph nodes of head, face, and neck
Malignant Neoplasms	202.62	ICD9CM	Malignant mast cell tumors, intrathoracic lymph nodes
Malignant Neoplasms	202.63	ICD9CM	Malignant mast cell tumors, intra-abdominal lymph nodes
Malignant Neoplasms	202.64	ICD9CM	Malignant mast cell tumors, lymph nodes of axilla and upper limb

Malignant Neoplasms	202.65	ICD9CM	Malignant mast cell tumors, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.66	ICD9CM	Malignant mast cell tumors, intrapelvic lymph nodes
Malignant Neoplasms	202.67	ICD9CM	Malignant mast cell tumors, spleen
Malignant Neoplasms	202.68	ICD9CM	Malignant mast cell tumors, lymph nodes of multiple sites
Malignant Neoplasms	202.70	ICD9CM	Peripheral T cell lymphoma, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.71	ICD9CM	Peripheral T cell lymphoma, lymph nodes of head, face, and neck
Malignant Neoplasms	202.72	ICD9CM	Peripheral T cell lymphoma, intrathoracic lymph nodes
Malignant Neoplasms	202.73	ICD9CM	Peripheral T cell lymphoma, intra-abdominal lymph nodes
Malignant Neoplasms	202.74	ICD9CM	Peripheral T cell lymphoma, lymph nodes of axilla and upper limb
Malignant Neoplasms	202.75	ICD9CM	Peripheral T cell lymphoma, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.76	ICD9CM	Peripheral T cell lymphoma, intrapelvic lymph nodes
Malignant Neoplasms	202.77	ICD9CM	Peripheral T cell lymphoma, spleen
Malignant Neoplasms	202.78	ICD9CM	Peripheral T cell lymphoma, lymph nodes of multiple sites
Malignant Neoplasms	202.80	ICD9CM	Other malignant lymphomas, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.81	ICD9CM	Other malignant lymphomas, lymph nodes of head, face, and neck
Malignant Neoplasms	202.82	ICD9CM	Other malignant lymphomas, intrathoracic lymph nodes
Malignant Neoplasms	202.83	ICD9CM	Other malignant lymphomas, intra-abdominal lymph nodes
Malignant Neoplasms	202.84	ICD9CM	Other malignant lymphomas, lymph nodes of axilla and upper limb
Malignant Neoplasms	202.85	ICD9CM	Other malignant lymphomas, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.86	ICD9CM	Other malignant lymphomas, intrapelvic lymph nodes
Malignant Neoplasms	202.87	ICD9CM	Other malignant lymphomas, spleen
Malignant Neoplasms	202.88	ICD9CM	Other malignant lymphomas, lymph nodes of multiple sites
Malignant Neoplasms	202.90	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, unspecified site, extranodal and solid organ sites
Malignant Neoplasms	202.91	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, lymph nodes of head, face, and neck

Malignant Neoplasms	202.92	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, intrathoracic lymph nodes
Malignant Neoplasms	202.93	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, intra-abdominal lymph nodes
Malignant Neoplasms	202.94	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, lymph nodes of axilla and upper limb
Malignant Neoplasms	202.95	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, lymph nodes of inguinal region and lower limb
Malignant Neoplasms	202.96	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, intrapelvic lymph nodes
Malignant Neoplasms	202.97	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, spleen
Malignant Neoplasms	202.98	ICD9CM	Other and unspecified malignant neoplasms of lymphoid and histiocytic tissue, lymph nodes of multiple sites
Malignant Neoplasms	203.00	ICD9CM	Multiple myeloma, without mention of having achieved remission
Malignant Neoplasms	203.01	ICD9CM	Multiple myeloma, in remission
Malignant Neoplasms	203.02	ICD9CM	Multiple myeloma, in relapse
Malignant Neoplasms	203.10	ICD9CM	Plasma cell leukemia, without mention of having achieved remission
Malignant Neoplasms	203.11	ICD9CM	Plasma cell leukemia, in remission
Malignant Neoplasms	203.12	ICD9CM	Plasma cell leukemia, in relapse
Malignant Neoplasms	203.80	ICD9CM	Other immunoproliferative neoplasms, without mention of having achieved remission
Malignant Neoplasms	203.81	ICD9CM	Other immunoproliferative neoplasms, in remission
Malignant Neoplasms	203.82	ICD9CM	Other immunoproliferative neoplasms, in relapse
Malignant Neoplasms	204.00	ICD9CM	Acute lymphoid leukemia, without mention of having achieved remission
Malignant Neoplasms	204.01	ICD9CM	Acute lymphoid leukemia, in remission
Malignant Neoplasms	204.02	ICD9CM	Acute lymphoid leukemia, in relapse
Malignant Neoplasms	204.10	ICD9CM	Chronic lymphoid leukemia, without mention of having achieved remission
Malignant Neoplasms	204.11	ICD9CM	Chronic lymphoid leukemia, in remission

Malignant Neoplasms	204.12	ICD9CM	Chronic lymphoid leukemia, in relapse
Malignant Neoplasms	204.20	ICD9CM	Subacute lymphoid leukemia, without mention of having achieved remission
Malignant Neoplasms	204.21	ICD9CM	Subacute lymphoid leukemia, in remission
Malignant Neoplasms	204.22	ICD9CM	Subacute lymphoid leukemia, in relapse
Malignant Neoplasms	204.80	ICD9CM	Other lymphoid leukemia, without mention of having achieved remission
Malignant Neoplasms	204.81	ICD9CM	Other lymphoid leukemia, in remission
Malignant Neoplasms	204.82	ICD9CM	Other lymphoid leukemia, in relapse
Malignant Neoplasms	204.90	ICD9CM	Unspecified lymphoid leukemia, without mention of having achieved remission
Malignant Neoplasms	204.91	ICD9CM	Unspecified lymphoid leukemia, in remission
Malignant Neoplasms	204.92	ICD9CM	Unspecified lymphoid leukemia, in relapse
Malignant Neoplasms	205.00	ICD9CM	Acute myeloid leukemia, without mention of having achieved remission
Malignant Neoplasms	205.01	ICD9CM	Acute myeloid leukemia, in remission
Malignant Neoplasms	205.02	ICD9CM	Acute myeloid leukemia, in relapse
Malignant Neoplasms	205.10	ICD9CM	Chronic myeloid leukemia, without mention of having achieved remission
Malignant Neoplasms	205.11	ICD9CM	Chronic myeloid leukemia, in remission
Malignant Neoplasms	205.12	ICD9CM	Chronic myeloid leukemia, in relapse
Malignant Neoplasms	205.20	ICD9CM	Subacute myeloid leukemia, without mention of having achieved remission
Malignant Neoplasms	205.21	ICD9CM	Subacute myeloid leukemia, in remission
Malignant Neoplasms	205.22	ICD9CM	Subacute myeloid leukemia, in relapse
Malignant Neoplasms	205.30	ICD9CM	Myeloid sarcoma, without mention of having achieved remission
Malignant Neoplasms	205.31	ICD9CM	Myeloid sarcoma, in remission
Malignant Neoplasms	205.32	ICD9CM	Myeloid sarcoma, in relapse
Malignant Neoplasms	205.80	ICD9CM	Other myeloid leukemia, without mention of having achieved remission
Malignant Neoplasms	205.81	ICD9CM	Other myeloid leukemia, in remission
Malignant Neoplasms	205.82	ICD9CM	Other myeloid leukemia, in relapse
Malignant Neoplasms	205.90	ICD9CM	Unspecified myeloid leukemia, without mention of having achieved remission
Malignant Neoplasms	205.91	ICD9CM	Unspecified myeloid leukemia, in remission

Malignant Neoplasms	205.92	ICD9CM	Unspecified myeloid leukemia, in relapse
Malignant Neoplasms	206.00	ICD9CM	Acute monocytic leukemia, without mention of having achieved remission
Malignant Neoplasms	206.01	ICD9CM	Acute monocytic leukemia,in remission
Malignant Neoplasms	206.02	ICD9CM	Acute monocytic leukemia, in relapse
Malignant Neoplasms	206.10	ICD9CM	Chronic monocytic leukemia, without mention of having achieved remission
Malignant Neoplasms	206.11	ICD9CM	Chronic monocytic leukemia, in remission
Malignant Neoplasms	206.12	ICD9CM	Chronic monocytic leukemia, in relapse
Malignant Neoplasms	206.20	ICD9CM	Subacute monocytic leukemia, without mention of having achieved remission
Malignant Neoplasms	206.21	ICD9CM	Subacute monocytic leukemia, in remission
Malignant Neoplasms	206.22	ICD9CM	Subacute monocytic leukemia, in relapse
Malignant Neoplasms	206.80	ICD9CM	Other monocytic leukemia, without mention of having achieved remission
Malignant Neoplasms	206.81	ICD9CM	Other monocytic leukemia, in remission
Malignant Neoplasms	206.82	ICD9CM	Other monocytic leukemia, in relapse
Malignant Neoplasms	206.90	ICD9CM	Unspecified monocytic leukemia, without mention of having achieved remission
Malignant Neoplasms	206.91	ICD9CM	Unspecified monocytic leukemia, in remission
Malignant Neoplasms	206.92	ICD9CM	Unspecified monocytic leukemia, in relapse
Malignant Neoplasms	207.00	ICD9CM	Acute erythremia and erythroleukemia, without mention of having achieved remission
Malignant Neoplasms	207.01	ICD9CM	Acute erythremia and erythroleukemia, in remission
Malignant Neoplasms	207.02	ICD9CM	Acute erythremia and erythroleukemia, in relapse
Malignant Neoplasms	207.10	ICD9CM	Chronic erythremia, without mention of having achieved remission
Malignant Neoplasms	207.11	ICD9CM	Chronic erythremia, in remission
Malignant Neoplasms	207.12	ICD9CM	Chronic erythremia, in relapse
Malignant Neoplasms	207.20	ICD9CM	Megakaryocytic leukemia, without mention of having achieved remission
Malignant Neoplasms	207.21	ICD9CM	Megakaryocytic leukemia, in remission
Malignant Neoplasms	207.22	ICD9CM	Megakaryocytic leukemia, in relapse
Malignant Neoplasms	207.80	ICD9CM	Other specified leukemia, without mention of having achieved remission
Malignant Neoplasms	207.81	ICD9CM	Other specified leukemia, in remission

Malignant Neoplasms	207.82	ICD9CM	Other specified leukemia, in relapse
Malignant Neoplasms	208.00	ICD9CM	Acute leukemia of unspecified cell type, without mention of having achieved remission
Malignant Neoplasms	208.01	ICD9CM	Acute leukemia of unspecified cell type, in remission
Malignant Neoplasms	208.02	ICD9CM	Acute leukemia of unspecified cell type, in relapse
Malignant Neoplasms	208.10	ICD9CM	Chronic leukemia of unspecified cell type, without mention of having achieved remission
Malignant Neoplasms	208.11	ICD9CM	Chronic leukemia of unspecified cell type, in remission
Malignant Neoplasms	208.12	ICD9CM	Chronic leukemia of unspecified cell type, in relapse
Malignant Neoplasms	208.20	ICD9CM	Subacute leukemia of unspecified cell type, without mention of having achieved remission
Malignant Neoplasms	208.21	ICD9CM	Subacute leukemia of unspecified cell type, in remission
Malignant Neoplasms	208.22	ICD9CM	Subacute leukemia of unspecified cell type, in relapse
Malignant Neoplasms	208.80	ICD9CM	Other leukemia of unspecified cell type, without mention of having achieved remission
Malignant Neoplasms	208.81	ICD9CM	Other leukemia of unspecified cell type, in remission
Malignant Neoplasms	208.82	ICD9CM	Other leukemia of unspecified cell type, in relapse
Malignant Neoplasms	208.90	ICD9CM	Unspecified leukemia, without mention of having achieved remission
Malignant Neoplasms	208.91	ICD9CM	Unspecified leukemia, in remission
Malignant Neoplasms	208.92	ICD9CM	Unspecified leukemia, in relapse
Malignant Neoplasms	209.00	ICD9CM	Malignant carcinoid tumor of the small intestine, unspecified portion
Malignant Neoplasms	209.01	ICD9CM	Malignant carcinoid tumor of the duodenum
Malignant Neoplasms	209.02	ICD9CM	Malignant carcinoid tumor of the jejunum
Malignant Neoplasms	209.03	ICD9CM	Malignant carcinoid tumor of the ileum
Malignant Neoplasms	209.10	ICD9CM	Malignant carcinoid tumor of the large intestine, unspecified portion
Malignant Neoplasms	209.11	ICD9CM	Malignant carcinoid tumor of the appendix
Malignant Neoplasms	209.12	ICD9CM	Malignant carcinoid tumor of the cecum
Malignant Neoplasms	209.13	ICD9CM	Malignant carcinoid tumor of the ascending colon

Malignant Neoplasms	209.14	ICD9CM	Malignant carcinoid tumor of the transverse colon
Malignant Neoplasms	209.15	ICD9CM	Malignant carcinoid tumor of the descending colon
Malignant Neoplasms	209.16	ICD9CM	Malignant carcinoid tumor of the sigmoid colon
Malignant Neoplasms	209.17	ICD9CM	Malignant carcinoid tumor of the rectum
Malignant Neoplasms	209.20	ICD9CM	Malignant carcinoid tumor of unknown primary site
Malignant Neoplasms	209.21	ICD9CM	Malignant carcinoid tumor of the bronchus and lung
Malignant Neoplasms	209.22	ICD9CM	Malignant carcinoid tumor of the thymus
Malignant Neoplasms	209.23	ICD9CM	Malignant carcinoid tumor of the stomach
Malignant Neoplasms	209.24	ICD9CM	Malignant carcinoid tumor of the kidney
Malignant Neoplasms	209.25	ICD9CM	Malignant carcinoid tumor of foregut, not otherwise specified
Malignant Neoplasms	209.26	ICD9CM	Malignant carcinoid tumor of midgut, not otherwise specified
Malignant Neoplasms	209.27	ICD9CM	Malignant carcinoid tumor of hindgut, not otherwise specified
Malignant Neoplasms	209.29	ICD9CM	Malignant carcinoid tumor of other sites
Malignant Neoplasms	209.30	ICD9CM	Malignant poorly differentiated neuroendocrine carcinoma, any site
Malignant Neoplasms	209.31	ICD9CM	Merkel cell carcinoma of the face
Malignant Neoplasms	209.32	ICD9CM	Merkel cell carcinoma of the scalp and neck
Malignant Neoplasms	209.33	ICD9CM	Merkel cell carcinoma of the upper limb
Malignant Neoplasms	209.34	ICD9CM	Merkel cell carcinoma of the lower limb
Malignant Neoplasms	209.35	ICD9CM	Merkel cell carcinoma of the trunk
Malignant Neoplasms	209.36	ICD9CM	Merkel cell carcinoma of other sites
Malignant Neoplasms	209.40	ICD9CM	Benign carcinoid tumor of the small intestine, unspecified portion
Malignant Neoplasms	209.41	ICD9CM	Benign carcinoid tumor of the duodenum
Malignant Neoplasms	209.42	ICD9CM	Benign carcinoid tumor of the jejunum
Malignant Neoplasms	209.43	ICD9CM	Benign carcinoid tumor of the ileum
Malignant Neoplasms	209.50	ICD9CM	Benign carcinoid tumor of the large intestine, unspecified portion
Malignant Neoplasms	209.51	ICD9CM	Benign carcinoid tumor of the appendix
Malignant Neoplasms	209.52	ICD9CM	Benign carcinoid tumor of the cecum

Malignant Neoplasms	209.53	ICD9CM	Benign carcinoid tumor of the ascending colon
Malignant Neoplasms	209.54	ICD9CM	Benign carcinoid tumor of the transverse colon
Malignant Neoplasms	209.55	ICD9CM	Benign carcinoid tumor of the descending colon
Malignant Neoplasms	209.56	ICD9CM	Benign carcinoid tumor of the sigmoid colon
Malignant Neoplasms	209.57	ICD9CM	Benign carcinoid tumor of the rectum
Malignant Neoplasms	209.60	ICD9CM	Benign carcinoid tumor of unknown primary site
Malignant Neoplasms	209.61	ICD9CM	Benign carcinoid tumor of the bronchus and lung
Malignant Neoplasms	209.62	ICD9CM	Benign carcinoid tumor of the thymus
Malignant Neoplasms	209.63	ICD9CM	Benign carcinoid tumor of the stomach
Malignant Neoplasms	209.64	ICD9CM	Benign carcinoid tumor of the kidney
Malignant Neoplasms	209.65	ICD9CM	Benign carcinoid tumor of foregut, not otherwise specified
Malignant Neoplasms	209.66	ICD9CM	Benign carcinoid tumor of midgut, not otherwise specified
Malignant Neoplasms	209.67	ICD9CM	Benign carcinoid tumor of hindgut, not otherwise specified
Malignant Neoplasms	209.69	ICD9CM	Benign carcinoid tumor of other sites
Malignant Neoplasms	209.70	ICD9CM	Secondary neuroendocrine tumor, unspecified site
Malignant Neoplasms	209.71	ICD9CM	Secondary neuroendocrine tumor of distant lymph nodes
Malignant Neoplasms	209.72	ICD9CM	Secondary neuroendocrine tumor of liver
Malignant Neoplasms	209.73	ICD9CM	Secondary neuroendocrine tumor of bone
Malignant Neoplasms	209.74	ICD9CM	Secondary neuroendocrine tumor of peritoneum
Malignant Neoplasms	209.75	ICD9CM	Secondary Merkel cell carcinoma
Malignant Neoplasms	209.79	ICD9CM	Secondary neuroendocrine tumor of other sites
Other Neoplasms	230.0	ICD9CM	Carcinoma in situ of lip, oral cavity, and pharynx
Other Neoplasms	230.1	ICD9CM	Carcinoma in situ of esophagus
Other Neoplasms	230.2	ICD9CM	Carcinoma in situ of stomach
Other Neoplasms	230.3	ICD9CM	Carcinoma in situ of colon
Other Neoplasms	230.4	ICD9CM	Carcinoma in situ of rectum
Other Neoplasms	230.5	ICD9CM	Carcinoma in situ of anal canal

Other Neoplasms	230.6	ICD9CM	Carcinoma in situ of anus, unspecified
Other Neoplasms	230.7	ICD9CM	Carcinoma in situ of other and unspecified parts of intestine
Other Neoplasms	230.8	ICD9CM	Carcinoma in situ of liver and biliary system
Other Neoplasms	230.9	ICD9CM	Carcinoma in situ of other and unspecified digestive organs
Other Neoplasms	231.0	ICD9CM	Carcinoma in situ of larynx
Other Neoplasms	231.1	ICD9CM	Carcinoma in situ of trachea
Other Neoplasms	231.2	ICD9CM	Carcinoma in situ of bronchus and lung
Other Neoplasms	231.8	ICD9CM	Carcinoma in situ of other specified parts of respiratory system
Other Neoplasms	231.9	ICD9CM	Carcinoma in situ of respiratory system, part unspecified
Other Neoplasms	232.0	ICD9CM	Carcinoma in situ of skin of lip
Other Neoplasms	232.1	ICD9CM	Carcinoma in situ of eyelid, including canthus
Other Neoplasms	232.2	ICD9CM	Carcinoma in situ of skin of ear and external auditory canal
Other Neoplasms	232.3	ICD9CM	Carcinoma in situ of skin of other and unspecified parts of face
Other Neoplasms	232.4	ICD9CM	Carcinoma in situ of scalp and skin of neck
Other Neoplasms	232.5	ICD9CM	Carcinoma in situ of skin of trunk, except scrotum
Other Neoplasms	232.6	ICD9CM	Carcinoma in situ of skin of upper limb, including shoulder
Other Neoplasms	232.7	ICD9CM	Carcinoma in situ of skin of lower limb, including hip
Other Neoplasms	232.8	ICD9CM	Carcinoma in situ of other specified sites of skin
Other Neoplasms	232.9	ICD9CM	Carcinoma in situ of skin, site unspecified
Other Neoplasms	233.0	ICD9CM	Carcinoma in situ of breast
Other Neoplasms	233.1	ICD9CM	Carcinoma in situ of cervix uteri
Other Neoplasms	233.2	ICD9CM	Carcinoma in situ of other and unspecified parts of uterus
Other Neoplasms	233.30	ICD9CM	Carcinoma in situ, unspecified female genital organ
Other Neoplasms	233.31	ICD9CM	Carcinoma in situ, vagina
Other Neoplasms	233.32	ICD9CM	Carcinoma in situ, vulva
Other Neoplasms	233.39	ICD9CM	Carcinoma in situ, other female genital organ
Other Neoplasms	233.4	ICD9CM	Carcinoma in situ of prostate

Other Neoplasms	233.5	ICD9CM	Carcinoma in situ of penis
Other Neoplasms	233.6	ICD9CM	Carcinoma in situ of other and unspecified male genital organs
Other Neoplasms	233.7	ICD9CM	Carcinoma in situ of bladder
Other Neoplasms	233.9	ICD9CM	Carcinoma in situ of other and unspecified urinary organs
Other Neoplasms	234.0	ICD9CM	Carcinoma in situ of eye
Other Neoplasms	234.8	ICD9CM	Carcinoma in situ of other specified sites
Other Neoplasms	234.9	ICD9CM	Carcinoma in situ, site unspecified
Other Neoplasms	235.0	ICD9CM	Neoplasm of uncertain behavior of major salivary glands
Other Neoplasms	235.1	ICD9CM	Neoplasm of uncertain behavior of lip, oral cavity, and pharynx
Other Neoplasms	235.2	ICD9CM	Neoplasm of uncertain behavior of stomach, intestines, and rectum
Other Neoplasms	235.3	ICD9CM	Neoplasm of uncertain behavior of liver and biliary passages
Other Neoplasms	235.4	ICD9CM	Neoplasm of uncertain behavior of retroperitoneum and peritoneum
Other Neoplasms	235.5	ICD9CM	Neoplasm of uncertain behavior of other and unspecified digestive organs
Other Neoplasms	235.6	ICD9CM	Neoplasm of uncertain behavior of larynx
Other Neoplasms	235.7	ICD9CM	Neoplasm of uncertain behavior of trachea, bronchus, and lung
Other Neoplasms	235.8	ICD9CM	Neoplasm of uncertain behavior of pleura, thymus, and mediastinum
Other Neoplasms	235.9	ICD9CM	Neoplasm of uncertain behavior of other and unspecified respiratory organs
Other Neoplasms	236.0	ICD9CM	Neoplasm of uncertain behavior of uterus
Other Neoplasms	236.1	ICD9CM	Neoplasm of uncertain behavior of placenta
Other Neoplasms	236.2	ICD9CM	Neoplasm of uncertain behavior of ovary
Other Neoplasms	236.3	ICD9CM	Neoplasm of uncertain behavior of other and unspecified female genital organs
Other Neoplasms	236.4	ICD9CM	Neoplasm of uncertain behavior of testis
Other Neoplasms	236.5	ICD9CM	Neoplasm of uncertain behavior of prostate
Other Neoplasms	236.6	ICD9CM	Neoplasm of uncertain behavior of other and unspecified male genital organs
Other Neoplasms	236.7	ICD9CM	Neoplasm of uncertain behavior of bladder
Other Neoplasms	236.90	ICD9CM	Neoplasm of uncertain behavior of urinary organ, unspecified
Other Neoplasms	236.91	ICD9CM	Neoplasm of uncertain behavior of kidney and ureter

Other Neoplasms	236.99	ICD9CM	Neoplasm of uncertain behavior of other and unspecified urinary organs
Other Neoplasms	237.0	ICD9CM	Neoplasm of uncertain behavior of pituitary gland and craniopharyngeal duct
Other Neoplasms	237.1	ICD9CM	Neoplasm of uncertain behavior of pineal gland
Other Neoplasms	237.2	ICD9CM	Neoplasm of uncertain behavior of adrenal gland
Other Neoplasms	237.3	ICD9CM	Neoplasm of uncertain behavior of paraganglia
Other Neoplasms	237.4	ICD9CM	Neoplasm of uncertain behavior of other and unspecified endocrine glands
Other Neoplasms	237.5	ICD9CM	Neoplasm of uncertain behavior of brain and spinal cord
Other Neoplasms	237.6	ICD9CM	Neoplasm of uncertain behavior of meninges
Other Neoplasms	237.70	ICD9CM	Neurofibromatosis, unspecified
Other Neoplasms	237.71	ICD9CM	Neurofibromatosis, type 1 [von recklinghausen's disease]
Other Neoplasms	237.72	ICD9CM	Neurofibromatosis, type 2 [acoustic neurofibromatosis]
Other Neoplasms	237.73	ICD9CM	Schwannomatosis
Other Neoplasms	237.79	ICD9CM	Other neurofibromatosis
Other Neoplasms	237.9	ICD9CM	Neoplasm of uncertain behavior of other and unspecified parts of nervous system
Other Neoplasms	238.0	ICD9CM	Neoplasm of uncertain behavior of bone and articular cartilage
Other Neoplasms	238.1	ICD9CM	Neoplasm of uncertain behavior of connective and other soft tissue
Other Neoplasms	238.2	ICD9CM	Neoplasm of uncertain behavior of skin
Other Neoplasms	238.3	ICD9CM	Neoplasm of uncertain behavior of breast
Other Neoplasms	238.4	ICD9CM	Polycythemia vera
Other Neoplasms	238.5	ICD9CM	Neoplasm of uncertain behavior of histiocytic and mast cells
Other Neoplasms	238.6	ICD9CM	Neoplasm of uncertain behavior of plasma cells
Other Neoplasms	238.71	ICD9CM	Essential thrombocythemia
Other Neoplasms	238.72	ICD9CM	Low grade myelodysplastic syndrome lesions
Other Neoplasms	238.73	ICD9CM	High grade myelodysplastic syndrome lesions
Other Neoplasms	238.74	ICD9CM	Myelodysplastic syndrome with 5q deletion
Other Neoplasms	238.75	ICD9CM	Myelodysplastic syndrome, unspecified
Other Neoplasms	238.76	ICD9CM	Myelofibrosis with myeloid metaplasia

Other Neoplasms	238.77	ICD9CM	Post-transplant lymphoproliferative disorder (PTLD)
Other Neoplasms	238.79	ICD9CM	Other lymphatic and hematopoietic tissues
Other Neoplasms	238.8	ICD9CM	Neoplasm of uncertain behavior of other specified sites
Other Neoplasms	238.9	ICD9CM	Neoplasm of uncertain behavior, site unspecified
Other Neoplasms	239.0	ICD9CM	Neoplasm of unspecified nature of digestive system
Other Neoplasms	239.1	ICD9CM	Neoplasm of unspecified nature of respiratory system
Other Neoplasms	239.2	ICD9CM	Neoplasm of unspecified nature of bone, soft tissue, and skin
Other Neoplasms	239.3	ICD9CM	Neoplasm of unspecified nature of breast
Other Neoplasms	239.4	ICD9CM	Neoplasm of unspecified nature of bladder
Other Neoplasms	239.5	ICD9CM	Neoplasm of unspecified nature of other genitourinary organs
Other Neoplasms	239.6	ICD9CM	Neoplasm of unspecified nature of brain
Other Neoplasms	239.7	ICD9CM	Neoplasm of unspecified nature of endocrine glands and other parts of nervous system
Other Neoplasms	239.81	ICD9CM	Neoplasms of unspecified nature, retina and choroid
Other Neoplasms	239.89	ICD9CM	Neoplasms of unspecified nature, other specified sites
Other Neoplasms	239.9	ICD9CM	Neoplasm of unspecified nature, site unspecified
History of Malignant Neoplasm	V10.00	ICD9CM	Personal history of malignant neoplasm of gastrointestinal tract, unspecified
History of Malignant Neoplasm	V10.01	ICD9CM	Personal history of malignant neoplasm of tongue
History of Malignant Neoplasm	V10.02	ICD9CM	Personal history of malignant neoplasm of other and unspecified oral cavity and pharynx
History of Malignant Neoplasm	V10.03	ICD9CM	Personal history of malignant neoplasm of esophagus
History of Malignant Neoplasm	V10.04	ICD9CM	Personal history of malignant neoplasm of stomach
History of Malignant Neoplasm	V10.05	ICD9CM	Personal history of malignant neoplasm of large intestine
History of Malignant Neoplasm	V10.06	ICD9CM	Personal history of malignant neoplasm of rectum, rectosigmoid junction, and anus
History of Malignant Neoplasm	V10.07	ICD9CM	Personal history of malignant neoplasm of liver
History of Malignant Neoplasm	V10.09	ICD9CM	Personal history of malignant neoplasm of other gastrointestinal tract
History of Malignant Neoplasm	V10.11	ICD9CM	Personal history of malignant neoplasm of bronchus and lung

History of Malignant Neoplasm	V10.12	ICD9CM	Personal history of malignant neoplasm of trachea
History of Malignant Neoplasm	V10.20	ICD9CM	Personal history of malignant neoplasm of respiratory organ, unspecified
History of Malignant Neoplasm	V10.21	ICD9CM	Personal history of malignant neoplasm of larynx
History of Malignant Neoplasm	V10.22	ICD9CM	Personal history of malignant neoplasm of nasal cavities, middle ear, and accessory sinuses
History of Malignant Neoplasm	V10.29	ICD9CM	Personal history of malignant neoplasm of other respiratory and intrathoracic organs
History of Malignant Neoplasm	V10.3	ICD9CM	Personal history of malignant neoplasm of breast
History of Malignant Neoplasm	V10.40	ICD9CM	Personal history of malignant neoplasm of female genital organ, unspecified
History of Malignant Neoplasm	V10.41	ICD9CM	Personal history of malignant neoplasm of cervix uteri
History of Malignant Neoplasm	V10.42	ICD9CM	Personal history of malignant neoplasm of other parts of uterus
History of Malignant Neoplasm	V10.43	ICD9CM	Personal history of malignant neoplasm of ovary
History of Malignant Neoplasm	V10.44	ICD9CM	Personal history of malignant neoplasm of other female genital organs
History of Malignant Neoplasm	V10.45	ICD9CM	Personal history of malignant neoplasm of male genital organ, unspecified
History of Malignant Neoplasm	V10.46	ICD9CM	Personal history of malignant neoplasm of prostate
History of Malignant Neoplasm	V10.47	ICD9CM	Personal history of malignant neoplasm of testis
History of Malignant Neoplasm	V10.48	ICD9CM	Personal history of malignant neoplasm of epididymis
History of Malignant Neoplasm	V10.49	ICD9CM	Personal history of malignant neoplasm of other male genital organs
History of Malignant Neoplasm	V10.50	ICD9CM	Personal history of malignant neoplasm of urinary organ, unspecified
History of Malignant Neoplasm	V10.51	ICD9CM	Personal history of malignant neoplasm of bladder
History of Malignant Neoplasm	V10.52	ICD9CM	Personal history of malignant neoplasm of kidney
History of Malignant Neoplasm	V10.53	ICD9CM	Personal history of malignant neoplasm of renal pelvis
History of Malignant Neoplasm	V10.59	ICD9CM	Personal history of malignant neoplasm of other urinary organs
History of Malignant Neoplasm	V10.60	ICD9CM	Personal history of leukemia, unspecified
History of Malignant Neoplasm	V10.61	ICD9CM	Personal history of lymphoid leukemia
History of Malignant Neoplasm	V10.62	ICD9CM	Personal history of myeloid leukemia
History of Malignant Neoplasm	V10.63	ICD9CM	Personal history of monocytic leukemia
History of Malignant Neoplasm	V10.69	ICD9CM	Personal history of other leukemia

History of Malignant Neoplasm	V10.71	ICD9CM	Personal history of lymphosarcoma and reticulosarcoma
History of Malignant Neoplasm	V10.72	ICD9CM	Personal history of hodgkin's disease
History of Malignant Neoplasm	V10.79	ICD9CM	Personal history of other lymphatic and hematopoietic neoplasms
History of Malignant Neoplasm	V10.81	ICD9CM	Personal history of malignant neoplasm of bone
History of Malignant Neoplasm	V10.82	ICD9CM	Personal history of malignant melanoma of skin
History of Malignant Neoplasm	V10.83	ICD9CM	Personal history of other malignant neoplasm of skin
History of Malignant Neoplasm	V10.84	ICD9CM	Personal history of malignant neoplasm of eye
History of Malignant Neoplasm	V10.85	ICD9CM	Personal history of malignant neoplasm of brain
History of Malignant Neoplasm	V10.86	ICD9CM	Personal history of malignant neoplasm of other parts of nervous system
History of Malignant Neoplasm	V10.87	ICD9CM	Personal history of malignant neoplasm of thyroid
History of Malignant Neoplasm	V10.88	ICD9CM	Personal history of malignant neoplasm of other endocrine glands and related structures
History of Malignant Neoplasm	V10.89	ICD9CM	Personal history of malignant neoplasm of other sites
History of Malignant Neoplasm	V10.90	ICD9CM	Personal history of unspecified malignant neoplasm
History of Malignant Neoplasm	V10.91	ICD9CM	Personal history of malignant neuroendocrine tumor
IV Drug Abuse	304.00	ICD9CM	Opioid type dependence, unspecified
IV Drug Abuse	304.01	ICD9CM	Opioid type dependence, continuous
IV Drug Abuse	304.02	ICD9CM	Opioid type dependence, episodic
IV Drug Abuse	304.03	ICD9CM	Opioid type dependence, in remission
IV Drug Abuse	304.10	ICD9CM	Sedative, hypnotic or anxiolytic dependence, unspecified
IV Drug Abuse	304.11	ICD9CM	Sedative, hypnotic or anxiolytic dependence, continuous
IV Drug Abuse	304.12	ICD9CM	Sedative, hypnotic or anxiolytic dependence, episodic
IV Drug Abuse	304.13	ICD9CM	Sedative, hypnotic or anxiolytic dependence, in remission
IV Drug Abuse	304.20	ICD9CM	Cocaine dependence, unspecified
IV Drug Abuse	304.21	ICD9CM	Cocaine dependence, continuous
IV Drug Abuse	304.22	ICD9CM	Cocaine dependence, episodic
IV Drug Abuse	304.23	ICD9CM	Cocaine dependence, in remission

IV Drug Abuse	304.40	ICD9CM	Amphetamine and other psychostimulant dependence, unspecified
IV Drug Abuse	304.41	ICD9CM	Amphetamine and other psychostimulant dependence, continuous
IV Drug Abuse	304.42	ICD9CM	Amphetamine and other psychostimulant dependence, episodic
IV Drug Abuse	304.43	ICD9CM	Amphetamine and other psychostimulant dependence, in remission
IV Drug Abuse	305.40	ICD9CM	Sedative, hypnotic or anxiolytic abuse, unspecified
IV Drug Abuse	305.41	ICD9CM	Sedative, hypnotic or anxiolytic abuse, continuous
IV Drug Abuse	305.42	ICD9CM	Sedative, hypnotic or anxiolytic abuse, episodic
IV Drug Abuse	305.43	ICD9CM	Sedative, hypnotic or anxiolytic abuse, in remission
IV Drug Abuse	305.50	ICD9CM	Opioid abuse, unspecified
IV Drug Abuse	305.51	ICD9CM	Opioid abuse, continuous
IV Drug Abuse	305.52	ICD9CM	Opioid abuse, episodic
IV Drug Abuse	305.53	ICD9CM	Opioid abuse, in remission
IV Drug Abuse	305.60	ICD9CM	Cocaine abuse, unspecified
IV Drug Abuse	305.61	ICD9CM	Cocaine abuse, continuous
IV Drug Abuse	305.62	ICD9CM	Cocaine abuse, episodic
IV Drug Abuse	305.63	ICD9CM	Cocaine abuse, in remission
IV Drug Abuse	305.70	ICD9CM	Amphetamine or related acting sympathomimetic abuse, unspecified
IV Drug Abuse	305.71	ICD9CM	Amphetamine or related acting sympathomimetic abuse, continuous
IV Drug Abuse	305.72	ICD9CM	Amphetamine or related acting sympathomimetic abuse, episodic
IV Drug Abuse	305.73	ICD9CM	Amphetamine or related acting sympathomimetic abuse, in remission
Trauma	800.00	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, unspecified state of consciousness
Trauma	800.01	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, with no loss of consciousness
Trauma	800.02	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, with brief [less than one hour] loss of consciousness
Trauma	800.03	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, with moderate [1-24 hours] loss of consciousness

Trauma	800.04	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.05	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.06	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, with loss of consciousness of unspecified duration
Trauma	800.09	ICD9CM	Closed fracture of vault of skull without mention of intracranial injury, with concussion, unspecified
Trauma	800.10	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, unspecified state of consciousness
Trauma	800.11	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, with no loss of consciousness
Trauma	800.12	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	800.13	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness
Trauma	800.14	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.15	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.16	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	800.19	ICD9CM	Closed fracture of vault of skull with cerebral laceration and contusion, with concussion, unspecified

Trauma	800.20	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness
Trauma	800.21	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	800.22	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	800.23	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	800.24	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.25	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.26	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration
Trauma	800.29	ICD9CM	Closed fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	800.30	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, unspecified state of consciousness
Trauma	800.31	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	800.32	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	800.33	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness

Trauma	800.34	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.35	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.36	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	800.39	ICD9CM	Closed fracture of vault of skull with other and unspecified intracranial hemorrhage, with concussion, unspecified
Trauma	800.40	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	800.41	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	800.42	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness
Trauma	800.43	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	800.44	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.45	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.46	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration
Trauma	800.49	ICD9CM	Closed fracture of vault of skull with intracranial injury of other and unspecified nature, with concussion, unspecified

Trauma	800.50	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, unspecified state of consciousness
Trauma	800.51	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, with no loss of consciousness
Trauma	800.52	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, with brief [less than one hour] loss of consciousness
Trauma	800.53	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, with moderate [1-24 hours] loss of consciousness
Trauma	800.54	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.55	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.56	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, with loss of consciousness of unspecified duration
Trauma	800.59	ICD9CM	Open fracture of vault of skull without mention of intracranial injury, with concussion, unspecified
Trauma	800.60	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, unspecified state of consciousness
Trauma	800.61	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, with no loss of consciousness
Trauma	800.62	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	800.63	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness
Trauma	800.64	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level

Trauma	800.65	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.66	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	800.69	ICD9CM	Open fracture of vault of skull with cerebral laceration and contusion, with concussion, unspecified
Trauma	800.70	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness
Trauma	800.71	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	800.72	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	800.73	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	800.74	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.75	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.76	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration
Trauma	800.79	ICD9CM	Open fracture of vault of skull with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	800.80	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, unspecified state of consciousness

Trauma	800.81	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	800.82	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	800.83	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	800.84	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	800.85	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.86	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	800.89	ICD9CM	Open fracture of vault of skull with other and unspecified intracranial hemorrhage, with concussion, unspecified
Trauma	800.90	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	800.91	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	800.92	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness
Trauma	800.93	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	800.94	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level

Trauma	800.95	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	800.96	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration
Trauma	800.99	ICD9CM	Open fracture of vault of skull with intracranial injury of other and unspecified nature, with concussion, unspecified
Trauma	801.00	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, unspecified state of consciousness
Trauma	801.01	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, with no loss of consciousness
Trauma	801.02	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, with brief [less than one hour] loss of consciousness
Trauma	801.03	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, with moderate [1-24 hours] loss of consciousness
Trauma	801.04	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.05	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.06	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, with loss of consciousness of unspecified duration
Trauma	801.09	ICD9CM	Closed fracture of base of skull without mention of intra cranial injury, with concussion, unspecified
Trauma	801.10	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, unspecified state of consciousness
Trauma	801.11	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, with no loss of consciousness

Trauma	801.12	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	801.13	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness
Trauma	801.14	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.15	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.16	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	801.19	ICD9CM	Closed fracture of base of skull with cerebral laceration and contusion, with concussion, unspecified
Trauma	801.20	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness
Trauma	801.21	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	801.22	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	801.23	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	801.24	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.25	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level

Trauma	801.26	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration
Trauma	801.29	ICD9CM	Closed fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	801.30	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, unspecified state of consciousness
Trauma	801.31	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	801.32	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	801.33	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	801.34	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.35	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.36	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	801.39	ICD9CM	Closed fracture of base of skull with other and unspecified intracranial hemorrhage, with concussion, unspecified
Trauma	801.40	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	801.41	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	801.42	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness

Trauma	801.43	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	801.44	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.45	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.46	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration
Trauma	801.49	ICD9CM	Closed fracture of base of skull with intracranial injury of other and unspecified nature, with concussion, unspecified
Trauma	801.50	ICD9CM	Open fracture of base of skull without mention of intracranial injury, unspecified state of consciousness
Trauma	801.51	ICD9CM	Open fracture of base of skull without mention of intracranial injury, with no loss of consciousness
Trauma	801.52	ICD9CM	Open fracture of base of skull without mention of intracranial injury, with brief [less than one hour] loss of consciousness
Trauma	801.53	ICD9CM	Open fracture of base of skull without mention of intracranial injury, with moderate [1-24 hours] loss of consciousness
Trauma	801.54	ICD9CM	Open fracture of base of skull without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.55	ICD9CM	Open fracture of base of skull without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.56	ICD9CM	Open fracture of base of skull without mention of intracranial injury, with loss of consciousness of unspecified duration

Trauma	801.59	ICD9CM	Open fracture of base of skull without mention of intracranial injury, with concussion, unspecified
Trauma	801.60	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, unspecified state of consciousness
Trauma	801.61	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, with no loss of consciousness
Trauma	801.62	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	801.63	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness
Trauma	801.64	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.65	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.66	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	801.69	ICD9CM	Open fracture of base of skull with cerebral laceration and contusion, with concussion, unspecified
Trauma	801.70	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness
Trauma	801.71	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	801.72	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	801.73	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of consciousness

Trauma	801.74	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.75	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.76	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration
Trauma	801.79	ICD9CM	Open fracture of base of skull with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	801.80	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, unspecified state of consciousness
Trauma	801.81	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	801.82	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	801.83	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	801.84	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.85	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.86	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	801.89	ICD9CM	Open fracture of base of skull with other and unspecified intracranial hemorrhage, with concussion, unspecified

Trauma	801.90	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	801.91	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	801.92	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness
Trauma	801.93	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	801.94	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	801.95	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	801.96	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration
Trauma	801.99	ICD9CM	Open fracture of base of skull with intracranial injury of other and unspecified nature, with concussion, unspecified
Trauma	802.0	ICD9CM	Closed fracture of nasal bones
Trauma	802.1	ICD9CM	Open fracture of nasal bones
Trauma	802.20	ICD9CM	Closed fracture of mandible, unspecified site
Trauma	802.21	ICD9CM	Closed fracture of mandible, condylar process
Trauma	802.22	ICD9CM	Closed fracture of mandible, subcondylar
Trauma	802.23	ICD9CM	Closed fracture of mandible, coronoid process
Trauma	802.24	ICD9CM	Closed fracture of mandible, ramus, unspecified
Trauma	802.25	ICD9CM	Closed fracture of mandible, angle of jaw
Trauma	802.26	ICD9CM	Closed fracture of mandible, symphysis of body
Trauma	802.27	ICD9CM	Closed fracture of mandible, alveolar border of body

Trauma	802.28	ICD9CM	Closed fracture of mandible, body, other and unspecified
Trauma	802.29	ICD9CM	Closed fracture of mandible, multiple sites
Trauma	802.30	ICD9CM	Open fracture of mandible, unspecified site
Trauma	802.31	ICD9CM	Open fracture of mandible, condylar process
Trauma	802.32	ICD9CM	Open fracture of mandible, subcondylar
Trauma	802.33	ICD9CM	Open fracture of mandible, coronoid process
Trauma	802.34	ICD9CM	Open fracture of mandible, ramus, unspecified
Trauma	802.35	ICD9CM	Open fracture of mandible, angle of jaw
Trauma	802.36	ICD9CM	Open fracture of mandible, symphysis of body
Trauma	802.37	ICD9CM	Open fracture of mandible, alveolar border of body
Trauma	802.38	ICD9CM	Open fracture of mandible, body, other and unspecified
Trauma	802.39	ICD9CM	Open fracture of mandible, multiple sites
Trauma	802.4	ICD9CM	Closed fracture of malar and maxillary bones
Trauma	802.5	ICD9CM	Open fracture of malar and maxillary bones
Trauma	802.6	ICD9CM	Closed fracture of orbital floor (blow-out)
Trauma	802.7	ICD9CM	Open fracture of orbital floor (blow-out)
Trauma	802.8	ICD9CM	Closed fracture of other facial bones
Trauma	802.9	ICD9CM	Open fracture of other facial bones
Trauma	803.00	ICD9CM	Other closed skull fracture without mention of intracranial injury, unspecified state of consciousness
Trauma	803.01	ICD9CM	Other closed skull fracture without mention of intracranial injury, with no loss of consciousness
Trauma	803.02	ICD9CM	Other closed skull fracture without mention of intracranial injury, with brief [less than one hour] loss of consciousness
Trauma	803.03	ICD9CM	Other closed skull fracture without mention of intracranial injury, with moderate [1-24 hours] loss of consciousness
Trauma	803.04	ICD9CM	Other closed skull fracture without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious

			level
Trauma	803.05	ICD9CM	Other closed skull fracture without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.06	ICD9CM	Other closed skull fracture without mention of intracranial injury, with loss of consciousness of unspecified duration
Trauma	803.09	ICD9CM	Other closed skull fracture without mention of intracranial injury, with concussion, unspecified
Trauma	803.10	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, unspecified state of consciousness
Trauma	803.11	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, with no loss of consciousness
Trauma	803.12	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	803.13	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness
Trauma	803.14	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.15	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.16	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	803.19	ICD9CM	Other closed skull fracture with cerebral laceration and contusion, with concussion, unspecified
Trauma	803.20	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness

Trauma	803.21	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	803.22	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	803.23	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	803.24	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.25	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.26	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration
Trauma	803.29	ICD9CM	Other closed skull fracture with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	803.30	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, unspecified state of unconsciousness
Trauma	803.31	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	803.32	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	803.33	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	803.34	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level

Trauma	803.35	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.36	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	803.39	ICD9CM	Other closed skull fracture with other and unspecified intracranial hemorrhage, with concussion, unspecified
Trauma	803.40	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	803.41	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	803.42	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness
Trauma	803.43	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	803.44	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.45	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.46	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration
Trauma	803.49	ICD9CM	Other closed skull fracture with intracranial injury of other and unspecified nature, with concussion, unspecified
Trauma	803.50	ICD9CM	Other open skull fracture without mention of injury, unspecified state of consciousness

Trauma	803.51	ICD9CM	Other open skull fracture without mention of intracranial injury, with no loss of consciousness
Trauma	803.52	ICD9CM	Other open skull fracture without mention of intracranial injury, with brief [less than one hour] loss of consciousness
Trauma	803.53	ICD9CM	Other open skull fracture without mention of intracranial injury, with moderate [1-24 hours] loss of consciousness
Trauma	803.54	ICD9CM	Other open skull fracture without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.55	ICD9CM	Other open skull fracture without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.56	ICD9CM	Other open skull fracture without mention of intracranial injury, with loss of consciousness of unspecified duration
Trauma	803.59	ICD9CM	Other open skull fracture without mention of intracranial injury, with concussion, unspecified
Trauma	803.60	ICD9CM	Other open skull fracture with cerebral laceration and contusion, unspecified state of consciousness
Trauma	803.61	ICD9CM	Other open skull fracture with cerebral laceration and contusion, with no loss of consciousness
Trauma	803.62	ICD9CM	Other open skull fracture with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	803.63	ICD9CM	Other open skull fracture with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness
Trauma	803.64	ICD9CM	Other open skull fracture with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.65	ICD9CM	Other open skull fracture with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level

Trauma	803.66	ICD9CM	Other open skull fracture with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	803.69	ICD9CM	Other open skull fracture with cerebral laceration and contusion, with concussion, unspecified
Trauma	803.70	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness
Trauma	803.71	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	803.72	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	803.73	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	803.74	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.75	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.76	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration
Trauma	803.79	ICD9CM	Other open skull fracture with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	803.80	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, unspecified state of consciousness
Trauma	803.81	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	803.82	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness

Trauma	803.83	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	803.84	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.85	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.86	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	803.89	ICD9CM	Other open skull fracture with other and unspecified intracranial hemorrhage, with concussion, unspecified
Trauma	803.90	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	803.91	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	803.92	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness
Trauma	803.93	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	803.94	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	803.95	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	803.96	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration

Trauma	803.99	ICD9CM	Other open skull fracture with intracranial injury of other and unspecified nature, with concussion, unspecified
Trauma	804.00	ICD9CM	Closed fractures involving skull or face with other bones, without mention of intracranial injury, unspecified state of consciousness
Trauma	804.01	ICD9CM	Closed fractures involving skull or face with other bones, without mention of intracranial injury, with no loss of consciousness
Trauma	804.02	ICD9CM	Closed fractures involving skull or face with other bones, without mention of intracranial injury, with brief [less than one hour] loss of consciousness
Trauma	804.03	ICD9CM	Closed fractures involving skull or face with other bones, without mention of intracranial injury, with moderate [1-24 hours] loss of consciousness
Trauma	804.04	ICD9CM	Closed fractures involving skull or face with other bones, without mention or intracranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.05	ICD9CM	Closed fractures involving skull of face with other bones, without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.06	ICD9CM	Closed fractures involving skull of face with other bones, without mention of intracranial injury, with loss of consciousness of unspecified duration
Trauma	804.09	ICD9CM	Closed fractures involving skull of face with other bones, without mention of intracranial injury, with concussion, unspecified
Trauma	804.10	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, unspecified state of consciousness
Trauma	804.11	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, with no loss of consciousness
Trauma	804.12	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	804.13	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness

Trauma	804.14	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.15	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.16	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	804.19	ICD9CM	Closed fractures involving skull or face with other bones, with cerebral laceration and contusion, with concussion, unspecified
Trauma	804.20	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness
Trauma	804.21	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	804.22	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	804.23	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	804.24	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.25	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.26	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration

Trauma	804.29	ICD9CM	Closed fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	804.30	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, unspecified state of consciousness
Trauma	804.31	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	804.32	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	804.33	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	804.34	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.35	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.36	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	804.39	ICD9CM	Closed fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with concussion, unspecified
Trauma	804.40	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	804.41	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	804.42	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness

Trauma	804.43	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	804.44	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.45	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.46	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration
Trauma	804.49	ICD9CM	Closed fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with concussion, unspecified
Trauma	804.50	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, unspecified state of consciousness
Trauma	804.51	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, with no loss of consciousness
Trauma	804.52	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, with brief [less than one hour] loss of consciousness
Trauma	804.53	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, with moderate [1-24 hours] loss of consciousness
Trauma	804.54	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.55	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.56	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, with loss of consciousness of unspecified duration

Trauma	804.59	ICD9CM	Open fractures involving skull or face with other bones, without mention of intracranial injury, with concussion, unspecified
Trauma	804.60	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, unspecified state of consciousness
Trauma	804.61	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, with no loss of consciousness
Trauma	804.62	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, with brief [less than one hour] loss of consciousness
Trauma	804.63	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, with moderate [1-24 hours] loss of consciousness
Trauma	804.64	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.65	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.66	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, with loss of consciousness of unspecified duration
Trauma	804.69	ICD9CM	Open fractures involving skull or face with other bones, with cerebral laceration and contusion, with concussion, unspecified
Trauma	804.70	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, unspecified state of consciousness
Trauma	804.71	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with no loss of consciousness
Trauma	804.72	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	804.73	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with moderate [1-24 hours] loss of

			consciousness
Trauma	804.74	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.75	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with prolonged [more than 24 hours] loss of consciousness, without return to pre-existing conscious level
Trauma	804.76	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with loss of consciousness of unspecified duration
Trauma	804.79	ICD9CM	Open fractures involving skull or face with other bones with subarachnoid, subdural, and extradural hemorrhage, with concussion, unspecified
Trauma	804.80	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, unspecified state of consciousness
Trauma	804.81	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with no loss of consciousness
Trauma	804.82	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with brief [less than one hour] loss of consciousness
Trauma	804.83	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with moderate [1-24 hours] loss of consciousness
Trauma	804.84	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.85	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with prolonged [more than 24 hours] loss consciousness, without return to pre-existing conscious level

Trauma	804.86	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with loss of consciousness of unspecified duration
Trauma	804.89	ICD9CM	Open fractures involving skull or face with other bones, with other and unspecified intracranial hemorrhage, with concussion, unspecified
Trauma	804.90	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, unspecified state of consciousness
Trauma	804.91	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with no loss of consciousness
Trauma	804.92	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with brief [less than one hour] loss of consciousness
Trauma	804.93	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with moderate [1-24 hours] loss of consciousness
Trauma	804.94	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	804.95	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	804.96	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with loss of consciousness of unspecified duration
Trauma	804.99	ICD9CM	Open fractures involving skull or face with other bones, with intracranial injury of other and unspecified nature, with concussion, unspecified
Trauma	805.00	ICD9CM	Closed fracture of cervical vertebra, unspecified level
Trauma	805.01	ICD9CM	Closed fracture of first cervical vertebra
Trauma	805.02	ICD9CM	Closed fracture of second cervical vertebra
Trauma	805.03	ICD9CM	Closed fracture of third cervical vertebra
Trauma	805.04	ICD9CM	Closed fracture of fourth cervical vertebra

Trauma	805.05	ICD9CM	Closed fracture of fifth cervical vertebra
Trauma	805.06	ICD9CM	Closed fracture of sixth cervical vertebra
Trauma	805.07	ICD9CM	Closed fracture of seventh cervical vertebra
Trauma	805.08	ICD9CM	Closed fracture of multiple cervical vertebrae
Trauma	805.10	ICD9CM	Open fracture of cervical vertebra, unspecified level
Trauma	805.11	ICD9CM	Open fracture of first cervical vertebra
Trauma	805.12	ICD9CM	Open fracture of second cervical vertebra
Trauma	805.13	ICD9CM	Open fracture of third cervical vertebra
Trauma	805.14	ICD9CM	Open fracture of fourth cervical vertebra
Trauma	805.15	ICD9CM	Open fracture of fifth cervical vertebra
Trauma	805.16	ICD9CM	Open fracture of sixth cervical vertebra
Trauma	805.17	ICD9CM	Open fracture of seventh cervical vertebra
Trauma	805.18	ICD9CM	Open fracture of multiple cervical vertebrae
Trauma	805.2	ICD9CM	Closed fracture of dorsal [thoracic] vertebra without mention of spinal cord injury
Trauma	805.3	ICD9CM	Open fracture of dorsal [thoracic] vertebra without mention of spinal cord injury
Trauma	805.4	ICD9CM	Closed fracture of lumbar vertebra without mention of spinal cord injury
Trauma	805.5	ICD9CM	Open fracture of lumbar vertebra without mention of spinal cord injury
Trauma	805.6	ICD9CM	Closed fracture of sacrum and coccyx without mention of spinal cord injury
Trauma	805.7	ICD9CM	Open fracture of sacrum and coccyx without mention of spinal cord injury
Trauma	805.8	ICD9CM	Closed fracture of unspecified vertebral column without mention of spinal cord injury
Trauma	805.9	ICD9CM	Open fracture of unspecified vertebral column without mention of spinal cord injury
Trauma	806.00	ICD9CM	Closed fracture of C1-C4 level with unspecified spinal cord injury
Trauma	806.01	ICD9CM	Closed fracture of C1-C4 level with complete lesion of cord
Trauma	806.02	ICD9CM	Closed fracture of C1-C4 level with anterior cord syndrome
Trauma	806.03	ICD9CM	Closed fracture of C1-C4 level with central cord syndrome
Trauma	806.04	ICD9CM	Closed fracture of C1-C4 level with other specified spinal cord injury

Trauma	806.05	ICD9CM	Closed fracture of C5-C7 level with unspecified spinal cord injury
Trauma	806.06	ICD9CM	Closed fracture of C5-C7 level with complete lesion of cord
Trauma	806.07	ICD9CM	Closed fracture of C5-C7 level with anterior cord syndrome
Trauma	806.08	ICD9CM	Closed fracture of C5-C7 level with central cord syndrome
Trauma	806.09	ICD9CM	Closed fracture of C5-C7 level with other specified spinal cord injury
Trauma	806.10	ICD9CM	Open fracture of C1-C4 level with unspecified spinal cord injury
Trauma	806.11	ICD9CM	Open fracture of C1-C4 level with complete lesion of cord
Trauma	806.12	ICD9CM	Open fracture of C1-C4 level with anterior cord syndrome
Trauma	806.13	ICD9CM	Open fracture of C1-C4 level with central cord syndrome
Trauma	806.14	ICD9CM	Open fracture of C1-C4 level with other specified spinal cord injury
Trauma	806.15	ICD9CM	Open fracture of C5-C7 level with unspecified spinal cord injury
Trauma	806.16	ICD9CM	Open fracture of C5-C7 level with complete lesion of cord
Trauma	806.17	ICD9CM	Open fracture of C5-C7 level with anterior cord syndrome
Trauma	806.18	ICD9CM	Open fracture of C5-C7 level with central cord syndrome
Trauma	806.19	ICD9CM	Open fracture of C5-C7 level with other specified spinal cord injury
Trauma	806.20	ICD9CM	Closed fracture of T1-T6 level with unspecified spinal cord injury
Trauma	806.21	ICD9CM	Closed fracture of T1-T6 level with complete lesion of cord
Trauma	806.22	ICD9CM	Closed fracture of T1-T6 level with anterior cord syndrome
Trauma	806.23	ICD9CM	Closed fracture of T1-T6 level with central cord syndrome
Trauma	806.24	ICD9CM	Closed fracture of T1-T6 level with other specified spinal cord injury
Trauma	806.25	ICD9CM	Closed fracture of T7-T12 level with unspecified spinal cord injury
Trauma	806.26	ICD9CM	Closed fracture of T7-T12 level with complete lesion of cord
Trauma	806.27	ICD9CM	Closed fracture of T7-T12 level with anterior cord syndrome
Trauma	806.28	ICD9CM	Closed fracture of T7-T12 level with central cord syndrome
Trauma	806.29	ICD9CM	Closed fracture of T7-T12 level with other specified spinal cord injury
Trauma	806.30	ICD9CM	Open fracture of T1-T6 level with unspecified spinal cord injury
Trauma	806.31	ICD9CM	Open fracture of T1-T6 level with complete lesion of cord

Trauma	806.32	ICD9CM	Open fracture of T1-T6 level with anterior cord syndrome
Trauma	806.33	ICD9CM	Open fracture of T1-T6 level with central cord syndrome
Trauma	806.34	ICD9CM	Open fracture of T1-T6 level with other specified spinal cord injury
Trauma	806.35	ICD9CM	Open fracture of T7-T12 level with unspecified spinal cord injury
Trauma	806.36	ICD9CM	Open fracture of T7-T12 level with complete lesion of cord
Trauma	806.37	ICD9CM	Open fracture of T7-T12 level with anterior cord syndrome
Trauma	806.38	ICD9CM	Open fracture of T7-T12 level with central cord syndrome
Trauma	806.39	ICD9CM	Open fracture of T7-T12 level with other specified spinal cord injury
Trauma	806.4	ICD9CM	Closed fracture of lumbar spine with spinal cord injury
Trauma	806.5	ICD9CM	Open fracture of lumbar spine with spinal cord injury
Trauma	806.60	ICD9CM	Closed fracture of sacrum and coccyx with unspecified spinal cord injury
Trauma	806.61	ICD9CM	Closed fracture of sacrum and coccyx with complete cauda equina lesion
Trauma	806.62	ICD9CM	Closed fracture of sacrum and coccyx with other cauda equina injury
Trauma	806.69	ICD9CM	Closed fracture of sacrum and coccyx with other spinal cord injury
Trauma	806.70	ICD9CM	Open fracture of sacrum and coccyx with unspecified spinal cord injury
Trauma	806.71	ICD9CM	Open fracture of sacrum and coccyx with complete cauda equina lesion
Trauma	806.72	ICD9CM	Open fracture of sacrum and coccyx with other cauda equina injury
Trauma	806.79	ICD9CM	Open fracture of sacrum and coccyx with other spinal cord injury
Trauma	806.8	ICD9CM	Closed fracture of unspecified vertebral column with spinal cord injury
Trauma	806.9	ICD9CM	Open fracture of unspecified vertebral column with spinal cord injury
Trauma	807.00	ICD9CM	Closed fracture of rib(s), unspecified
Trauma	807.01	ICD9CM	Closed fracture of one rib
Trauma	807.02	ICD9CM	Closed fracture of two ribs
Trauma	807.03	ICD9CM	Closed fracture of three ribs
Trauma	807.04	ICD9CM	Closed fracture of four ribs
Trauma	807.05	ICD9CM	Closed fracture of five ribs
Trauma	807.06	ICD9CM	Closed fracture of six ribs

Trauma	807.07	ICD9CM	Closed fracture of seven ribs
Trauma	807.08	ICD9CM	Closed fracture of eight or more ribs
Trauma	807.09	ICD9CM	Closed fracture of multiple ribs, unspecified
Trauma	807.10	ICD9CM	Open fracture of rib(s), unspecified
Trauma	807.11	ICD9CM	Open fracture of one rib
Trauma	807.12	ICD9CM	Open fracture of two ribs
Trauma	807.13	ICD9CM	Open fracture of three ribs
Trauma	807.14	ICD9CM	Open fracture of four ribs
Trauma	807.15	ICD9CM	Open fracture of five ribs
Trauma	807.16	ICD9CM	Open fracture of six ribs
Trauma	807.17	ICD9CM	Open fracture of seven ribs
Trauma	807.18	ICD9CM	Open fracture of eight or more ribs
Trauma	807.19	ICD9CM	Open fracture of multiple ribs, unspecified
Trauma	807.2	ICD9CM	Closed fracture of sternum
Trauma	807.3	ICD9CM	Open fracture of sternum
Trauma	807.4	ICD9CM	Flail chest
Trauma	807.5	ICD9CM	Closed fracture of larynx and trachea
Trauma	807.6	ICD9CM	Open fracture of larynx and trachea
Trauma	808.0	ICD9CM	Closed fracture of acetabulum
Trauma	808.1	ICD9CM	Open fracture of acetabulum
Trauma	808.2	ICD9CM	Closed fracture of pubis
Trauma	808.3	ICD9CM	Open fracture of pubis
Trauma	808.41	ICD9CM	Closed fracture of ilium
Trauma	808.42	ICD9CM	Closed fracture of ischium
Trauma	808.43	ICD9CM	Multiple closed pelvic fractures with disruption of pelvic circle
Trauma	808.44	ICD9CM	Multiple closed pelvic fractures without disruption of pelvic circle
Trauma	808.49	ICD9CM	Closed fracture of other specified part of pelvis

Trauma	808.51	ICD9CM	Open fracture of ilium
Trauma	808.52	ICD9CM	Open fracture of ischium
Trauma	808.53	ICD9CM	Multiple open pelvic fractures with disruption of pelvic circle
Trauma	808.54	ICD9CM	Multiple open pelvic fractures without disruption of pelvic circle
Trauma	808.59	ICD9CM	Open fracture of other specified part of pelvis
Trauma	808.8	ICD9CM	Closed unspecified fracture of pelvis
Trauma	808.9	ICD9CM	Open unspecified fracture of pelvis
Trauma	809.0	ICD9CM	Fracture of bones of trunk, closed
Trauma	809.1	ICD9CM	Fracture of bones of trunk, open
Trauma	810.00	ICD9CM	Closed fracture of clavicle, unspecified part
Trauma	810.01	ICD9CM	Closed fracture of sternal end of clavicle
Trauma	810.02	ICD9CM	Closed fracture of shaft of clavicle
Trauma	810.03	ICD9CM	Closed fracture of acromial end of clavicle
Trauma	810.10	ICD9CM	Open fracture of clavicle, unspecified part
Trauma	810.11	ICD9CM	Open fracture of sternal end of clavicle
Trauma	810.12	ICD9CM	Open fracture of shaft of clavicle
Trauma	810.13	ICD9CM	Open fracture of acromial end of clavicle
Trauma	811.00	ICD9CM	Closed fracture of scapula, unspecified part
Trauma	811.01	ICD9CM	Closed fracture of acromial process of scapula
Trauma	811.02	ICD9CM	Closed fracture of coracoid process of scapula
Trauma	811.03	ICD9CM	Closed fracture of glenoid cavity and neck of scapula
Trauma	811.09	ICD9CM	Closed fracture of scapula, other
Trauma	811.10	ICD9CM	Open fracture of scapula, unspecified part
Trauma	811.11	ICD9CM	Open fracture of acromial process of scapula
Trauma	811.12	ICD9CM	Open fracture of coracoid process
Trauma	811.13	ICD9CM	Open fracture of glenoid cavity and neck of scapula
Trauma	811.19	ICD9CM	Open fracture of scapula, other

Trauma	812.00	ICD9CM	Closed fracture of unspecified part of upper end of humerus
Trauma	812.01	ICD9CM	Closed fracture of surgical neck of humerus
Trauma	812.02	ICD9CM	Closed fracture of anatomical neck of humerus
Trauma	812.03	ICD9CM	Closed fracture of greater tuberosity of humerus
Trauma	812.09	ICD9CM	Other closed fracture of upper end of humerus
Trauma	812.10	ICD9CM	Open fracture of unspecified part of upper end of humerus
Trauma	812.11	ICD9CM	Open fracture of surgical neck of humerus
Trauma	812.12	ICD9CM	Open fracture of anatomical neck of humerus
Trauma	812.13	ICD9CM	Open fracture of greater tuberosity of humerus
Trauma	812.19	ICD9CM	Other open fracture of upper end of humerus
Trauma	812.20	ICD9CM	Closed fracture of unspecified part of humerus
Trauma	812.21	ICD9CM	Closed fracture of shaft of humerus
Trauma	812.30	ICD9CM	Open fracture of unspecified part of humerus
Trauma	812.31	ICD9CM	Open fracture of shaft of humerus
Trauma	812.40	ICD9CM	Closed fracture of unspecified part of lower end of humerus
Trauma	812.41	ICD9CM	Closed supracondylar fracture of humerus
Trauma	812.42	ICD9CM	Closed fracture of lateral condyle of humerus
Trauma	812.43	ICD9CM	Closed fracture of medial condyle of humerus
Trauma	812.44	ICD9CM	Closed fracture of unspecified condyle(s) of humerus
Trauma	812.49	ICD9CM	Other closed fracture of lower end of humerus
Trauma	812.50	ICD9CM	Open fracture of unspecified part of lower end of humerus
Trauma	812.51	ICD9CM	Open supracondylar fracture of humerus
Trauma	812.52	ICD9CM	Open fracture of lateral condyle of humerus
Trauma	812.53	ICD9CM	Open fracture of medial condyle of humerus
Trauma	812.54	ICD9CM	Open fracture of unspecified condyle(s) of humerus
Trauma	812.59	ICD9CM	Other open fracture of lower end of humerus
Trauma	813.00	ICD9CM	Closed fracture of upper end of forearm, unspecified

Trauma	813.01	ICD9CM	Closed fracture of olecranon process of ulna
Trauma	813.02	ICD9CM	Closed fracture of coronoid process of ulna
Trauma	813.03	ICD9CM	Closed Monteggia's fracture
Trauma	813.04	ICD9CM	Other and unspecified closed fractures of proximal end of ulna (alone)
Trauma	813.05	ICD9CM	Closed fracture of head of radius
Trauma	813.06	ICD9CM	Closed fracture of neck of radius
Trauma	813.07	ICD9CM	Other and unspecified closed fractures of proximal end of radius (alone)
Trauma	813.08	ICD9CM	Closed fracture of radius with ulna, upper end [any part]
Trauma	813.10	ICD9CM	Open fracture of upper end of forearm, unspecified
Trauma	813.11	ICD9CM	Open fracture of olecranon process of ulna
Trauma	813.12	ICD9CM	Open fracture of coronoid process of ulna
Trauma	813.13	ICD9CM	Open Monteggia's fracture
Trauma	813.14	ICD9CM	Other and unspecified open fractures of proximal end of ulna (alone)
Trauma	813.15	ICD9CM	Open fracture of head of radius
Trauma	813.16	ICD9CM	Open fracture of neck of radius
Trauma	813.17	ICD9CM	Other and unspecified open fractures of proximal end of radius (alone)
Trauma	813.18	ICD9CM	Open fracture of radius with ulna, upper end (any part)
Trauma	813.20	ICD9CM	Closed fracture of shaft of radius or ulna, unspecified
Trauma	813.21	ICD9CM	Closed fracture of shaft of radius (alone)
Trauma	813.22	ICD9CM	Closed fracture of shaft of ulna (alone)
Trauma	813.23	ICD9CM	Closed fracture of shaft of radius with ulna
Trauma	813.30	ICD9CM	Open fracture of shaft of radius or ulna, unspecified
Trauma	813.31	ICD9CM	Open fracture of shaft of radius (alone)
Trauma	813.32	ICD9CM	Open fracture of shaft of ulna (alone)
Trauma	813.33	ICD9CM	Open fracture of shaft of radius with ulna
Trauma	813.40	ICD9CM	Closed fracture of lower end of forearm, unspecified
Trauma	813.41	ICD9CM	Closed Colles' fracture

Trauma	813.42	ICD9CM	Other closed fractures of distal end of radius (alone)
Trauma	813.43	ICD9CM	Closed fracture of distal end of ulna (alone)
Trauma	813.44	ICD9CM	Closed fracture of lower end of radius with ulna
Trauma	813.45	ICD9CM	Torus fracture of radius (alone)
Trauma	813.46	ICD9CM	Torus fracture of ulna (alone)
Trauma	813.47	ICD9CM	Torus fracture of radius and ulna
Trauma	813.50	ICD9CM	Open fracture of lower end of forearm, unspecified
Trauma	813.51	ICD9CM	Open Colles' fracture
Trauma	813.52	ICD9CM	Other open fractures of distal end of radius (alone)
Trauma	813.53	ICD9CM	Open fracture of distal end of ulna (alone)
Trauma	813.54	ICD9CM	Open fracture of lower end of radius with ulna
Trauma	813.80	ICD9CM	Closed fracture of unspecified part of forearm
Trauma	813.81	ICD9CM	Closed fracture of unspecified part of radius (alone)
Trauma	813.82	ICD9CM	Closed fracture of unspecified part of ulna (alone)
Trauma	813.83	ICD9CM	Closed fracture of unspecified part of radius with ulna
Trauma	813.90	ICD9CM	Open fracture of unspecified part of forearm
Trauma	813.91	ICD9CM	Open fracture of unspecified part of radius (alone)
Trauma	813.92	ICD9CM	Open fracture of unspecified part of ulna (alone)
Trauma	813.93	ICD9CM	Open fracture of unspecified part of radius with ulna
Trauma	814.00	ICD9CM	Closed fracture of carpal bone, unspecified
Trauma	814.01	ICD9CM	Closed fracture of navicular [scaphoid] bone of wrist
Trauma	814.02	ICD9CM	Closed fracture of lunate [semilunar] bone of wrist
Trauma	814.03	ICD9CM	Closed fracture of triquetral [cuneiform] bone of wrist
Trauma	814.04	ICD9CM	Closed fracture of pisiform bone of wrist
Trauma	814.05	ICD9CM	Closed fracture of trapezium bone [larger multangular] of wrist
Trauma	814.06	ICD9CM	Closed fracture of trapezoid bone [smaller multangular] of wrist
Trauma	814.07	ICD9CM	Closed fracture of capitate bone [os magnum] of wrist

Trauma	814.08	ICD9CM	Closed fracture of hamate [unciform] bone of wrist
Trauma	814.09	ICD9CM	Closed fracture of other bone of wrist
Trauma	814.10	ICD9CM	Open fracture of carpal bone, unspecified
Trauma	814.11	ICD9CM	Open fracture of navicular [scaphoid] bone of wrist
Trauma	814.12	ICD9CM	Open fracture of lunate [semilunar] bone of wrist
Trauma	814.13	ICD9CM	Open fracture of triquetral [cuneiform] bone of wrist
Trauma	814.14	ICD9CM	Open fracture of pisiform bone of wrist
Trauma	814.15	ICD9CM	Open fracture of trapezium bone [larger multangular] of wrist
Trauma	814.16	ICD9CM	Open fracture of trapezoid bone [smaller multangular] of wrist
Trauma	814.17	ICD9CM	Open fracture of capitate bone [os magnum] of wrist
Trauma	814.18	ICD9CM	Open fracture of hamate [unciform] bone of wrist
Trauma	814.19	ICD9CM	Open fracture of other bone of wrist
Trauma	815.00	ICD9CM	Closed fracture of metacarpal bone(s), site unspecified
Trauma	815.01	ICD9CM	Closed fracture of base of thumb [first] metacarpal
Trauma	815.02	ICD9CM	Closed fracture of base of other metacarpal bone(s)
Trauma	815.03	ICD9CM	Closed fracture of shaft of metacarpal bone(s)
Trauma	815.04	ICD9CM	Closed fracture of neck of metacarpal bone(s)
Trauma	815.09	ICD9CM	Closed fracture of multiple sites of metacarpus
Trauma	815.10	ICD9CM	Open fracture of metacarpal bone(s), site unspecified
Trauma	815.11	ICD9CM	Open fracture of base of thumb [first] metacarpal
Trauma	815.12	ICD9CM	Open fracture of base of other metacarpal bone(s)
Trauma	815.13	ICD9CM	Open fracture of shaft of metacarpal bone(s)
Trauma	815.14	ICD9CM	Open fracture of neck of metacarpal bone(s)
Trauma	815.19	ICD9CM	Open fracture of multiple sites of metacarpus
Trauma	816.00	ICD9CM	Closed fracture of phalanx or phalanges of hand, unspecified
Trauma	816.01	ICD9CM	Closed fracture of middle or proximal phalanx or phalanges of hand
Trauma	816.02	ICD9CM	Closed fracture of distal phalanx or phalanges of hand

Trauma	816.03	ICD9CM	Closed fracture of multiple sites of phalanx or phalanges of hand
Trauma	816.10	ICD9CM	Open fracture of phalanx or phalanges of hand, unspecified
Trauma	816.11	ICD9CM	Open fracture of middle or proximal phalanx or phalanges of hand
Trauma	816.12	ICD9CM	Open fracture of distal phalanx or phalanges of hand
Trauma	816.13	ICD9CM	Open fracture of multiple sites of phalanx or phalanges of hand
Trauma	817.0	ICD9CM	Multiple closed fractures of hand bones
Trauma	817.1	ICD9CM	Multiple open fractures of hand bones
Trauma	818.0	ICD9CM	Ill-defined closed fractures of upper limb
Trauma	818.1	ICD9CM	Ill-defined open fractures of upper limb
Trauma	819.0	ICD9CM	Multiple closed fractures involving both upper limbs, and upper limb with rib(s) and sternum
Trauma	819.1	ICD9CM	Multiple open fractures involving both upper limbs, and upper limb with rib(s) and sternum
Trauma	820.00	ICD9CM	Closed fracture of intracapsular section of neck of femur, unspecified
Trauma	820.01	ICD9CM	Closed fracture of epiphysis (separation) (upper) of neck of femur
Trauma	820.02	ICD9CM	Closed fracture of midcervical section of neck of femur
Trauma	820.03	ICD9CM	Closed fracture of base of neck of femur
Trauma	820.09	ICD9CM	Other closed transcervical fracture of neck of femur
Trauma	820.10	ICD9CM	Open fracture of intracapsular section of neck of femur, unspecified
Trauma	820.11	ICD9CM	Open fracture of epiphysis (separation) (upper) of neck of femur
Trauma	820.12	ICD9CM	Open fracture of midcervical section of neck of femur
Trauma	820.13	ICD9CM	Open fracture of base of neck of femur
Trauma	820.19	ICD9CM	Other open transcervical fracture of neck of femur
Trauma	820.20	ICD9CM	Closed fracture of trochanteric section of neck of femur
Trauma	820.21	ICD9CM	Closed fracture of intertrochanteric section of neck of femur
Trauma	820.22	ICD9CM	Closed fracture of subtrochanteric section of neck of femur
Trauma	820.30	ICD9CM	Open fracture of trochanteric section of neck of femur, unspecified

Trauma	820.31	ICD9CM	Open fracture of intertrochanteric section of neck of femur
Trauma	820.32	ICD9CM	Open fracture of subtrochanteric section of neck of femur
Trauma	820.8	ICD9CM	Closed fracture of unspecified part of neck of femur
Trauma	820.9	ICD9CM	Open fracture of unspecified part of neck of femur
Trauma	821.00	ICD9CM	Closed fracture of unspecified part of femur
Trauma	821.01	ICD9CM	Closed fracture of shaft of femur
Trauma	821.10	ICD9CM	Open fracture of unspecified part of femur
Trauma	821.11	ICD9CM	Open fracture of shaft of femur
Trauma	821.20	ICD9CM	Closed fracture of lower end of femur, unspecified part
Trauma	821.21	ICD9CM	Closed fracture of condyle, femoral
Trauma	821.22	ICD9CM	Closed fracture of epiphysis, lower (separation) of femur
Trauma	821.23	ICD9CM	Closed supracondylar fracture of femur
Trauma	821.29	ICD9CM	Other closed fracture of lower end of femur
Trauma	821.30	ICD9CM	Open fracture of lower end of femur, unspecified part
Trauma	821.31	ICD9CM	Open fracture of condyle, femoral
Trauma	821.32	ICD9CM	Open fracture of epiphysis. Lower (separation) of femur
Trauma	821.33	ICD9CM	Open supracondylar fracture of femur
Trauma	821.39	ICD9CM	Other open fracture of lower end of femur
Trauma	822.0	ICD9CM	Closed fracture of patella
Trauma	822.1	ICD9CM	Open fracture of patella
Trauma	823.00	ICD9CM	Closed fracture of upper end of tibia alone
Trauma	823.01	ICD9CM	Closed fracture of upper end of fibula alone
Trauma	823.02	ICD9CM	Closed fracture of upper end of fibula with tibia
Trauma	823.10	ICD9CM	Open fracture of upper end of tibia alone
Trauma	823.11	ICD9CM	Open fracture of upper end of fibula alone
Trauma	823.12	ICD9CM	Open fracture of upper end of fibula with tibia
Trauma	823.20	ICD9CM	Closed fracture of shaft of tibia alone

Trauma	823.21	ICD9CM	Closed fracture of shaft of fibula alone
Trauma	823.22	ICD9CM	Closed fracture of shaft of fibula with tibia
Trauma	823.30	ICD9CM	Open fracture of shaft of tibia alone
Trauma	823.31	ICD9CM	Open fracture of shaft of fibula alone
Trauma	823.32	ICD9CM	Open fracture of shaft of fibula with tibia
Trauma	823.40	ICD9CM	Torus fracture, tibia alone
Trauma	823.41	ICD9CM	Torus fracture, fibula alone
Trauma	823.42	ICD9CM	Torus fracture, fibula with tibia
Trauma	823.80	ICD9CM	Closed fracture of unspecified part of tibia alone
Trauma	823.81	ICD9CM	Closed fracture of unspecified part of fibula alone
Trauma	823.82	ICD9CM	Closed fracture of unspecified part of fibula with tibia
Trauma	823.90	ICD9CM	Open fracture of unspecified part of tibia alone
Trauma	823.91	ICD9CM	Open fracture of unspecified part of fibula alone
Trauma	823.92	ICD9CM	Open fracture of unspecified part of fibula with tibia
Trauma	824.0	ICD9CM	Fracture of medial malleolus, closed
Trauma	824.1	ICD9CM	Fracture of medial malleolus, open
Trauma	824.2	ICD9CM	Fracture of lateral malleolus, closed
Trauma	824.3	ICD9CM	Fracture of lateral malleolus, open
Trauma	824.4	ICD9CM	Bimalleolar fracture, closed
Trauma	824.5	ICD9CM	Bimalleolar fracture, open
Trauma	824.6	ICD9CM	Trimalleolar fracture, closed
Trauma	824.7	ICD9CM	Trimalleolar fracture, open
Trauma	824.8	ICD9CM	Unspecified fracture of ankle, closed
Trauma	824.9	ICD9CM	Unspecified fracture of ankle, open
Trauma	825.0	ICD9CM	Fracture of calcaneus, closed
Trauma	825.1	ICD9CM	Fracture of calcaneus, open
Trauma	825.20	ICD9CM	Closed fracture of unspecified bone(s) of foot [except toes]

Trauma	825.21	ICD9CM	Closed fracture of astragalus
Trauma	825.22	ICD9CM	Closed fracture of navicular [scaphoid], foot
Trauma	825.23	ICD9CM	Closed fracture of cuboid
Trauma	825.24	ICD9CM	Closed fracture of cuneiform, foot
Trauma	825.25	ICD9CM	Closed fracture of metatarsal bone(s)
Trauma	825.29	ICD9CM	Other closed fracture of tarsal and metatarsal bones
Trauma	825.30	ICD9CM	Open fracture of unspecified bone(s) of foot [except toes]
Trauma	825.31	ICD9CM	Open fracture of astragalus
Trauma	825.32	ICD9CM	Open fracture of navicular [scaphoid], foot
Trauma	825.33	ICD9CM	Open fracture of cuboid
Trauma	825.34	ICD9CM	Open fracture of cuneiform, foot
Trauma	825.35	ICD9CM	Open fracture of metatarsal bone(s)
Trauma	825.39	ICD9CM	Other open fracture of tarsal and metatarsal bones
Trauma	826.0	ICD9CM	Closed fracture of one or more phalanges of foot
Trauma	826.1	ICD9CM	Open fracture of one or more phalanges of foot
Trauma	827.0	ICD9CM	Other, multiple and ill-defined fractures of lower limb, closed
Trauma	827.1	ICD9CM	Other, multiple and ill-defined fractures of lower limb, open
Trauma	828.0	ICD9CM	Closed multiple fractures involving both lower limbs, lower with upper limb, and lower limb(s) with rib(s) and sternum
Trauma	828.1	ICD9CM	Open multiple fractures involving both lower limbs, lower with upper limb, and lower limb(s) with rib(s) and sternum
Trauma	829.0	ICD9CM	Fracture of unspecified bone, closed
Trauma	829.1	ICD9CM	Fracture of unspecified bone, open
Trauma	830.0	ICD9CM	Closed dislocation of jaw
Trauma	830.1	ICD9CM	Open dislocation of jaw
Trauma	831.00	ICD9CM	Closed dislocation of shoulder, unspecified
Trauma	831.01	ICD9CM	Closed anterior dislocation of humerus

Trauma	831.02	ICD9CM	Closed posterior dislocation of humerus
Trauma	831.03	ICD9CM	Closed inferior dislocation of humerus
Trauma	831.04	ICD9CM	Closed dislocation of acromioclavicular (joint)
Trauma	831.09	ICD9CM	Closed dislocation of shoulder, other
Trauma	831.10	ICD9CM	Open dislocation of shoulder, unspecified
Trauma	831.11	ICD9CM	Open anterior dislocation of humerus
Trauma	831.12	ICD9CM	Open posterior dislocation of humerus
Trauma	831.13	ICD9CM	Open inferior dislocation of humerus
Trauma	831.14	ICD9CM	Open dislocation of acromioclavicular (joint)
Trauma	831.19	ICD9CM	Open dislocation of shoulder, other
Trauma	832.00	ICD9CM	Closed dislocation of elbow, unspecified
Trauma	832.01	ICD9CM	Closed anterior dislocation of elbow
Trauma	832.02	ICD9CM	Closed posterior dislocation of elbow
Trauma	832.03	ICD9CM	Closed medial dislocation of elbow
Trauma	832.04	ICD9CM	Closed lateral dislocation of elbow
Trauma	832.09	ICD9CM	Closed dislocation of elbow, other
Trauma	832.10	ICD9CM	Open dislocation of elbow, unspecified
Trauma	832.11	ICD9CM	Open anterior dislocation of elbow
Trauma	832.12	ICD9CM	Open posterior dislocation of elbow
Trauma	832.13	ICD9CM	Open medial dislocation of elbow
Trauma	832.14	ICD9CM	Open lateral dislocation of elbow
Trauma	832.19	ICD9CM	Open dislocation of elbow, other
Trauma	832.2	ICD9CM	Nursemaid's elbow
Trauma	833.00	ICD9CM	Closed dislocation of wrist, unspecified part
Trauma	833.01	ICD9CM	Closed dislocation of radioulnar (joint), distal
Trauma	833.02	ICD9CM	Closed dislocation of radiocarpal (joint)
Trauma	833.03	ICD9CM	Closed dislocation of midcarpal (joint)

Trauma	833.04	ICD9CM	Closed dislocation of carpometacarpal (joint)
Trauma	833.05	ICD9CM	Closed dislocation of metacarpal (bone), proximal end
Trauma	833.09	ICD9CM	Closed dislocation of wrist, other
Trauma	833.10	ICD9CM	Open dislocation of wrist, unspecified part
Trauma	833.11	ICD9CM	Open dislocation of radioulnar (joint), distal
Trauma	833.12	ICD9CM	Open dislocation of radiocarpal (joint)
Trauma	833.13	ICD9CM	Open dislocation of midcarpal (joint)
Trauma	833.14	ICD9CM	Open dislocation of carpometacarpal (joint)
Trauma	833.15	ICD9CM	Open dislocation of metacarpal (bone), proximal end
Trauma	833.19	ICD9CM	Open dislocation of wrist, other
Trauma	834.00	ICD9CM	Closed dislocation of finger, unspecified part
Trauma	834.01	ICD9CM	Closed dislocation of metacarpophalangeal (joint)
Trauma	834.02	ICD9CM	Closed dislocation of interphalangeal (joint), hand
Trauma	834.10	ICD9CM	Open dislocation of finger, unspecified part
Trauma	834.11	ICD9CM	Open dislocation of metacarpophalangeal (joint)
Trauma	834.12	ICD9CM	Open dislocation interphalangeal (joint), hand
Trauma	835.00	ICD9CM	Closed dislocation of hip, unspecified site
Trauma	835.01	ICD9CM	Closed posterior dislocation of hip
Trauma	835.02	ICD9CM	Closed obturator dislocation of hip
Trauma	835.03	ICD9CM	Other closed anterior dislocation of hip
Trauma	835.10	ICD9CM	Open dislocation of hip, unspecified site
Trauma	835.11	ICD9CM	Open posterior dislocation of hip
Trauma	835.12	ICD9CM	Open obturator dislocation of hip
Trauma	835.13	ICD9CM	Other open anterior dislocation of hip
Trauma	836.0	ICD9CM	Tear of medial cartilage or meniscus of knee, current
Trauma	836.1	ICD9CM	Tear of lateral cartilage or meniscus of knee, current
Trauma	836.2	ICD9CM	Other tear of cartilage or meniscus of knee, current

Trauma	836.3	ICD9CM	Dislocation of patella, closed
Trauma	836.4	ICD9CM	Dislocation of patella, open
Trauma	836.50	ICD9CM	Dislocation of knee, unspecified, closed
Trauma	836.51	ICD9CM	Anterior dislocation of tibia, proximal end, closed
Trauma	836.52	ICD9CM	Posterior dislocation of tibia, proximal end, closed
Trauma	836.53	ICD9CM	Medial dislocation of tibia, proximal end, closed
Trauma	836.54	ICD9CM	Lateral dislocation of tibia, proximal end, closed
Trauma	836.59	ICD9CM	Other dislocation of knee, closed
Trauma	836.60	ICD9CM	Dislocation of knee, unspecified, open
Trauma	836.61	ICD9CM	Anterior dislocation of tibia, proximal end, open
Trauma	836.62	ICD9CM	Posterior dislocation of tibia, proximal end, open
Trauma	836.63	ICD9CM	Medial dislocation of tibia, proximal end, open
Trauma	836.64	ICD9CM	Lateral dislocation of tibia, proximal end, open
Trauma	836.69	ICD9CM	Other dislocation of knee, open
Trauma	837.0	ICD9CM	Closed dislocation of ankle
Trauma	837.1	ICD9CM	Open dislocation of ankle
Trauma	838.00	ICD9CM	Closed dislocation of foot, unspecified
Trauma	838.01	ICD9CM	Closed dislocation of tarsal (bone), joint unspecified
Trauma	838.02	ICD9CM	Closed dislocation of midtarsal (joint)
Trauma	838.03	ICD9CM	Closed dislocation of tarsometatarsal (joint)
Trauma	838.04	ICD9CM	Closed dislocation of metatarsal (bone), joint unspecified
Trauma	838.05	ICD9CM	Closed dislocation of metatarsophalangeal (joint)
Trauma	838.06	ICD9CM	Closed dislocation of interphalangeal (joint), foot
Trauma	838.09	ICD9CM	Closed dislocation of foot, other
Trauma	838.10	ICD9CM	Open dislocation of foot, unspecified
Trauma	838.11	ICD9CM	Open dislocation of tarsal (bone), joint unspecified
Trauma	838.12	ICD9CM	Open dislocation of midtarsal (joint)

Trauma	838.13	ICD9CM	Open dislocation of tarsometatarsal (joint)
Trauma	838.14	ICD9CM	Open dislocation of metatarsal (bone), joint unspecified
Trauma	838.15	ICD9CM	Open dislocation of metatarsophalangeal (joint)
Trauma	838.16	ICD9CM	Open dislocation of interphalangeal (joint), foot
Trauma	838.19	ICD9CM	Open dislocation of foot, other
Trauma	839.00	ICD9CM	Closed dislocation, cervical vertebra, unspecified
Trauma	839.01	ICD9CM	Closed dislocation, first cervical vertebra
Trauma	839.02	ICD9CM	Closed dislocation, second cervical vertebra
Trauma	839.03	ICD9CM	Closed dislocation, third cervical vertebra
Trauma	839.04	ICD9CM	Closed dislocation, fourth cervical vertebra
Trauma	839.05	ICD9CM	Closed dislocation, fifth cervical vertebra
Trauma	839.06	ICD9CM	Closed dislocation, sixth cervical vertebra
Trauma	839.07	ICD9CM	Closed dislocation, seventh cervical vertebra
Trauma	839.08	ICD9CM	Closed dislocation, multiple cervical vertebrae
Trauma	839.10	ICD9CM	Open dislocation, cervical vertebra, unspecified
Trauma	839.11	ICD9CM	Open dislocation, first cervical vertebra
Trauma	839.12	ICD9CM	Open dislocation, second cervical vertebra
Trauma	839.13	ICD9CM	Open dislocation, third cervical vertebra
Trauma	839.14	ICD9CM	Open dislocation, fourth cervical vertebra
Trauma	839.15	ICD9CM	Open dislocation, fifth cervical vertebra
Trauma	839.16	ICD9CM	Open dislocation, sixth cervical vertebra
Trauma	839.17	ICD9CM	Open dislocation, seventh cervical vertebra
Trauma	839.18	ICD9CM	Open dislocation, multiple cervical vertebrae
Trauma	839.20	ICD9CM	Closed dislocation, lumbar vertebra
Trauma	839.21	ICD9CM	Closed dislocation, thoracic vertebra
Trauma	839.30	ICD9CM	Open dislocation, lumbar vertebra
Trauma	839.31	ICD9CM	Open dislocation, thoracic vertebra

Trauma	839.40	ICD9CM	Closed dislocation, vertebra, unspecified site
Trauma	839.41	ICD9CM	Closed dislocation, coccyx
Trauma	839.42	ICD9CM	Closed dislocation, sacrum
Trauma	839.49	ICD9CM	Closed dislocation, vertebra, other
Trauma	839.50	ICD9CM	Open dislocation, vertebra, unspecified site
Trauma	839.51	ICD9CM	Open dislocation, coccyx
Trauma	839.52	ICD9CM	Open dislocation, sacrum
Trauma	839.59	ICD9CM	Open dislocation, vertebra, other
Trauma	839.61	ICD9CM	Closed dislocation, sternum
Trauma	839.69	ICD9CM	Closed dislocation, other location
Trauma	839.71	ICD9CM	Open dislocation, sternum
Trauma	839.79	ICD9CM	Open dislocation, other location
Trauma	839.8	ICD9CM	Closed dislocation, multiple and ill-defined sites
Trauma	839.9	ICD9CM	Open dislocation, multiple and ill-defined sites
Trauma	850.0	ICD9CM	Concussion with no loss of consciousness
Trauma	850.11	ICD9CM	Concussion, with loss of consciousness of 30 minutes or less
Trauma	850.12	ICD9CM	Concussion, with loss of consciousness from 31 to 59 minutes
Trauma	850.2	ICD9CM	Concussion with moderate loss of consciousness
Trauma	850.3	ICD9CM	Concussion with prolonged loss of consciousness and return to pre-existing conscious level
Trauma	850.4	ICD9CM	Concussion with prolonged loss of consciousness, without return to pre-existing conscious level
Trauma	850.5	ICD9CM	Concussion with loss of consciousness of unspecified duration
Trauma	850.9	ICD9CM	Concussion, unspecified
Trauma	851.00	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, unspecified state of consciousness
Trauma	851.01	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, with no loss of consciousness

Trauma	851.02	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.03	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.04	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	851.05	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.06	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.09	ICD9CM	Cortex (cerebral) contusion without mention of open intracranial wound, with concussion, unspecified
Trauma	851.10	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, unspecified state of consciousness
Trauma	851.11	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, with no loss of consciousness
Trauma	851.12	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.13	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.14	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	851.15	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.16	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, with loss of consciousness of unspecified duration

Trauma	851.19	ICD9CM	Cortex (cerebral) contusion with open intracranial wound, with concussion, unspecified
Trauma	851.20	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, unspecified state of consciousness
Trauma	851.21	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, with no loss of consciousness
Trauma	851.22	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.23	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.24	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	851.25	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.26	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.29	ICD9CM	Cortex (cerebral) laceration without mention of open intracranial wound, with concussion, unspecified
Trauma	851.30	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, unspecified state of consciousness
Trauma	851.31	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, with no loss of consciousness
Trauma	851.32	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.33	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, with moderate [1-24 hours] loss of consciousness

Trauma	851.34	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	851.35	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.36	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.39	ICD9CM	Cortex (cerebral) laceration with open intracranial wound, with concussion, unspecified
Trauma	851.40	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, unspecified state of consciousness
Trauma	851.41	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, with no loss of consciousness
Trauma	851.42	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.43	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.44	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, with prolonged [more than 24 hours] loss consciousness and return to pre-existing conscious level
Trauma	851.45	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.46	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.49	ICD9CM	Cerebellar or brain stem contusion without mention of open intracranial wound, with concussion, unspecified
Trauma	851.50	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, unspecified state of consciousness

Trauma	851.51	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, with no loss of consciousness
Trauma	851.52	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.53	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.54	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	851.55	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.56	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.59	ICD9CM	Cerebellar or brain stem contusion with open intracranial wound, with concussion, unspecified
Trauma	851.60	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, unspecified state of consciousness
Trauma	851.61	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, with no loss of consciousness
Trauma	851.62	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, with brief [less than 1 hour] loss of consciousness
Trauma	851.63	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.64	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level

Trauma	851.65	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.66	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.69	ICD9CM	Cerebellar or brain stem laceration without mention of open intracranial wound, with concussion, unspecified
Trauma	851.70	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, unspecified state of consciousness
Trauma	851.71	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, with no loss of consciousness
Trauma	851.72	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.73	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.74	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	851.75	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.76	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.79	ICD9CM	Cerebellar or brain stem laceration with open intracranial wound, with concussion, unspecified
Trauma	851.80	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, unspecified state of consciousness
Trauma	851.81	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, with no loss of consciousness

Trauma	851.82	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.83	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.84	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre- existing conscious level
Trauma	851.85	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	851.86	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.89	ICD9CM	Other and unspecified cerebral laceration and contusion, without mention of open intracranial wound, with concussion, unspecified
Trauma	851.90	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, unspecified state of consciousness
Trauma	851.91	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, with no loss of consciousness
Trauma	851.92	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	851.93	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	851.94	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	851.95	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level

Trauma	851.96	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	851.99	ICD9CM	Other and unspecified cerebral laceration and contusion, with open intracranial wound, with concussion, unspecified
Trauma	852.00	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, unspecified state of consciousness
Trauma	852.01	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, with no loss of consciousness
Trauma	852.02	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	852.03	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	852.04	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	852.05	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	852.06	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	852.09	ICD9CM	Subarachnoid hemorrhage following injury without mention of open intracranial wound, with concussion, unspecified
Trauma	852.10	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, unspecified state of consciousness
Trauma	852.11	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, with no loss of consciousness
Trauma	852.12	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, with brief [less than one hour] loss of consciousness

Trauma	852.13	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	852.14	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	852.15	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	852.16	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	852.19	ICD9CM	Subarachnoid hemorrhage following injury with open intracranial wound, with concussion, unspecified
Trauma	852.20	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, unspecified state of consciousness
Trauma	852.21	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, with no loss of consciousness
Trauma	852.22	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	852.23	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	852.24	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	852.25	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	852.26	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, with loss of consciousness of unspecified duration

Trauma	852.29	ICD9CM	Subdural hemorrhage following injury without mention of open intracranial wound, with concussion, unspecified
Trauma	852.30	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, unspecified state of consciousness
Trauma	852.31	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, with no loss of consciousness
Trauma	852.32	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	852.33	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	852.34	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	852.35	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	852.36	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	852.39	ICD9CM	Subdural hemorrhage following injury with open intracranial wound, with concussion, unspecified
Trauma	852.40	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, unspecified state of consciousness
Trauma	852.41	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, with no loss of consciousness
Trauma	852.42	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, with brief [less than 1 hour] loss of consciousness
Trauma	852.43	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness

Trauma	852.44	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	852.45	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	852.46	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	852.49	ICD9CM	Extradural hemorrhage following injury without mention of open intracranial wound, with concussion, unspecified
Trauma	852.50	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, unspecified state of consciousness
Trauma	852.51	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, with no loss of consciousness
Trauma	852.52	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	852.53	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	852.54	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	852.55	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	852.56	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	852.59	ICD9CM	Extradural hemorrhage following injury with open intracranial wound, with concussion, unspecified

Trauma	853.00	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, unspecified state of consciousness
Trauma	853.01	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, with no loss of consciousness
Trauma	853.02	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	853.03	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	853.04	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	853.05	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	853.06	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	853.09	ICD9CM	Other and unspecified intracranial hemorrhage following injury without mention of open intracranial wound, with concussion, unspecified
Trauma	853.10	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, unspecified state of consciousness
Trauma	853.11	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, with no loss of consciousness
Trauma	853.12	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	853.13	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, with moderate [1-24 hours] loss of consciousness

Trauma	853.14	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	853.15	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	853.16	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	853.19	ICD9CM	Other and unspecified intracranial hemorrhage following injury with open intracranial wound, with concussion, unspecified
Trauma	854.00	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, unspecified state of consciousness
Trauma	854.01	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, with no loss of consciousness
Trauma	854.02	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	854.03	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	854.04	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	854.05	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	854.06	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, with loss of consciousness of unspecified duration
Trauma	854.09	ICD9CM	Intracranial injury of other and unspecified nature without mention of open intracranial wound, with concussion, unspecified

Trauma	854.10	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, unspecified state of consciousness
Trauma	854.11	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, with no loss of consciousness
Trauma	854.12	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, with brief [less than one hour] loss of consciousness
Trauma	854.13	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, with moderate [1-24 hours] loss of consciousness
Trauma	854.14	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness and return to pre-existing conscious level
Trauma	854.15	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, with prolonged [more than 24 hours] loss of consciousness without return to pre-existing conscious level
Trauma	854.16	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, with loss of consciousness of unspecified duration
Trauma	854.19	ICD9CM	Intracranial injury of other and unspecified nature with open intracranial wound, with concussion, unspecified
Trauma	860.0	ICD9CM	Traumatic pneumothorax without mention of open wound into thorax
Trauma	860.1	ICD9CM	Traumatic pneumothorax with open wound into thorax
Trauma	860.2	ICD9CM	Traumatic hemothorax without mention of open wound into thorax
Trauma	860.3	ICD9CM	Traumatic hemothorax with open wound into thorax
Trauma	860.4	ICD9CM	Traumatic pneumohemothorax without mention of open wound into thorax
Trauma	860.5	ICD9CM	Traumatic pneumohemothorax with open wound into thorax
Trauma	861.00	ICD9CM	Unspecified injury of heart without mention of open wound into thorax
Trauma	861.01	ICD9CM	Contusion of heart without mention of open wound into thorax
Trauma	861.02	ICD9CM	Laceration of heart without penetration of heart chambers or without mention of open wound into thorax

Trauma	861.03	ICD9CM	Laceration of heart with penetration of heart chambers without mention of open wound into thorax
Trauma	861.10	ICD9CM	Unspecified injury of heart with open wound into thorax
Trauma	861.11	ICD9CM	Contusion of heart with open wound into thorax
Trauma	861.12	ICD9CM	Laceration of heart without penetration of heart chambers, with open wound into thorax
Trauma	861.13	ICD9CM	Laceration of heart with penetration of heart chambers with open wound into thorax
Trauma	861.20	ICD9CM	Unspecified injury of lung without mention of open wound into thorax
Trauma	861.21	ICD9CM	Contusion of lung without mention of open wound into thorax
Trauma	861.22	ICD9CM	Laceration of lung without mention of open wound into thorax
Trauma	861.30	ICD9CM	Unspecified injury of lung with open wound into thorax
Trauma	861.31	ICD9CM	Contusion of lung with open wound into thorax
Trauma	861.32	ICD9CM	Laceration of lung with open wound into thorax
Trauma	862.0	ICD9CM	Injury to diaphragm, without mention of open wound into cavity
Trauma	862.1	ICD9CM	Injury to diaphragm, with open wound into cavity
Trauma	862.21	ICD9CM	Injury to bronchus without mention of open wound into cavity
Trauma	862.22	ICD9CM	Injury to esophagus without mention of open wound into cavity
Trauma	862.29	ICD9CM	Injury to other specified intrathoracic organs without mention of open wound into cavity
Trauma	862.31	ICD9CM	Injury to bronchus with open wound into cavity
Trauma	862.32	ICD9CM	Injury to esophagus with open wound into cavity
Trauma	862.39	ICD9CM	Injury to other specified intrathoracic organs with open wound into cavity
Trauma	862.8	ICD9CM	Injury to multiple and unspecified intrathoracic organs, without mention of open wound into cavity
Trauma	862.9	ICD9CM	Injury to multiple and unspecified intrathoracic organs, with open wound into cavity
Trauma	863.0	ICD9CM	Injury to stomach, without mention of open wound into cavity

Trauma	863.1	ICD9CM	Injury to stomach, with open wound into cavity
Trauma	863.20	ICD9CM	Injury to small intestine, unspecified site, without open wound into cavity
Trauma	863.21	ICD9CM	Injury to duodenum, without open wound into cavity
Trauma	863.29	ICD9CM	Other injury to small intestine, without mention of open wound into cavity
Trauma	863.30	ICD9CM	Injury to small intestine, unspecified site, with open wound into cavity
Trauma	863.31	ICD9CM	Injury to duodenum, with open wound into cavity
Trauma	863.39	ICD9CM	Other injury to small intestine, with open wound into cavity
Trauma	863.40	ICD9CM	Injury to colon, unspecified site, without mention of open wound into cavity
Trauma	863.41	ICD9CM	Injury to ascending [right] colon, without mention of open wound into cavity
Trauma	863.42	ICD9CM	Injury to transverse colon, without mention of open wound into cavity
Trauma	863.43	ICD9CM	Injury to descending [left] colon, without mention of open wound into cavity
Trauma	863.44	ICD9CM	Injury to sigmoid colon, without mention of open wound into cavity
Trauma	863.45	ICD9CM	Injury to rectum, without mention of open wound into cavity
Trauma	863.46	ICD9CM	Injury to multiple sites in colon and rectum, without mention of open wound into cavity
Trauma	863.49	ICD9CM	Other injury to colon or rectum, without mention of open wound into cavity
Trauma	863.50	ICD9CM	Injury to colon, unspecified site, with open wound into cavity
Trauma	863.51	ICD9CM	Injury to ascending [right] colon, with open wound into cavity
Trauma	863.52	ICD9CM	Injury to transverse colon, with open wound into cavity
Trauma	863.53	ICD9CM	Injury to descending [left] colon, with open wound into cavity
Trauma	863.54	ICD9CM	Injury to sigmoid colon, with open wound into cavity
Trauma	863.55	ICD9CM	Injury to rectum, with open wound into cavity
Trauma	863.56	ICD9CM	Injury to multiple sites in colon and rectum, with open wound into cavity
Trauma	863.59	ICD9CM	Other injury to colon or rectum, with open wound into cavity
Trauma	863.80	ICD9CM	Injury to gastrointestinal tract, unspecified site, without mention of open wound into cavity
Trauma	863.81	ICD9CM	Injury to pancreas, head, without mention of open wound into cavity
Trauma	863.82	ICD9CM	Injury to pancreas, body, without mention of open wound into cavity

Trauma	863.83	ICD9CM	Injury to pancreas, tail, without mention of open wound into cavity
Trauma	863.84	ICD9CM	Injury to pancreas, multiple and unspecified sites, without mention of open wound into cavity
Trauma	863.85	ICD9CM	Injury to appendix, without mention of open wound into cavity
Trauma	863.89	ICD9CM	Injury to other gastrointestinal sites, without mention of open wound into cavity
Trauma	863.90	ICD9CM	Injury to gastrointestinal tract, unspecified site, with open wound into cavity
Trauma	863.91	ICD9CM	Injury to pancreas, head, with open wound into cavity
Trauma	863.92	ICD9CM	Injury to pancreas, body, with open wound into cavity
Trauma	863.93	ICD9CM	Injury to pancreas, tail, with open wound into cavity
Trauma	863.94	ICD9CM	Injury to pancreas, multiple and unspecified sites, with open wound into cavity
Trauma	863.95	ICD9CM	Injury to appendix, with open wound into cavity
Trauma	863.99	ICD9CM	Injury to other gastrointestinal sites, with open wound into cavity
Trauma	864.00	ICD9CM	Injury to liver without mention of open wound into cavity, unspecified injury
Trauma	864.01	ICD9CM	Injury to liver without mention of open wound into cavity, hematoma and contusion
Trauma	864.02	ICD9CM	Injury to liver without mention of open wound into cavity, laceration, minor
Trauma	864.03	ICD9CM	Injury to liver without mention of open wound into cavity, laceration, moderate
Trauma	864.04	ICD9CM	Injury to liver without mention of open wound into cavity, laceration, major
Trauma	864.05	ICD9CM	Injury to liver without mention of open wound into cavity laceration, unspecified
Trauma	864.09	ICD9CM	Other injury to liver without mention of open wound into cavity
Trauma	864.10	ICD9CM	Injury to liver with open wound into cavity, unspecified injury
Trauma	864.11	ICD9CM	Injury to liver with open wound into cavity, hematoma and contusion
Trauma	864.12	ICD9CM	Injury to liver with open wound into cavity, laceration, minor
Trauma	864.13	ICD9CM	Injury to liver with open wound into cavity, laceration, moderate
Trauma	864.14	ICD9CM	Injury to liver with open wound into cavity, laceration, major
Trauma	864.15	ICD9CM	Injury to liver with open wound into cavity laceration, unspecified
Trauma	864.19	ICD9CM	Other injury to liver with open wound into cavity
Trauma	865.00	ICD9CM	Injury to spleen without mention of open wound into cavity, unspecified injury

Trauma	865.01	ICD9CM	Injury to spleen without mention of open wound into cavity, hematoma without rupture of capsule
Trauma	865.02	ICD9CM	Injury to spleen without mention of open wound into cavity, capsular tears, without major disruption of parenchyma
Trauma	865.03	ICD9CM	Injury to spleen without mention of open wound into cavity, laceration extending into parenchyma
Trauma	865.04	ICD9CM	Injury to spleen without mention of open wound into cavity, massive parenchymal disruption
Trauma	865.09	ICD9CM	Other injury into spleen without mention of open wound into cavity
Trauma	865.10	ICD9CM	Injury to spleen with open wound into cavity, unspecified injury
Trauma	865.11	ICD9CM	Injury to spleen with open wound into cavity, hematoma without rupture of capsule
Trauma	865.12	ICD9CM	Injury to spleen with open wound into cavity, capsular tears, without major disruption of parenchyma
Trauma	865.13	ICD9CM	Injury to spleen with open wound into cavity, laceration extending into parenchyma
Trauma	865.14	ICD9CM	Injury to spleen with open wound into cavity, massive parenchyma disruption
Trauma	865.19	ICD9CM	Other injury to spleen with open wound into cavity
Trauma	866.00	ICD9CM	Injury to kidney without mention of open wound into cavity, unspecified injury
Trauma	866.01	ICD9CM	Injury to kidney without mention of open wound into cavity, hematoma without rupture of capsule
Trauma	866.02	ICD9CM	Injury to kidney without mention of open wound into cavity, laceration
Trauma	866.03	ICD9CM	Injury to kidney without mention of open wound into cavity, complete disruption of kidney parenchyma
Trauma	866.10	ICD9CM	Injury to kidney with open wound into cavity, unspecified injury
Trauma	866.11	ICD9CM	Injury to kidney with open wound into cavity, hematoma without rupture of capsule
Trauma	866.12	ICD9CM	Injury to kidney with open wound into cavity, laceration

Trauma	866.13	ICD9CM	Injury to kidney with open wound into cavity, complete disruption of kidney parenchyma
Trauma	867.0	ICD9CM	Injury to bladder and urethra, without mention of open wound into cavity
Trauma	867.1	ICD9CM	Injury to bladder and urethra, with open wound into cavity
Trauma	867.2	ICD9CM	Injury to ureter, without mention of open wound into cavity
Trauma	867.3	ICD9CM	Injury to ureter, with open wound into cavity
Trauma	867.4	ICD9CM	Injury to uterus, without mention of open wound into cavity
Trauma	867.5	ICD9CM	Injury to uterus, with open wound into cavity
Trauma	867.6	ICD9CM	Injury to other specified pelvic organs, without mention of open wound into cavity
Trauma	867.7	ICD9CM	Injury to other specified pelvic organs, with open wound into cavity
Trauma	867.8	ICD9CM	Injury to unspecified pelvic organ, without mention of open wound into cavity
Trauma	867.9	ICD9CM	Injury to unspecified pelvic organ, with open wound into cavity
Trauma	868.00	ICD9CM	Injury to other intra-abdominal organs without mention of open wound into cavity, unspecified intra-abdominal organ
Trauma	868.01	ICD9CM	Injury to other intra-abdominal organs without mention of open wound into cavity, adrenal gland
Trauma	868.02	ICD9CM	Injury to other intra-abdominal organs without mention of open wound into cavity, bile duct and gallbladder
Trauma	868.03	ICD9CM	Injury to other intra-abdominal organs without mention of open wound into cavity, peritoneum
Trauma	868.04	ICD9CM	Injury to other intra-abdominal organs without mention of open wound into cavity, retroperitoneum
Trauma	868.09	ICD9CM	Injury to other and multiple intra-abdominal organs without mention of open wound into cavity
Trauma	868.10	ICD9CM	Injury to other intra-abdominal organs with open wound into cavity, unspecified intra-abdominal organ
Trauma	868.11	ICD9CM	Injury to other intra-abdominal organs with open wound into cavity, adrenal gland

Trauma	868.12	ICD9CM	Injury to other intra-abdominal organs with open wound into cavity, bile duct and gallbladder
Trauma	868.13	ICD9CM	Injury to other intra-abdominal organs with open wound into cavity, peritoneum
Trauma	868.14	ICD9CM	Injury to other intra-abdominal organs with open wound into cavity, retroperitoneum
Trauma	868.19	ICD9CM	Injury to other and multiple intra-abdominal organs, with open wound into cavity
Trauma	869.0	ICD9CM	Internal injury to unspecified or ill-defined organs without mention of open wound into cavity
Trauma	869.1	ICD9CM	Internal injury to unspecified or ill-defined organs with open wound into cavity
Trauma	905.0	ICD9CM	Late effect of fracture of skull and face bones
Trauma	905.1	ICD9CM	Late effect of fracture of spine and trunk without mention of spinal cord lesion
Trauma	905.2	ICD9CM	Late effect of fracture of upper extremities
Trauma	905.3	ICD9CM	Late effect of fracture of neck of femur
Trauma	905.4	ICD9CM	Late effect of fracture of lower extremities
Trauma	905.5	ICD9CM	Late effect of fracture of multiple and unspecified bones
Trauma	905.6	ICD9CM	Late effect of dislocation
Trauma	905.7	ICD9CM	Late effect of sprain and strain without mention of tendon injury
Trauma	905.8	ICD9CM	Late effect of tendon injury
Trauma	905.9	ICD9CM	Late effect of traumatic amputation
Trauma	906.0	ICD9CM	Late effect of open wound of head, neck, and trunk
Trauma	906.1	ICD9CM	Late effect of open wound of extremities without mention of tendon injury
Trauma	906.2	ICD9CM	Late effect of superficial injury
Trauma	906.3	ICD9CM	Late effect of contusion
Trauma	906.4	ICD9CM	Late effect of crushing
Trauma	906.5	ICD9CM	Late effect of burn of eye, face, head, and neck
Trauma	906.6	ICD9CM	Late effect of burn of wrist and hand
Trauma	906.7	ICD9CM	Late effect of burn of other extremities
Trauma	906.8	ICD9CM	Late effect of burns of other specified sites

Trauma	906.9	ICD9CM	Late effect of burn of unspecified site
Trauma	907.0	ICD9CM	Late effect of intracranial injury without mention of skull fracture
Trauma	907.1	ICD9CM	Late effect of injury to cranial nerve
Trauma	907.2	ICD9CM	Late effect of spinal cord injury
Trauma	907.3	ICD9CM	Late effect of injury to nerve root(s), spinal plexus(es), and other nerves of trunk
Trauma	907.4	ICD9CM	Late effect of injury to peripheral nerve of shoulder girdle and upper limb
Trauma	907.5	ICD9CM	Late effect of injury to peripheral nerve of pelvic girdle and lower limb
Trauma	907.9	ICD9CM	Late effect of injury to other and unspecified nerve
Trauma	908.0	ICD9CM	Late effect of internal injury to chest
Trauma	908.1	ICD9CM	Late effect of internal injury to intra-abdominal organs
Trauma	908.2	ICD9CM	Late effect of internal injury to other internal organs
Trauma	908.3	ICD9CM	Late effect of injury to blood vessel of head, neck, and extremities
Trauma	908.4	ICD9CM	Late effect of injury to blood vessel of thorax, abdomen, and pelvis
Trauma	908.5	ICD9CM	Late effect of foreign body in orifice
Trauma	908.6	ICD9CM	Late effect of certain complications of trauma
Trauma	908.9	ICD9CM	Late effect of unspecified injury
Trauma	909.0	ICD9CM	Late effect of poisoning due to drug, medicinal or biological substance
Trauma	909.1	ICD9CM	Late effect of toxic effects of nonmedical substances
Trauma	909.2	ICD9CM	Late effect of radiation
Trauma	909.3	ICD9CM	Late effect of complications of surgical and medical care
Trauma	909.4	ICD9CM	Late effect of certain other external causes
Trauma	909.5	ICD9CM	Late effect of adverse effect of drug, medicinal or biological substance
Trauma	909.9	ICD9CM	Late effect of other and unspecified external causes
Trauma	926.11	ICD9CM	Crushing injury of back
Trauma	926.12	ICD9CM	Crushing injury of buttock
Trauma	929.0	ICD9CM	Crushing injury of multiple sites, not elsewhere classified
Trauma	929.9	ICD9CM	Crushing injury of unspecified site

Trauma	952.00	ICD9CM	C1-C4 level with unspecified spinal cord injury
Trauma	952.01	ICD9CM	C1-C4 level with complete lesion of spinal cord
Trauma	952.02	ICD9CM	C1-C4 level with anterior cord syndrome
Trauma	952.03	ICD9CM	C1-C4 level with central cord syndrome
Trauma	952.04	ICD9CM	C1-C4 level with other specified spinal cord injury
Trauma	952.05	ICD9CM	C5-C7 level with unspecified spinal cord injury
Trauma	952.06	ICD9CM	C5-C7 level with complete lesion of spinal cord
Trauma	952.07	ICD9CM	C5-C7 level with anterior cord syndrome
Trauma	952.08	ICD9CM	C5-C7 level with central cord syndrome
Trauma	952.09	ICD9CM	C5-C7 level with other specified spinal cord injury
Trauma	952.10	ICD9CM	T1-T6 level with unspecified spinal cord injury
Trauma	952.11	ICD9CM	T1-T6 level with complete lesion of spinal cord
Trauma	952.12	ICD9CM	T1-T6 level with anterior cord syndrome
Trauma	952.13	ICD9CM	T1-T6 level with central cord syndrome
Trauma	952.14	ICD9CM	T1-T6 level with other specified spinal cord injury
Trauma	952.15	ICD9CM	T7-T12 level with unspecified spinal cord injury
Trauma	952.16	ICD9CM	T7-T12 level with complete lesion of spinal cord
Trauma	952.17	ICD9CM	T7-T12 level with anterior cord syndrome
Trauma	952.18	ICD9CM	T7-T12 level with central cord syndrome
Trauma	952.19	ICD9CM	T7-T12 level with other specified spinal cord injury
Trauma	952.2	ICD9CM	Lumbar spinal cord injury without evidence of spinal bone injury
Trauma	952.3	ICD9CM	Sacral spinal cord injury without evidence of spinal bone injury
Trauma	952.4	ICD9CM	Cauda equina spinal cord injury without evidence of spinal bone injury
Trauma	952.8	ICD9CM	Multiple sites of spinal cord injury without evidence of spinal bone injury
Trauma	952.9	ICD9CM	Unspecified site of spinal cord injury without evidence of spinal bone injury
Trauma	958.0	ICD9CM	Air embolism
Trauma	958.1	ICD9CM	Fat embolism

Trauma	958.2	ICD9CM	Secondary and recurrent hemorrhage
Trauma	958.3	ICD9CM	Posttraumatic wound infection not elsewhere classified
Trauma	958.4	ICD9CM	Traumatic shock
Trauma	958.5	ICD9CM	Traumatic anuria
Trauma	958.6	ICD9CM	Volkmann's ischemic contracture
Trauma	958.7	ICD9CM	Traumatic subcutaneous emphysema
Trauma	958.8	ICD9CM	Other early complications of trauma
Trauma	958.90	ICD9CM	Compartment syndrome, unspecified
Trauma	958.91	ICD9CM	Traumatic compartment syndrome of upper extremity
Trauma	958.92	ICD9CM	Traumatic compartment syndrome of lower extremity
Trauma	958.93	ICD9CM	Traumatic compartment syndrome of abdomen
Trauma	958.99	ICD9CM	Traumatic compartment syndrome of other sites
Trauma	959.01	ICD9CM	Head injury, unspecified
Trauma	959.09	ICD9CM	Injury of face and neck
Trauma	959.11	ICD9CM	Other injury of chest wall
Trauma	959.12	ICD9CM	Other injury of abdomen
Trauma	959.13	ICD9CM	Fracture of corpus cavernosum penis
Trauma	959.14	ICD9CM	Other injury of external genitals
Trauma	959.19	ICD9CM	Other injury of other sites of trunk
Trauma	959.2	ICD9CM	Shoulder and upper arm injury
Trauma	959.3	ICD9CM	Elbow, forearm, and wrist injury
Trauma	959.4	ICD9CM	Hand, except finger injury
Trauma	959.5	ICD9CM	Finger injury
Trauma	959.6	ICD9CM	Hip and thigh injury
Trauma	959.7	ICD9CM	Knee, leg, ankle, and foot injury
Trauma	959.8	ICD9CM	Other specified sites, including multiple injury
Trauma	959.9	ICD9CM	Unspecified site injury

Neurologic Impairment	344.60	ICD9CM	Cauda equina syndrome without mention of neurogenic bladder
Neurologic Impairment	729.2	ICD9CM	Neuralgia, neuritis, and radiculitis, unspecified
Imaging Study	72010	CPT	Radiologic examination, spine, entire, survey study, anteroposterior and lateral
Imaging Study	72020	CPT	Radiologic examination, spine, single view, specify level
Imaging Study	72052	CPT	Radiologic examination, spine, cervical; 6 or more views
Imaging Study	72100	CPT	Radiologic examination, spine, lumbosacral; 2 or 3 views
Imaging Study	72110	CPT	Radiologic examination, spine, lumbosacral; minimum of 4 views
Imaging Study	72114	CPT	Radiologic examination, spine, lumbosacral; complete, including bending views, minimum of 6 views
Imaging Study	72120	CPT	Radiologic examination, spine, lumbosacral; bending views only, 2 or 3 views
Imaging Study	72200	CPT	Radiologic examination, sacroiliac joints; less than 3 views
Imaging Study	72202	CPT	Radiologic examination, sacroiliac joints; 3 or more views
Imaging Study	72220	CPT	Radiologic examination, sacrum and coccyx, minimum of 2 views
Imaging Study	72131	CPT	Computed tomography, lumbar spine; without contrast material
Imaging Study	72132	CPT	Computed tomography, lumbar spine; with contrast material
Imaging Study	72133	CPT	Computed tomography, lumbar spine; without contrast material, followed by contrast material(s) and further sections
Imaging Study	72141	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, cervical; without contrast material
Imaging Study	72142	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, cervical; with contrast material(s)
Imaging Study	72146	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, thoracic; without contrast material
Imaging Study	72147	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, thoracic; with contrast material(s)
Imaging Study	72148	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, lumbar; without contrast material

Imaging Study	72149	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, lumbar; with contrast material(s)
Imaging Study	72156	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, without contrast material, followed by contrast material(s) and further sequences; cervical
Imaging Study	72158	CPT	Magnetic resonance (eg, proton) imaging, spinal canal and contents, without contrast material, followed by contrast material(s) and further sequences; lumbar
Intraspinal Abscess	013.50	ICD9CM	Tuberculous abscess of spinal cord, confirmation unspecified
Intraspinal Abscess	013.51	ICD9CM	Tuberculous abscess of spinal cord, bacteriological or histological examination not done
Intraspinal Abscess	013.52	ICD9CM	Tuberculous abscess of spinal cord, bacteriological or histological examination unknown (at present)
Intraspinal Abscess	013.53	ICD9CM	Tuberculous abscess of spinal cord, tubercle bacilli found (in sputum) by microscopy
Intraspinal Abscess	013.54	ICD9CM	Tuberculous abscess of spinal cord, tubercle bacilli not found (in sputum) by microscopy, but found by bacterial culture
Intraspinal Abscess	013.55	ICD9CM	Tuberculous abscess of spinal cord, tubercle bacilli not found by bacteriological examination, but tuberculosis confirmed histologically
Intraspinal Abscess	013.56	ICD9CM	Tuberculous abscess of spinal cord, tubercle bacilli not found by bacteriological or histological examination, but tuberculosis confirmed by other methods [inoculation of animals]
Intraspinal Abscess	324.1	ICD9CM	Intraspinal abscess of spinal cord
Intraspinal Abscess	324.9	ICD9CM	Intraspinal abscess of unspecified site
HIV	042	ICD9CM	Human immunodeficiency virus [HIV] disease
HIV	V08	ICD9CM	Asymptomatic human immunodeficiency virus [HIV] infection status

Table 18 Variables of Interest with Description

Dependent Variables	Description	Year of Data
Enrollee Demographics		2012
Age	Member's age on 1/1/2012	2012
Gender	Most recent gender value of member	2012
Female	Female	2012
Male	Male	2012
Neighborhood Effects		2012
Rurality	Member's rurality based upon Rural-Urban Commuting Area Codes	2012
Urban	Urban	2012
Rural	Rural	2012
Race/Ethnicity		2012
% White, non-Hispanic	Percent of non-Hispanic White population at block level	2012
% Hispanic	Percent of Hispanic population at block level	2012
% Black	Percent of non-Hispanic Black population at block level	2012
% Asian	Percent of non-Hispanic Asian population at block level	2012
% other	Percent of other non-Hispanic population at block level	2012
Education		2012
% less than High School	Percent of age 25+ population with less than high school education in block group	2012
% High School but no Bachelor's degree	Percent of age 25+ population with high school education but no bachelor's degree in block group	2012
% Bachelor's degree or greater	Percent of age 25+ population with bachelor's degree or graduate degree in block group	2012
Median Household Income		2012
Median income \$0-\$44,999	Percentage of households with median Household Income \$0-\$44,999 in census tract	2012
Median income \$45,000-\$59,999	Percentage of households with median Household Income \$45,000-\$59,999 in census tract	2012
Median income \$60,000-\$74,999	Percentage of households with median Household Income \$60,000-\$74,999 in census tract	2012
Median income \$75,000 and above	Percentage of households with median Household Income \$75,000 and above in census tract	2012
Poverty Rate	Percent of households with income below federal poverty limit in census tract	2012

Health risk measures		2011, 2012
Health Status	Member's health status based upon utilization level	2012
Very healthy users	No utilization	2012
Healthy users	Healthy users	2012
Low health risk	Low health risk	2012
Moderate health risk	Moderate health risk	2012
High health risk	High health risk	2012
Very high health risk	Very high health risk	2012
Prior year Health Status	Member's health status for the prior year based upon utilization level	2011
Very healthy users	No utilization	2011
Healthy users	Healthy users	2011
Low health risk	Low health risk	2011
Moderate health risk	Moderate health risk	2011
High health risk	High health risk	2011
Very high health risk	Very high health risk	2011
Insurance Plan Design		2012
Commercial	Member's most recent insurance product is a commercial plan	2012
High Deductible	High deductible plan indicator	2012
Medicaid/MSHO	Member's most recent insurance product is a Medicaid or MSHO plan	2012
Medicare	Member's most recent insurance product is a Medicare plan	2012
Provider Characteristics		2012
Age	Provider's age on 1/1/2012	2012
40- years old	40- years old	2012
40 to 49 years old	40 to 49 years old	2012
50 to 59 years old	50 to 59 years old	2012
60+ years old	60+ years old	2012
Gender	Gender of provider	2012
Female	Female	2012
Male	Male	2012
State	State of provider's servicing address	2012
MN	Minnesota	2012

WI	Wisconsin	2012
ND	North Dakota	2012
SD	South Dakota	2012
Rurality	Provider's rurality of servicing address based upon Rural-Urban Commuting Area Codes	2012
Urban	Urban	2012
Rural	Rural	2012
Credentialing	Provider's credentialing based upon degree code and credentialing category	2012
Physician extenders	Registered Nurse Practitioner, Physician Assistant, Doctor of Chiropractic	2012
Physician	Doctor of Medicine, Doctors of Osteopathic Medicine, Ob-gynecologist	2012
Specialty	Provider's specialty category based upon specialty code and practice area	2012
PCP	Primary care provider	2012
OB/GYN	Ob-gynecologist	2012
Orthopedist	Orthopedist	2012
Chiropractor	Chiropractor	2012
Other specialist	Other specialist	2012

Table 19 Primary and Secondary RUCA Codes, 2010

RUCA Code	Description	Category
1	Metropolitan area core: primary flow within an urbanized area (UA)	
1.0	No additional code	Urban
1.1	Secondary flow 30% to 50% to a larger UA	Urban
2	Metropolitan area high commuting: primary flow 30% or more to a UA	
2.0	No additional code	Urban
2.1	Secondary flow 30% to 50% to a larger UA	Urban
3	Metropolitan area low commuting: primary flow 10% to 30% to a UA	
3.0	No additional code	Urban
4	Metropolitan area core: primary flow within an Urban Cluster of 10,000 to 49,999 (large UC)	
4.0	No additional code	Rural
4.1	Secondary flow 30% to 50% to a UA	Urban
5	Metropolitan high commuting: primary flow 30% or more to a large UC	
5.0	No additional code	Rural
5.1	Secondary flow 30% to 50% to a UA	Urban
6	Metropolitan low commuting: primary flow 10% to 30% to a large UC	
6.0	No additional code	Rural
7	Small town core: primary flow within an Urban Cluster of 2,500 to 9,999 (small UC)	
7.0	No additional code	Rural
7.1	Secondary flow 30% to 50% to a UA	Urban
7.2	Secondary flow 30% to 50% to a large UC	Rural
8	Small town high commuting: primary flow 30% or more to a small UC	
8.0	No additional code	Rural
8.1	Secondary flow 30% to 50% to a UA	Urban
8.2	Secondary flow 30% to 50% to a large UC	Rural
9	Small town low commuting: primary flow 10% to 30% to a small UC	

9.0	No additional code	Rural
10	Rural areas: primary flow to a tract outside a UA or UC	
10.0	No additional code	Rural
10.1	Secondary flow 30% to 50% to a UA	Urban
10.2	Secondary flow 30% to 50% to a large UC	Rural
10.3	Secondary flow 30% to 50% to a small UC	Rural
99	Not coded: Census tract has zero population and no rural-urban identifier information	

Table 20 Evaluation and Management (E&M) CPT codes

Value Set Name	Code	Code System	Definition
Evaluation and Management	99050	CPT	Normal office visit - provided out of hours or alternate location
Evaluation and Management	99053	CPT	Normal office visit - provided out of hours or alternate location
Evaluation and Management	99054	CPT	Normal office visit - provided out of hours or alternate location
Evaluation and Management	99056	CPT	Normal office visit - provided out of hours or alternate location
Evaluation and Management	99058	CPT	Normal office visit - provided out of hours or alternate location
Evaluation and Management	99201	CPT	New patient - Office/OP
Evaluation and Management	99202	CPT	New patient - Office/OP
Evaluation and Management	99203	CPT	New patient - Office/OP
Evaluation and Management	99204	CPT	New patient - Office/OP
Evaluation and Management	99205	CPT	New patient - Office/OP
Evaluation and Management	99211	CPT	Established patient - Office/OP
Evaluation and Management	99212	CPT	Established patient - Office/OP
Evaluation and Management	99213	CPT	Established patient - Office/OP
Evaluation and Management	99214	CPT	Established patient - Office/OP
Evaluation and Management	99215	CPT	Established patient - Office/OP
Evaluation and Management	99241	CPT	Consultation Services - Office/OP (Medicare stopped recognizing 2010)
Evaluation and Management	99342	CPT	Consultation Services - Office/OP (Medicare stopped recognizing 2010)
Evaluation and Management	99243	CPT	Consultation Services - Office/OP (Medicare stopped recognizing 2010)
Evaluation and Management	99244	CPT	Consultation Services - Office/OP (Medicare stopped recognizing 2010)
Evaluation and Management	99245	CPT	Consultation Services - Office/OP (Medicare stopped recognizing 2010)
Evaluation and Management	99324	CPT	Domiciliary, rest home, custodial care - new patient
Evaluation and Management	99325	CPT	Domiciliary, rest home, custodial care - new patient
Evaluation and Management	99326	CPT	Domiciliary, rest home, custodial care - new patient
Evaluation and Management	99327	CPT	Domiciliary, rest home, custodial care - new patient
Evaluation and Management	99328	CPT	Domiciliary, rest home, custodial care - new patient

Evaluation and Management	99334	CPT	Domiciliary, rest home, custodial care - established patient
Evaluation and Management	99335	CPT	Domiciliary, rest home, custodial care - established patient
Evaluation and Management	99336	CPT	Domiciliary, rest home, custodial care - established patient
Evaluation and Management	99337	CPT	Domiciliary, rest home, custodial care - established patient
Evaluation and Management	99339	CPT	Domiciliary, rest home, custodial care - care plan oversight
Evaluation and Management	99340	CPT	Domiciliary, rest home, custodial care - care plan oversight
Evaluation and Management	99341	CPT	Home visit - new patient
Evaluation and Management	99342	CPT	Home visit - new patient
Evaluation and Management	99343	CPT	Home visit - new patient
Evaluation and Management	99344	CPT	Home visit - new patient
Evaluation and Management	99345	CPT	Home visit - new patient
Evaluation and Management	99347	CPT	Home visit - established patient
Evaluation and Management	99348	CPT	Home visit - established patient
Evaluation and Management	99349	CPT	Home visit - established patient
Evaluation and Management	99350	CPT	Home visit - established patient
Evaluation and Management	99354	CPT	Prolonged care - OP
Evaluation and Management	99355	CPT	Prolonged care - OP
Evaluation and Management	99374	CPT	Physician supervision of a patient with HHC
Evaluation and Management	99375	CPT	Physician supervision of a patient with HHC
Evaluation and Management	99381	CPT	Preventive medicine - Initial visit
Evaluation and Management	99382	CPT	Preventive medicine - Initial visit
Evaluation and Management	99383	CPT	Preventive medicine - Initial visit
Evaluation and Management	99384	CPT	Preventive medicine - Initial visit
Evaluation and Management	99385	CPT	Preventive medicine - Initial visit
Evaluation and Management	99386	CPT	Preventive medicine - Initial visit
Evaluation and Management	99387	CPT	Preventive medicine - Initial visit
Evaluation and Management	99391	CPT	Preventive medicine - Periodic visit

Evaluation and Management	99392	CPT	Preventive medicine - Periodic visit
Evaluation and Management	99393	CPT	Preventive medicine - Periodic visit
Evaluation and Management	99394	CPT	Preventive medicine - Periodic visit
Evaluation and Management	99395	CPT	Preventive medicine - Periodic visit
Evaluation and Management	99396	CPT	Preventive medicine - Periodic visit
Evaluation and Management	99397	CPT	Preventive medicine - Periodic visit
Evaluation and Management	99441	CPT	Telephone Services–Physician
Evaluation and Management	99442	CPT	Telephone Services–Physician
Evaluation and Management	99443	CPT	Telephone Services–Physician
Evaluation and Management	99444	CPT	Online Services – Physician

Table 21 Provider Place of Service (POS) Inclusion Criteria for Attribution

POS Code	POS Name	Description
3	School	A facility whose primary purpose is education.
5	Indian Health Service Free-standing Facility	A facility or location whose primary purpose is to provide temporary housing to homeless individuals (e.g., emergency shelters, individual or family shelters).
6	Indian Health Service Provider-based Facility	A facility or location, owned and operated by the Indian Health Service, which provides diagnostic, therapeutic (surgical and non-surgical), and rehabilitation services rendered by, or under the supervision of, physicians to American Indians and Alaska Natives admitted as inpatients or outpatients
11	Office	Location, other than a hospital, skilled nursing facility (SNF), military treatment facility, community health center, State or local public health clinic, or intermediate care facility (ICF), where the health professional routinely provides health examinations, diagnosis, and treatment of illness or injury on an ambulatory basis.
12	Home	Location, other than a hospital or other facility, where the patient receives care in a private residence.
13	Assisted Living Facility	Congregate residential facility with self-contained living units providing assessment of each resident's needs and on-site support 24 hours a day, 7 days a week, with the capacity to deliver or arrange for services including some health care and other services
14	Group Home	A residence, with shared living areas, where clients receive supervision and other services such as social and/or behavioral services, custodial service, and minimal services (e.g., medication administration).
15	Mobile Unit	A facility/unit that moves from place-to-place equipped to provide preventive, screening, diagnostic, and/or treatment services.

26	Military Treatment Facility	A medical facility operated by one or more of the Uniformed Services. Military Treatment Facility (MTF) also refers to certain former U.S. Public Health Service (USPHS) facilities now designated as Uniformed Service Treatment Facilities (USTF).
49	Independent Clinic	A location, not part of a hospital and not described by any other Place of Service code, that is organized and operated to provide preventive, diagnostic, therapeutic, rehabilitative, or palliative services to outpatients only.
50	Federally Qualified Health Center	A facility located in a medically underserved area that provides Medicare beneficiaries preventive primary medical care under the general direction of a physician.
71	Public Health Clinic	A facility maintained by either State or local health departments that provides ambulatory primary medical care under the general direction of a physician.
72	Rural Health Clinic	A certified facility that is located in a rural medically underserved area that provides ambulatory primary medical care under the general direction of a physician.

Table 22 Provider Credentialing Inclusion Criteria for Attribution

Health Care Services	Credentialing	Credentialing Description	Credentialing Category
Cervical Cancer Screening	MD	Doctor of Medicine	Physician
Cervical Cancer Screening	DO	Doctors of Osteopathic Medicine	Physician
Cervical Cancer Screening	RNP	Registered Nurse Practitioner	Physician extender
Cervical Cancer Screening	PA	Physician Assistant	Physician extender
Cervical Cancer Screening	OBGYN	Ob-gynecologist	Physician
Prostate Cancer Screening	MD	Doctor of Medicine	Physician
Prostate Cancer Screening	DO	Doctors of Osteopathic Medicine	Physician
Prostate Cancer Screening	RNP	Registered Nurse Practitioner	Physician extender
Prostate Cancer Screening	PA	Physician Assistant	Physician extender
Colorectal Cancer Screening	MD	Doctor of Medicine	Physician
Colorectal Cancer Screening	DO	Doctors of Osteopathic Medicine	Physician
Colorectal Cancer Screening	RNP	Registered Nurse Practitioner	Physician extender
Colorectal Cancer Screening	PA	Physician Assistant	Physician extender
Colorectal Cancer Screening	OBGYN	Ob-gynecologist	Physician
Low Back Pain Imaging	MD	Doctor of Medicine	Physician
Low Back Pain Imaging	DO	Doctors of Osteopathic Medicine	Physician
Low Back Pain Imaging	RNP	Registered Nurse Practitioner	Physician extender
Low Back Pain Imaging	PA	Physician Assistant	Physician extender
Low Back Pain Imaging	OBGYN	Ob-gynecologist	Physician
Low Back Pain Imaging	DC	Doctor of Chiropractic	Physician extender

Table 23 Provider Specialty Inclusion Criteria for Attribution

Health Care Services	Specialty Code	Specialty Description	Specialty Category
Cervical Cancer Screening	0001	Family practice	Primary care provider
Cervical Cancer Screening	0004	Internist	Primary care provider
Cervical Cancer Screening	0073	Family practice specialist	Primary care provider
Cervical Cancer Screening	0076	Internal medicine specialist	Primary care provider
Cervical Cancer Screening	0007	Ob-gynecologist	Ob-gynecologist
Cervical Cancer Screening	0074	Ob-gyn specialist	Ob-gynecologist
Cervical Cancer Screening	0012	Pediatrician	Primary care provider
Cervical Cancer Screening	0075	Pediatric specialist	Primary care provider
Prostate Cancer Screening	0001	Family practice	Primary care provider
Prostate Cancer Screening	0004	Internist	Primary care provider
Prostate Cancer Screening	0073	Family practice specialist	Primary care provider
Prostate Cancer Screening	0076	Internal medicine specialist	Primary care provider
Colorectal Cancer Screening	0001	Family practice	Primary care provider
Colorectal Cancer Screening	0004	Internist	Primary care provider
Colorectal Cancer Screening	0073	Family practice specialist	Primary care provider
Colorectal Cancer Screening	0076	Internal medicine specialist	Primary care provider
Colorectal Cancer Screening	0007	Ob-gynecologist	Ob-gynecologist
Colorectal Cancer Screening	0074	Ob-gyn specialist	Ob-gynecologist
Low Back Pain Imaging	0001	Family practice	Primary care provider
Low Back Pain Imaging	0004	Internist	Primary care provider
Low Back Pain Imaging	0007	Ob-gynecologist	Other specialist
Low Back Pain Imaging	0012	Pediatrician	Primary care provider
Low Back Pain Imaging	0005	Neurologist	Other specialist
Low Back Pain Imaging	0006	Neurosurgeon	Other specialist

Low Back Pain Imaging	0009	Orthopedist	Orthopedist
Low Back Pain Imaging	0011	Pathologist	Other specialist
Low Back Pain Imaging	0014	Colon & Rectal Surgeon	Other specialist
Low Back Pain Imaging	0016	Radiologist	Other specialist
Low Back Pain Imaging	0017	General Surgeon	Other specialist
Low Back Pain Imaging	0019	Urologist	Other specialist
Low Back Pain Imaging	0020	Anesthesiologist	Other specialist
Low Back Pain Imaging	0023	Rehabilitation Medicine	Other specialist
Low Back Pain Imaging	0025	Cardiologist	Other specialist
Low Back Pain Imaging	0031	Nephrologist	Other specialist
Low Back Pain Imaging	0032	Rheumatologist	Other specialist
Low Back Pain Imaging	0033	Endocrinologist	Other specialist
Low Back Pain Imaging	0037	Vascular Surgeon	Other specialist
Low Back Pain Imaging	0039	Emergency Medicine	Other specialist
Low Back Pain Imaging	0044	Chiropractic care	Chiropractor
Low Back Pain Imaging	0049	Special provider agreements	Other specialist
Low Back Pain Imaging	0057	Convenience Care	Other specialist
Low Back Pain Imaging	0066	After hours clinic/Urgicenter	Other specialist
Low Back Pain Imaging	0083	Registered nurse - special services	Other specialist
Low Back Pain Imaging	0092	Infectious Disease Specialist	Other specialist

Table 24 Sample Characteristics - Cervical cancer screening for young women

Cervical Cancer Screening	N	Frequency	Mean
Dependent Variables			
Cervical cancer screening	54,146	2,587	4.8%
HPV	54,146	1,254	2.3%
Pap smear	28,761	1,493	5.2%
Enrollee Demographics			
Age	54,146		20.2
13-20 years old	54,146	28,761	53.1%
21-29 years old	54,146	25,385	46.9%
Health Status			
Healthy users	53,968	12,768	23.7%
Low health risk	53,968	12,137	22.5%
Moderate health risk	53,968	22,132	41.0%
High health risk	53,968	6,931	12.8%
Prior year Health Status			
Healthy users	46,610	13,881	29.8%
Low health risk	46,610	11,071	23.8%
Moderate health risk	46,610	16,597	35.6%
High health risk	46,610	5,061	10.9%
Frailty	53,968	1,417	2.6%
Prior year Frailty	46,610	984	2.1%
Prior year months enrolled	46,610		10.5
Neighborhood Effects (49475/54145)			
Education			
% less than High School	49,475		8.2%
% High School but no Bachelor's degree	49,475		59.2%
% Bachelor's degree or greater	49,475		32.6%
Race/Ethnicity			
% White, non-Hispanic	49,475		83.7%

% Hispanic	49,475		4.3%
% Black	49,475		5.2%
% Asian	49,475		3.8%
% other	49,475		3.0%
% speaking English only	49,475		89.6%
% households with income below the fed'l poverty limit	49,475		10.4%
% Foreign Born	49,475		7.0%
Median Household Income (\$)	49,475		67,546
Median income \$0-\$44,999	49,475	10,767	21.8%
Median income \$45,000-\$59,999	49,475	11,242	22.7%
Median income \$60,000-\$74,999	49,475	10,262	20.7%
Median income \$75,000 and above	49,475	17,204	34.8%
RUCA			
Urban	49,475	39,138	79.1%
Rural	49,475	10,337	20.9%
Product Type			
Commercial	54,146	45,528	84.1%
High Deductible	24,353	16,211	66.6%
Medicaid/Medicare	54,146	8,618	15.9%
Self-insured	54,146	20,093	37.1%
Provider Dependent Variables			
Cervical cancer screening	32,515	1,831	5.6%
HPV	32,515	892	2.7%
Pap smear	16,917	1,047	6.2%
Provider Demographics			
Age	32,247		45.1
Age (imputed)	32,515		45.1
Gender			
Female	32,483	23,568	72.6%
Male	32,483	8,915	27.4%
Gender (imputed)			

Female	32,515	23,569	72.5%
Male	32,515	8,946	27.5%
State			
MN	32,515	28,767	88.5%
WI	32,515	1,547	4.8%
ND	32,515	1,833	5.6%
SD	32,515	368	1.1%
RUCA			
Urban	22,837	18,579	81.4%
Rural	22,837	4,258	18.6%
RUCA (imputed)			
Urban	32,515	25,993	79.9%
Rural	32,515	6,522	20.1%
Credential			
Physician	32,515	22,802	70.1%
Physician extenders	32,515	9,713	29.9%
Specialty			
PCP	32,515	27,132	83.4%
OB/GYN	32,515	5,383	16.6%

Table 25 Sample Characteristics - Prostate cancer screening for men 75 years and older

Prostate Cancer Screening	N	Frequency	Mean
Dependent Variables			
Prostate Cancer Screening	18,168	2,522	13.9%
Enrollee Demographics			
Age	18,168		80.2
Health Status			
Healthy users	18,167	1,036	5.7%
Low health risk	18,167	517	2.8%
Moderate health risk	18,167	7,124	39.2%
High health risk	18,167	9,490	52.2%
Prior year Health Status			
Healthy users	16,476	984	6.0%
Low health risk	16,476	568	3.4%
Moderate health risk	16,476	6,997	42.5%
High health risk	16,476	7,927	48.1%
Frailty	18,167	3,402	18.7%
Prior year Frailty	16,476	2,257	13.7%
Prior year months enrolled	16,476		11.6
Neighborhood Effects			
Education			
% less than High School	17,059		8.9%
% High School but no Bachelor's degree	17,059		62.7%
% Bachelor's degree or greater	17,059		28.5%
Race/Ethnicity			
% White, non-Hispanic	17,059		90.9%
% Hispanic	17,059		2.5%
% Black	17,059		2.3%
% Asian	17,059		2.1%
% other	17,059		2.3%
% speaking English only	17,059		92.1%

% households with income below the fed'l poverty limit	17,059		10.5%
% Foreign Born	17,059		5.0%
Median Household Income (\$)	17,059		59,127
Median income \$0-\$44,999	17,059	4,935	28.9%
Median income \$45,000-\$59,999	17,059	5,195	30.5%
Median income \$60,000-\$74,999	17,059	3,463	20.3%
Median income \$75,000 and above	17,059	3,466	20.3%
RUCA			
Urban	17,059	9,933	58.2%
Rural	17,059	7,126	41.8%
Product Type			
Commercial	18,168	865	4.8%
High Deductible	128	77	60.2%
Medicaid/MSHO	18,168	1,444	7.9%
Medicare	18,168	15,859	87.3%
Self-insured	18,168	755	4.2%
Provider Dependent Variables			
Prostate Cancer Screening	11,618	2,185	18.8%
Provider Demographics			
Age	11,612		51.0
Age (imputed)	11,618		51.0
Gender			
Female	11,618	2,312	19.9%
Male	11,618	9,306	80.1%
Gender (imputed)			
Female	11,618	2,312	19.9%
Male	11,618	9,306	80.1%
State			
MN	11,618	9,514	81.9%
WI	11,618	598	5.1%
ND	11,618	743	6.4%
SD	11,618	763	6.6%

RUCA			
Urban	10,753	7,200	67.0%
Rural	10,753	3,553	33.0%
RUCA (imputed)			
Urban	11,618	7,767	66.9%
Rural	11,618	3,851	33.1%
Credential			
Physician	11,618	10,216	87.9%
Physician extenders	11,618	1,402	12.1%

Table 26 Sample Characteristics - Colorectal cancer screening for adults older than 75 years

Colorectal Cancer Screening	N	Frequency	Mean
Dependent Variables			
Colorectal Cancer Screening	40,944	1,237	3.0%
Colonoscopy	40,944	593	1.4%
Enrollee Demographics			
Age	40,944		82.1
Gender			
Female	40,944	24,947	39.1%
Male	40,944	15,997	0.0%
Health Status			
Healthy users	40,943	1,889	4.6%
Low health risk	40,943	987	2.4%
Moderate health risk	40,943	16,775	41.0%
High health risk	40,943	21,292	52.0%
Prior year Health Status			
Healthy users	37,516	1,872	5.0%
Low health risk	37,516	1,202	3.2%
Moderate health risk	37,516	16,803	44.8%
High health risk	37,516	17,639	47.0%
Frailty	40,943	9,354	22.8%
Prior year Frailty	37,516	6,086	16.2%
Prior year months enrolled	37,516		11.6
Neighborhood Effects			
Education			
% less than High School	38,248		8.9%
% High School but no Bachelor's degree	38,248		62.0%
% Bachelor's degree or greater	38,248		29.1%
Race/Ethnicity	38,248		
% White, non-Hispanic	38,248		90.3%

% Hispanic	38,248		2.6%
% Black	38,248		2.6%
% Asian	38,248		2.2%
% other	38,248		2.4%
% speaking English only	38,248		91.7%
% households with income below the fed'l poverty limit	38,248		10.9%
% Foreign Born	38,248		5.3%
Median Household Income (\$)	38,248		57,783
Median income \$0-\$44,999	38,248	12,379	32.4%
Median income \$45,000-\$59,999	38,248	11,159	29.2%
Median income \$60,000-\$74,999	38,248	7,402	19.4%
Median income \$75,000 and above	38,248	7,308	19.1%
RUCA			
Urban	38,248	23,215	60.7%
Rural	38,248	15,033	39.3%
Product Type			
Commercial	40,944	1,772	4.3%
High Deductible	190	120	63.2%
Medicaid/MSHO	40,944	5,379	13.1%
Medicare	40,944	33,793	82.5%
Self-insured	40,944	1,611	3.9%
Provider Dependent Variables			
Colorectal Cancer Screening	26,612	997	3.7%
Colonoscopy	26,612	438	1.6%
Provider Demographics			
Age	26,602		50.2
Age (imputed)	26,612		50.2
Gender			
Female	26,612	17,239	64.8%
Male	26,612	9,373	35.2%
Gender (imputed)			
Female	26,612	17,239	64.8%

Male	26,612	9,373	35.2%
State			
MN	26,612	22,221	83.5%
WI	26,612	1,284	4.8%
ND	26,612	1,462	5.5%
SD	26,612	1,645	6.2%
RUCA			
Urban	24,715	17,052	69.0%
Rural	24,715	7,663	31.0%
RUCA (imputed)			
Urban	26,612	18,318	68.8%
Rural	26,612	8,294	31.2%
Credential			
Physician	26,612	23,131	86.9%
Physician extenders	26,612	3,481	13.1%

Table 27 Sample Characteristics - Imaging studies for non-specific low back pain

Low Back Pain Imaging	N	Frequency	Mean
Dependent Variables			
Low back pain imaging	9,088	1,615	17.8%
X-ray	9,088	1,609	17.7%
CT	9,088	92	1.0%
MRI	9,088	961	10.6%
Enrollee Demographics			
Age	9,088		36.8
18-29 years old	9,088		26.7%
30-39 years old	11,492		33.7%
40-50 years old	11,492		39.6%
Gender			
Female	9,088	5,229	57.5%
Male	9,088	3,859	42.5%
Health Status			
Healthy users	9,085	121	1.3%
Low health risk	9,085	1,019	11.2%
Moderate health risk	9,085	5,896	64.9%
High health risk	9,085	2,049	22.6%
Prior year Health Status			
Healthy users	7,616	1,667	21.9%
Low health risk	7,616	1,234	16.2%
Moderate health risk	7,616	3,717	48.8%
High health risk	7,616	998	13.1%
Frailty	9,085	454	5.0%

Prior year Frailty	7,616	213	2.8%
Prior year months enrolled	7,616		10.5
Neighborhood Effects			
Education			
% less than High School	8,287		8.1%
% High School but no Bachelor's degree	8,287		60.7%
% Bachelor's degree or greater	8,287		31.2%
Race/Ethnicity			
% White, non-Hispanic	8,287		86.0%
% Hispanic	8,287		3.9%
% Black	8,287		4.1%
% Asian	8,287		3.1%
% other	8,287		2.8%
% speaking English only	8,287		90.7%
% households with income below the fed'l poverty limit	8,287		9.7%
% Foreign Born	8,287		6.1%
Median Household Income (\$)	8,287		66285
Median income \$0-\$44,999	8,287	1,740	21.0%
Median income \$45,000-\$59,999	8,287	2,003	24.2%
Median income \$60,000-\$74,999	8,287	1,851	22.3%
Median income \$75,000 and above	8,287	2,693	32.5%
RUCA			
Urban	8,287	6,184	74.6%
Rural	8,287	2,103	25.4%
Product Type			
Commercial	9,088	8,159	89.8%
High Deductible	4,733	3,148	66.5%

Medicaid/Medicare	9,088	929	10.2%
Self-insured	9,088	3,446	37.9%
Provider Dependent Variables			
Low back pain imaging	8,287	1,458	17.6%
X-ray	8,287	1,443	17.4%
CT	8,287	82	1.0%
MRI	8,287	889	10.7%
Provider Demographics			
Age	7,985		45.5
Age (imputed)	8,287		45.5
Gender			
Female	8,178	2,417	29.6%
Male	8,178	5,761	70.4%
Gender (imputed)			
Female	8,287	2,417	29.2%
Male	8,287	5,870	70.8%
State			
MN	8,287	7,080	85.4%
WI	8,287	389	4.7%
ND	8,287	596	7.2%
SD	8,287	222	2.7%
RUCA			
Urban	6,320	4,455	70.5%
Rural	6,320	1,865	29.5%
RUCA (imputed)			
Urban	8,287	6,014	72.6%

Rural	8,287	2,273	27.4%
Credential			
Physician	8,287	7,422	89.6%
Physician extenders	8,287	865	10.4%
Specialty			
PCP	8,287	2,948	35.6%
Orthopedist	8,287	197	2.4%
Chiropractor	8,287	4,049	48.9%
other	8,287	1,093	13.2%

Table 28 Alternate Models – Pap test cervical cancer screening for young women

Sub-models	Patient-level Model Current Year Health Status		Full Model without Imputation		Full Model Current Year Health Status		Full Model with Member Urbanicity		Full Model without Provider Specialty		Clustered Fixed Effects Probit Model		Standard Fixed Effects Probit Model	
Patient Characteristics														
Age	3.39	***	3.93	***	4.07	***	4.03	***	4.12	***	4.06	***	4.06	***
Neighborhood Effects														
Rural	0.63	*					1.10	*						
% White, non-Hispanic	0.01	*	0.03	**	0.02		0.01	***	0.03	**	0.03	**	0.03	**
% High School Degree	-0.05		-0.12	*	-0.07		-0.12	**	-0.11	**	-0.13	**	-0.13	**
% Bachelor's degree or greater	-0.07	**	-0.13	**	-0.09	**	-0.13	***	-0.13	***	-0.14	***	-0.14	***
% households with income below FPL	0.01		0.04		0.03		0.03		0.03		0.02		0.02	

Plan Type (Ref=Medicaid)													
Commercial	-0.01		-0.75		-0.25		-0.91		-1.02		-0.94		-0.94
Prior Year Health Status													
Healthy users	3.81	***	0.57				0.60		0.63		0.36		0.36
Low health risk	3.98	***	1.10				1.04		0.98		0.96		0.96
Moderate health risk	5.84	***	1.56	*			1.35	**	1.31	*	1.12		1.12
High health risk	10.01	***	3.22	***			3.29	***	3.28	***	3.13	***	3.13
Very high health risk	6.25	***	3.06				0.75		0.51		0.46		0.46
Provider Characteristics													
Age (Ref=40- years old)													
40 to 49 years old			0.54		0.89	**	0.87	*	0.87	*	0.92	*	0.92
50 to 59 years old			0.67		0.83	*	0.72		0.89	*	0.84		0.84
60+ years old			0.73		0.32		0.65		0.88		0.75		0.75
Female			1.99	***	1.50	***	1.35	***	1.57	***	1.39	***	1.39
Rural			1.73	**	1.10	*			1.24	**	1.50	**	1.50
Credentialing (Ref=Physician extenders)													
Physician			0.46		0.11		0.13		0.10		0.21		0.21
Specialty (Ref=PCP)													
OB/GYN			3.24	***	2.52	***	3.06	***			3.06	***	3.06
Observations	26,129		10,072		16,313		14,418		14,418		14,418		14,418
Number of groups			3,750		6,551		6,148		6,148		6,148		6,148

*** p<0.01, ** p<0.05, * p<0.1

Table 29 Alternate Models – HPV test cervical cancer screening for young women

Sub-models	Patient-level Model Current Year Health Status	Full Model Current Year Health Status	Full Model without Imputation	Full Model with Member Urbanicity	Full Model without Provider Specialty	Clustered Fixed Effects Probit Model	Standard Fixed Effects Probit Model
Patient Characteristics							
Age	0.37 ***	0.42 ***	0.47 ***	0.44 ***	0.46 ***	0.43 ***	0.43 ***
Neighborhood Effects							
Rural	-0.22			-0.04			
% White, non-Hispanic	0.00	0.00	0.01	0.00	0.00	-0.01	-0.01
% High School Degree	0.00	0.02	-0.02	0.00	0.00	-0.01	-0.01
% Bachelor's degree or greater	0.01	0.03	0.00	0.01	0.01	0.00	0.00
% households with income below FPL	0.01	0.01	0.00	-0.01	-0.01	-0.01	-0.01
Plan Type							
Commercial	0.13	0.05	-0.17	0.04	0.05	-0.04	-0.04
Prior Year Health Status							
Healthy users	0.97 ***		0.58	0.12	0.15	0.14	0.14
Low health risk	1.89 ***		0.64	0.48	0.49	0.51	0.51
Moderate health risk	2.90 ***		1.13 ***	1.10 ***	1.08 ***	1.14 ***	1.14 ***
High health risk	2.66 ***		0.72	0.59	0.58	0.64	0.64
Very high health risk	3.09 ***		0.77	0.72	0.54	0.68	0.68
Provider Characteristics							
Age							
40 to 49 years old		0.06	-0.05	-0.05	-0.03	-0.03	-0.03
50 to 59 years old		-0.10	-0.21	-0.22	-0.10	-0.15	-0.15
60+ years old		-0.21	0.16	-0.06	0.15	0.08	0.08

Female		0.74 ***	0.78 ***	0.79 ***	0.88 ***	0.78 ***	0.78 ***
Rural		-0.28	0.07		-0.39	-0.28	-0.28
Credentialing Physician		-0.01	0.10	0.15	0.19	0.21	0.21
Specialty OB/GYN		1.58 ***	1.60 ***	1.44 ***		1.48 ***	1.48 ***
Observations	49,304	31,212	19,017	27,330	27,330	27,330	27,330
Number of groups		9,284	5,117	8,773	8,773	8,773	8,773

*** p<0.01, ** p<0.05, * p<0.1

Table 30 Alternate Models – Prostate cancer screening for men 75 years and older

Sub-models	Patient-level Model Current Year Health Status		Full Model Current Year Health Status		Full Model without Imputation		Full Model with Member Urbanicity		Full Model without Provider Specialty		Clustered Fixed Effects Probit Model	
Patient Characteristics												
Age	-1.36	***	-1.66	***	-1.70	***	-1.65	***	-1.67	***	-1.67	***
Neighborhood Effects												
Rural	-2.31	***					-0.05					
% White, non-Hispanic	-0.03		0.01		-0.02		-0.01		0.00		0.00	
% High School Degree	-0.03		-0.08		0.01		-0.07		-0.14		-0.14	
% Bachelor's degree or greater	0.11		0.01		0.09		0.03		-0.02		-0.02	
% households with income below FPL	-0.07		-0.08		-0.07		-0.10		-0.09		-0.09	
Plan Type												
Commercial	-0.02		-0.04	**	0.04		-0.05	***	-0.06	***	-0.06	***
Medicare	0.08	***	0.07	***	0.07	***	0.07	***	0.07	***	0.07	***
Prior Year Health Status												
Healthy users					8.01	**	9.03	**	8.26	*	8.26	**
Low health risk			9.40	*	13.10	***	12.99	***	11.31	***	11.31	***
Moderate health risk			10.43	**	10.35	***	9.92	***	8.87	***	8.87	***
High health risk			11.47	**	9.13	***	8.62	***	7.54	***	7.54	***
Very high health risk			7.29		5.72	**	5.45	**	3.84		3.84	
Provider Characteristics												
Age												
40 to 49 years old			0.97		0.67		0.63		1.19		1.19	
50 to 59 years old			2.62	**	2.67	*	2.74	**	3.25	**	3.25	***

60+ years old		3.42 **	3.05 *	3.05 **	3.90 **	3.90 ***
Female		0.52	-0.23	0.28	-0.79	-0.79
Rural		-0.33	0.42		0.66	0.66
Credentialing						
Physician		5.71 ***	4.40 ***	4.62 ***	5.43 ***	5.43 ***
Observations	16,462	10,996	9,444	10,091	10,091	10,091
Number of groups		3,564	3,011	3,408	3,408	3,408

*** p<0.01, ** p<0.05, * p<0.1

Table 31 Alternate Models – Colorectal cancer screening for adults older than 75 years

Sub-models	Patient-level Model Current Year Health Status		Full Model Current Year Health Status		Full Model without Imputation		Full Model with Member Urbanicity		Full Model without Provider Specialty		Clustered Fixed Effects Probit Model		Standard Fixed Effects Probit Model	
Patient Characteristics														
Age	-0.41	***	-0.46	***	-0.47	***	-0.46	***	-0.46	***	-0.46	***	-0.46	***
Female	0.26		0.26		0.17		0.24		0.23		0.23		0.23	
Neighborhood Effects														
Rural	0.46	*					0.88	**						
% White, non-Hispanic	-0.01	**	-0.01		-0.01		0.00		-0.01		-0.01		-0.01	
% High School Degree	-0.07	***	-0.13	***	-0.08	**	-0.12	***	-0.12	***	-0.13	***	-0.13	***
% Bachelor's degree or greater	-0.04		-0.09	***	-0.06	*	-0.09	***	-0.09	***	-0.09	***	-0.09	***
% households with income below FPL	-0.01		-0.04		-0.02		-0.03		-0.03		-0.03		-0.03	
Plan Type														
Commercial	0.14	**	-0.22	**	-0.43	**	-0.59	**	-0.60	**	-0.72	**	-0.72	**
Medicare	1.54	***	1.16	***	0.92	***	1.05	***	1.04	***	0.96	**	0.96	***
Prior Year Health Status														
Healthy users					-0.78		-0.06		-0.02		0.02		0.02	
Low health risk					0.05		0.40		0.42		0.42		0.42	
Moderate health risk					0.73		1.09		1.12		1.10		1.10	
High health risk					0.92		1.23		1.27		1.21		1.21	
Very high health risk					0.45		0.70		0.74		0.57		0.57	
Provider Characteristics														
Age														

40 to 49 years old		-0.09		-0.17		-0.20		-0.20		-0.16		-0.16	
50 to 59 years old		0.29		0.27		0.17		0.16		0.12		0.12	
60+ years old		1.02	**	0.74		0.90	*	0.91	*	1.14	*	1.14	*
Female		0.61	*	0.68	**	0.54	*	0.54	*	0.53		0.53	*
Rural		1.28	***	1.32	***			1.13	***	1.17	***	1.17	***
Credentialing													
Physician		1.03	***	0.89	**	0.89	**	0.88	**	0.81	**	0.81	**
Specialty													
OB/GYN		-0.53		-0.26		-0.65				-0.54		-0.54	
Observations	36,470	24,951		21,714		23,129		23,129		23,129		23,129	
Number of groups		5,832		4,959		5,635		5,635		5,635		5,635	

*** p<0.01, ** p<0.05, * p<0.1

Table 32 Alternate Models – Imaging studies for non-specific low back pain

Sub-models	Patient-level Model Current Year Health Status	Full Model Current Year Health Status	Full Model without Imputation	Full Model with Member Urbanicity	Full Model without Provider Specialty	Clustered Fixed Effects Probit Model	Standard Fixed Effects Probit Model
Patient Characteristics							
Age	-0.03	-0.04	0.01	-0.04	-0.05	-0.03	-0.03
Female	1.55 *	0.89	0.52	0.92	0.99	0.98	0.98
Neighborhood Effects							
Rural	-0.02			0.23			
% White, non-Hispanic	0.00	0.00	0.02	0.00	-0.01	0.00	0.00
% High School Degree	-0.07	-0.09	-0.02	-0.08	-0.01	-0.10	-0.10
% Bachelor's degree or greater	-0.12	-0.15	-0.11	-0.13	-0.08	-0.17	-0.17
% households with income below FPL	0.00 ***	0.00 ***	0.00 **	0.00 ***	0.00 ***	0.00 ***	0.00 ***
Plan Type							
Commercial	0.20	0.59	0.17	1.43	1.61	1.27	1.27
Medicare	-0.67	3.00	2.71	1.64	1.37	0.59	0.59
Prior Year Health Status							
Healthy users			2.24	1.75	2.06	1.46	1.46
Low health risk			1.52	0.77	0.46	0.72	0.72
Moderate health risk			1.61	2.41	2.45	2.55	2.55
High health risk			5.81 **	4.76 **	5.24 **	4.60 **	4.60 **
Very high health risk			-4.74	-0.76	-0.11	-1.17	-1.17
Provider Characteristics							
Age							
40 to 49 years old		-0.74	-1.33	-0.76	-1.23	-0.59	-0.59

50 to 59 years old		-1.77	-3.17 **	-1.23	-1.09	-1.86	-1.86
60+ years old		-2.00	-3.74 *	-2.01	-1.99	-2.36	-2.36
Female		-2.83 ***	-2.82 **	-2.60 **	-0.30	-2.79 **	-2.79 ***
Rural		1.52	1.48		1.05	0.47	0.47
Credentialing							
Physician		0.33	1.88	0.98	14.99 ***	0.69	0.69
Specialty							
Orthopedist		34.64 ***	33.03 ***	35.28 ***		35.98 ***	35.98 ***
Chiropractor		-15.14 ***	-14.39 ***	-14.23 ***		-14.79 ***	-14.79 ***
Other Specialist		1.57	1.89	2.64	0.00	2.20	2.20
Observations	8,547	7,570	4,841	6,375	6,375	6,375	6,375
Number of groups		4,619	2,871	4,080	4,080	4,080	4,080

*** p<0.01, ** p<0.05, * p<0.1