

Supplementary Online Content

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eAppendix. Technical Appendix

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This supplementary material has been provided by the authors to give readers additional information about their work.

eAppendix. Technical Appendix

METHODS

Study Design

We performed a cross-sectional analysis using data from the 1999 and 2007 NAMCS. NAMCS is a survey of outpatient offices of non-federally employed physicians who are principally engaged in patient care activities, and has been conducted annually since 1989 by the National Center for Health Statistics. Due to changes in the NAMCS survey design, NAMCS 2007 represents the most recent survey containing detailed information about physician specialty that allows discrimination of subspecialist internists from other specialty physicians. The response rates to the NAMCS in 1999 and 2007 were 62.9% and 61.6%, respectively.

The NAMCS survey is designed to generate national estimates by the use of multistage stratified probability sampling of geographic areas, physician practices within those areas, and patient visits within the practices. The NAMCS survey uses the physician-patient encounter or visit as the basic sampling unit. Data is collected from the physician, derived from a systematic random sample of visits recorded over a one week reporting period. The survey contains information on the demographic characteristics of patients in addition to the patients' symptoms, physicians' diagnoses, and services provided.

Study Sample

We restricted our analysis to visits to physicians by adults 18 years and older who were not referred by another health care provider, as determined by the "refer" field in the NAMCS dataset.

Visit Type

The primary variable of interest was whether the patient's visit to the physician was for a primary care service, as determined using the Reason for Visit (RFV) code. The RFV code represents the patient's complaint, symptom, or other reason for the visit in the patient's own words, and is coded according to a RFV Classification for Ambulatory Care. There are three open response spaces allotted. However, we limited our analysis to the reason given in the first field as it represents the "most important reason" as described in the instructions to the Patient Record Form of the NAMCS.

The RFV variable is organized into 7 categories: Symptom; Disease; Diagnostic, Screening, and Preventive; Treatment; Injuries and Adverse Effects; Test Results; and Administrative. We first excluded

visits that were not specific to primary care service delivery or could not be attributed to primary care service delivery with certainty, including all visits in the Treatment, Injuries and Adverse Effects, Test Results, and Administrative categories. Next, for visits considered Diagnostic, Screening, and Preventive, we excluded all visits except for those for a “general exam;” the remaining screening and preventive visits were for services, such as breast, heart or eye examinations, or diagnostic tests that could have been ordered by any type of physician. Finally, two investigators (MK, JSR) individually reviewed each RFV within both the Symptom and Disease categories to identify visits for common symptoms and diseases that represented primary care services (see below); disagreements were resolved by consensus. Among the 478 RFV codes within these categories, 427 (89.3%) were categorized as visits for primary care services. The percent agreement after initial review between the two investigators was 97.7% ($\kappa=0.89$, 95% Confidence Interval [CI], 0.83-0.96). For analytic purposes, we created two categories of visits for primary care services using the RFV variable: 1) common symptoms and diseases, and 2) preventive exams.

Physician Specialty

We categorized physicians into four mutually exclusive categories: 1) primary care physicians, including family practice, general practice, internal medicine, pediatrics, adolescent medicine, public health, geriatric, and general preventive medicine; 2) internal medicine (IM) specialists, including cardiology, pulmonology, nephrology, hematology, allergy, gastroenterology, sleep medicine, vascular medicine, and infectious diseases; 3) obstetrics and gynecology (OB/Gyn); and 4) all other specialists, representing general surgery and surgical specialties, psychiatry, neurology, dermatology, urology, and others.

Statistical Analysis

We used descriptive statistics to characterize the prevalence of visits overall and by both type of visits for primary care services by physician specialty, in 1999 and 2007. We then used the chi-square test to compare differences in visit rates for primary care services within physician specialties between 1999 and 2007.

We accounted for the complex sampling design of NAMCS in the estimation of standard errors by using the 1999 and 2007 stratification variables and estimated total number of visits nationally by applying the sampling weights. All analyses were performed using Stata statistical software, version 11.0 (Stata Corp., College Station, TX). We used a $p < 0.05$ to establish statistically significant differences.

eTable 1. Primary Care Symptoms and Diseases Visits: Symptom Module

		Yes	No
General symptoms	Chills	x	
	Fever	x	
	Other symptoms of body temperature: -feeling cold -feeling hot -feeling hot and cold	x	
	Tiredness, exhaustion	x	
	General weakness	x	
	General ill feeling	x	
	Fainting	x	
	Symptoms of fluid abnormalities -edema -excessive sweating -excessive thirst	x	
	Weight gain	x	
	Weight loss	x	
	Symptoms of face	x	
	Chest pain and related symptoms -soreness -pressure -burning sensation	x	
	Pain -rib pain -side pain -groin pain -facial pain)	x	
	Pain and related symptoms -pain, unspecified -cramps -stiffness	x	
	Tumor or mass, site unspecified -internal mass, NOS	x	
	Lesion, Internal NOS	x	
	Bleeding, multiple or unspecified	x	
	Symptoms of growth and developmental disorders -lack of growth -excessive growth	x	
	General or unspecified nonviral infection	x	
	Allergy, NOS	x	
	Disorders of motor functions	x	
	Dyslexia	x	
	General symptoms of infants -cranky -regurgitation -feeding problems		x
Symptoms referable to the psychological and mental disorders	Anxiety and nervousness	x	
	Fears and phobias	x	
	Depression	x	
	Anger	x	
	Problems with identity and self-esteem	x	
	Restlessness	x	
	Behavioral disturbances -antisocial behavior -hostile behavior -hysterical behavior	x	

	-temper problems -obsessions and compulsions		
	Disturbances of sleep -insomnia -sleepiness -nightmares -sleepwalking -apnea	x	
	Smoking problems	x	
	Alcohol-related problems	x	
	Abnormal drug-use	x	
	Delusions or hallucinations	x	
	Psychosexual disorders -frigidity -concerns with homosexuality -impotence -premature ejaculation -masturbation excessive -problem with orgasm -preoccupation with sex	x	
	Other symptoms relating to psychological disorders -nailbiting -thumbsucking	x	
Symptoms referable to the nervous system	Abnormal involuntary movements	x	
	Convulsions	x	
	Symptoms of head, NEC	x	
	Headache	x	
	Memory disturbances	x	
	Disturbances of sensation -loss of feeling -increased sensation -abnormal sensation -other disturbances of sense	x	
	Vertigo	x	
	Weakness	x	
	Disorders of speech -stuttering -slurring	x	
	Other symptoms referable to nervous system -apraxia	x	
Symptoms referable to the cardiovascular and lymphatic systems	Abnormal pulsations -increased heartbeat -decreased heartbeat -irregular heartbeat	x	
	Heart pain	x	
	Other symptoms of heart	x	
	Symptoms of lymph gland -swollen glands -sore glands	x	
	Other symptoms referable to cardiovascular system -poor circulation -pallor -flushed	x	
Symptoms referable to the eyes and ears	Vision dysfunctions -blindness and half vision	x	

	-diminished vision -double vision		
	Discharge from eye -bleeding -tearing -pus	x	
	Eye infection and inflammation	x	
	Abnormal sensation of eye -pain -itching -burning -strain)	x	
	Abnormal eye movements -abnormal retraction -cross-eyed -pupils unequal -deviation	x	
	Abnormal appearance of eyes -abnormal color -protrusion -cloudy)	x	
	Other and unspecified symptoms referable to eye -contact lens problem -allergy -swelling	x	
	Symptoms of eyelids -infection -itching -mass -abnormal movement	x	
	Hearing dysfunction -diminished hearing -heightened hearing, -extraneous hearing	x	
	Discharge from ear -bleeding -pus -swimmer's ear	x	
	Earache -pain -infection	x	
	Plugged feeling in ear	x	
	Other and unspecified symptoms referable to ears -itching -growth -pulling at ears -abnormal size	x	
Symptoms referable to the respiratory system	Nasal congestions	x	
	Other symptoms of nose -nosebleed -sore in nose -inflammation -problem with appearance	x	
	Sinus problems -pain and pressure -sinus inflammation -sinus congestion	x	

	Shortness of breath	x	
	Labored breathing	x	
	Wheezing	x	
	Breathing problems -disorders of respiratory sound -rapid breathing	x	
	Sneezing	x	
	Cough	x	
	Head cold	x	
	General viral infection	x	
	Throat symptoms -soreness -pain -infection -irritation -swelling -lump	x	
	Tonsil symptoms	x	
	Abnormalities of sputum -coughing up blood -pus -excessive	x	
	Chest congestion	x	
	Voice disorders -hoarseness -hypernasality	x	
	Other symptoms referable to respiratory system -lung pain -lung infection	x	
Symptoms referable to the digestive system	Symptoms of teeth and gums -toothache -gum pain -bleeding gums		x
	Symptoms of Jaw -swelling -lump	x	
	Lip symptoms -cracked -abnormal color -cold sore	x	
	Mouth symptoms -pain -bleeding -dryness -ulcer	x	
	Tongue symptoms -pain -bleeding -inflammation -abnormal color, ridges	x	
	Difficulty swallowing	x	
	Nausea	x	
	Vomiting	x	
	Heartburn	x	
	Gastrointestinal infection	x	
	Stomach and abdominal pain -abdominal pain, NOS -lower abdominal pain, cramps	x	

	-upper abdominal pain, cramps		
	Change in abdominal size -distention -mass or tumor -abdominal swelling	x	
	Abnormal appetite -excessive appetite -decreased appetite	x	
	Difficulty eating	x	
	Gastrointestinal bleeding -blood in stool -vomiting blood	x	
	Flatulence	x	
	Constipation	x	
	Diarrhea	x	
	Other symptoms or changes in bowel function -discharge in stools -worms -changes in size, color, shape -incontinence	x	
	Symptoms referable to anus -pain -bleeding -swelling -itching	x	
	Symptoms of liver, gallbladder -pain -jaundice	x	
	Other and unspecified symptoms referable to digestive system	x	
Symptoms referable to the genitourinary system	Abnormalities of urine -blood in urine -pus in urine -unusual color	x	
	Frequency and urgency in urination	x	
	Painful urination	x	
	Incontinence of urine	x	
	Other urinary dysfunction -retention -hesitancy -large volume -small volume	x	
	Symptoms of bladder -pain -infection -mass	x	
	Symptoms of kidney -pain -infection -mass	x	
	Urinary tract infection	x	
	Other symptoms referable to urinary tract	x	
	Symptoms of penis	x	
	Penile discharge	x	
	Symptoms of prostate -swelling -infection	x	

	Symptoms of scrotum -pain -swelling -growth -itching	x	
	Other symptoms of male reproductive system	x	
	Absence of menstruation	x	
	Irregularity of menstrual interval -frequent -infrequent -unpredictable	x	
	Irregularity of menstrual flow -excessively heavy -scanty flow -abnormal material	x	
	Menstrual symptoms -premenstrual symptoms -painful menstruation	x	
	Menopausal symptoms -early or late onset -vasomotor symptoms -emotional symptoms	x	
	Uterine and vaginal bleeding -intermenstrual bleeding -postmenopausal bleeding -postcoital bleeding	x	
	Vaginal discharge	x	
	Other vaginal symptoms -pain -infection -itching -dryness	x	
	Vulvar disorders -itching -mass- Growth	x	
	Pelvic symptoms -pain -pressure -infection, inflammation	x	
	Problems of pregnancy -pain during pregnancy -spotting during pregnancy -symptoms of onset of labor		x
	Postpartum problems		x
	Other symptoms referable to female reproductive tract	x	
	Pain or soreness of breast	x	
	Lump or mass of breast	x	
	Other symptoms referable to breast -nipple bleeding or discharge -postpartum problems -problems with shape or size	x	
	Symptoms of infertility	x	
	Hormone deficiency	x	
	Symptoms of sexual dysfunction	x	
Symptoms referable to the skin, nails, and hair	Acne or pimples	x	
	Discoloration or abnormal pigmentation	x	

	Infection of skin --of head or neck area -of arm, hand , or finger -of leg, foot, or toe	x	
	Symptoms of skin moles -change in size, color -bleeding mole	x	
	Warts, NOS	x	
	Other growth of skin	x	
	Skin rash	x	
	Skin lesion	x	
	Skin irritations	x	
	Swelling of skin	x	
	Other symptoms referable to skin -oiliness -dryness -wrinkles	x	
	Symptoms Referable to nails -infected -ingrown -brittle	x	
	Symptoms referable to hair and scalp -too little hair -unwanted hair -dryness -itching	x	
	Naval problems	x	
Symptoms referable to the musculoskeletal system	pain, cramps, stiffness, weakness, swelling, mass of: -neck -back -Low back -Hip -Leg -Knee -Ankle -Foot and toe -Shoulder -Arm -Elbow -Wrist -Hand and finger -Unspecified muscles -Unspecified joints	x	
	Musculoskeletal deformities	x	
	Other musculoskeletal symptoms	x	

eTable 2. Disease Module

		Yes	No
Infective and parasitic diseases	Intestinal infectious diseases	x	
	Streptococcal diseases	x	
	Viral diseases	x	
	Sexually transmitted diseases	x	
	Fungus infections	x	
	Parasitic disease	x	
	Other and unspecified infections	x	
	HIV		x
	Hemorrhagic fevers		x
Neoplasms	Cancer of GI tract		x
	Cancer of respiratory tract		x
	Cancer of skin and subcutaneous tissue		x
	Cancer of breast		x
	Cancer of female genital tract		x
	Cancer of male genital tract		x
	Cancer of urinary tract		x
	Other malignant neoplasms		x
	Hodgkins disease, lymphomas, leukemias		x
	Fibroids		x
	Other benign neoplasms		X
	Neoplasms of uncertain nature		x
Endocrine, nutritional, metabolic and immunity Diseases	Diseases of thyroid gland	x	
	Diabetes mellitus	x	
	Gout	x	
	Other endocrine diseases	x	
Diseases of the blood and blood-forming organs	Anemia	x	
	Other diseases of blood(hemophilia)		x
Mental disorders	Organic psychoses		x
	Functional psychoses		x
	Neuroses		x
	Personality and character disorders		x
	Alcoholism	x	
	Drug dependence	x	
	Mental retardation		x
	Other and unspecified mental disorders	x	
Diseases of nervous system	Multiple sclerosis		x
	Parkinson's Disease		x
	Epilepsy		x
	Migraine headache	x	
	Other unspecified diseases		x
Diseases of eye	Inflammatory diseases of eye		x
	Refractive error		x
	Cataract		x
	Glaucoma		x
	Other diseases of eye		x
Diseases of ear	Otitis media	x	
	Other diseases of ear (labyrinthitis)		x
Diseases of the circulatory system	Rheumatic fever and chronic rheumatic heart disease		x
	Hypertension with target organ involvement	x	
	Hypertension, hypertensive	x	

	Ischemic heart disease	x	
	Other heart disease	x	
	Cerebrovascular disease		x
	Atherosclerosis	x	
	Phlebitis	x	
	Varicose veins	x	
	Hemorrhoids	x	
	Other diseases of circulatory system	x	
Diseases of respiratory system	URI	x	
	Tonsillitis	x	
	Bronchitis	x	
	Emphysema	x	
	Asthma	x	
	Pneumonia	x	
	Hay fever	x	
	Other respiratory diseases		x
Diseases of digestive system	Diseases of esophagus, stomach, duodenum	x	
	Appendicitis		x
	Hernia of abdominal cavity		x
	Diseases of intestine and peritoneum		x
	Diseases of liver, gallbladder, and pancreas	x	
	Other diseases of digestive system -dental abscess -dental cavities -canker sores -stomatitis -TMJ pain		x
Diseases of genitourinary system	Cystitis	x	
	Urinary tract disease except cystitis (stones, neurogenic bladder)	x	
	Disease of male genital organs	x	
	Fibrocystic disease of breast		x
	Pelvic Inflammatory Disease		x
	Cervicitis		x
	Other diseases of female reproductive system		x
	Diagnosed complications of pregnancy and puerperium		x
Diseases of skin and subcutaneous tissue	Carbuncle	x	
	Impetigo	x	
	Seborrheic dermatitis	x	
	Eczema and dermatitis	x	
	Psoriasis	x	
	Other diseases of skin	x	
Diseases of musculoskeletal system and connective tissue	Arthritis	x	
	Nonarticular rheumatism	x	
	Other musculoskeletal connective tissue	x	
Congenital anomalies	Congenital anomalies of heart		x
	Undescended testicles		x
	Other and unspecified congenital anomalies		x
Perinatal morbidity and mortality conditions	Prematurity		x
	All other perinatal conditions		x

eTable 3. Primary Care Preventive Examination Visits: Diagnostic, Screening, and Preventive Module

		Yes	No
General examinations	General medical examination	x	
	Well baby examination		x
	General psychiatric exam		x
Special examinations	Pregnancy, unconfirmed		x
	Prenatal examination, routine		x
	Gynecological examination		x
	Eye examination		x
	Heart examination		x
	Other special examination		x
Diagnostic tests	Sensitization test		x
	Skin immunity test		x
	Glucose level determination		x
	HIV test		x
	Other blood test		x
	Blood pressure test		x
	Urine test		x
	Diagnostic endoscopies		x
	Biopsies		x
	Mammography		x
	Diagnostic radiology		x
	ECG		x
	Hearing test		x
	Pap smear		x
	Nasal swab		x
	Other and unspecified diagnostic tests		x
Other screening and preventive procedures	Prophylactic inoculations		x
	Exposure to STD		x
	Possible HIV		x
	Exposure to HIV		x
	Exposure to other infectious diseases		x
	Exposure to bodily fluids of another person, NOS		x
Family planning	Family planning		x
	Contraceptive medication		x
	Contraceptive device		x
	Counseling and examinations for pregnancy interruption		x
	Abortion to be performed		x
	Sterilization and sterilization reversal to be performed		x
	Artificial insemination		x
	Preconception counseling and education		