
National Health Statistics Reports

Number 75 ■ May 20, 2014

Trends in Electronic Health Record System Use Among Office-based Physicians: United States, 2007–2012

by Chun-Ju Hsiao, Ph.D., M.H.S., Agency for Healthcare Research & Quality;
Esther Hing, M.P.H., and Jill Ashman, Ph.D., National Center for Health Statistics

Abstract

Objectives—This report presents trends in the adoption of electronic health records (EHRs) by office-based physicians during 2007–2012. Rates of adoption are compared by selected physician and practice characteristics.

Methods—The National Ambulatory Medical Care Survey (NAMCS) is based on a national probability sample of nonfederal office-based physicians who see patients in an office setting. Prior to 2008, data on physician characteristics were collected through in-person interviews with physicians. To increase the sample for analyzing physician adoption of EHR systems, starting in 2008, NAMCS physician interview data were supplemented with data from an EHR mail survey. This report presents estimates from the 2007 in-person interviews, combined 2008–2010 data from both the in-person interviews and the EHR mail surveys, and 2011–2012 data from the EHR mail surveys. Sample data were weighted to produce national estimates of office-based physician characteristics and their practices.

Results—In 2012, 71.8% of office-based physicians reported using any type of EHR system, up from 34.8% in 2007. In 2012, 39.6% of physicians had an EHR system with features meeting the criteria of a basic system, up from 11.8% in 2007; 23.5% of office-based physicians had an EHR system with features meeting the criteria of a fully functional system in 2012, up from 3.8% in 2007. In 2007, a wide gap existed in use of any type of EHR system between physicians in practices with 11 or more physicians (74.3%) compared with physicians in smaller practices (20.6% among solo practitioners); the gap, however, narrowed during 2007–2012. In 2007, no significant gap was observed in adoption of a fully functional system between primary care (4.7%) and nonprimary care physicians (2.8%); the gap, however, widened over time (27.9% compared with 19.4% in 2012). The difference in adoption of a fully functional system between physicians in practices with 11 or more physicians compared with solo practitioners was 10.4 percentage points in 2007; the gap widened to 30.6 percentage points in 2012.

Keywords: electronic medical records • National Ambulatory Medical Care Survey

Introduction

The 2009 Health Information Technology for Economic and Clinical Health (HITECH) Act authorized incentive payments through Medicare and Medicaid to health care providers that use certified electronic health record (EHR) systems to achieve specified improvements in care delivery (1). Eligible Medicare and Medicaid physicians may receive incentive payments over 5 years, starting in 2011, if they demonstrate that they are using a certified EHR system that meets 15 Stage 1 Core Set objectives and 5 of 10 Menu Set objectives. A federally funded regional extension center (REC) program was created to provide physicians with assistance in purchasing and implementing EHR systems, training staff, and addressing how they use EHR systems when they see patients (2). The REC program seeks to support 100,000 primary care providers, with particular emphasis given to practices with fewer than 10 clinicians and to clinicians who work in settings that tend to serve uninsured, underinsured, and medically underserved populations.

The terms electronic medical record and electronic health record have been used interchangeably over time. For



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics



simplicity, this report refers to these records as EHRs. This report describes trends in the adoption of EHR systems by office-based physicians from 2007 through 2012. Three measures of EHR adoption are examined: use of *any* type of EHR system, and the *availability* of an EHR system that had features meeting the criteria of a basic or a fully functional system (3). EHR adoption trends by selected physician and practice characteristics from 2007 to 2012 are also reported. Information on adoption by physician and practice characteristics in prior years can be found elsewhere (4–7).

Methods

The National Ambulatory Medical Care Survey (NAMCS) is an annual probability survey of nonfederal, office-based physicians providing direct patient care, excluding radiologists, anesthesiologists, and pathologists. The survey is conducted by the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS). A sample of office-based physicians who reported that they were in direct patient care was taken from the master files of the American Medical Association and the American Osteopathic Association. Through 2011, the sample design for the core NAMCS included 112 geographic primary sampling units (PSUs). Within those PSUs, physicians were stratified by specialty, and a sample of physicians was selected. Physicians were randomly assigned to one of 52 reporting weeks throughout the year. Physician data for the core NAMCS were collected through in-person interviews.

Since 2008, in addition to the core NAMCS, a supplemental mail survey on EHR systems has been conducted. In 2008 and 2009, a sample of 2,000 physicians was selected each year using the same sampling design as the core NAMCS. Starting in 2010, to allow for state-level estimates, the EHR mail survey sample size was increased fivefold: A sample of 10,302 physicians was selected each year from the 50 states and the District of Columbia. EHR adoption estimates by state from

Table A. Source of data, sample size, and response rate, by survey year

Year	Data source	Responding sample size	Response rate (percent)
2007	In-person interview	1,743	72
2008	In-person interview and mail survey	2,338	65
2009	In-person interview and mail survey	2,646	70
2010	In-person interview and mail survey	6,121	67
2011	Mail survey	4,326	61
2012	Mail survey	4,545	65

SOURCE: CDC/NCHS, National Ambulatory Medical Care Survey (NAMCS) and NAMCS-Electronic Health Record Survey.

2010 to 2012 have been published elsewhere (8–11). From 2008 to 2012, EHR mail surveys were conducted each year during a 4- or 5-month period between February and August. Nonrespondents to the EHR mail survey received follow-up telephone calls, and when possible, the survey was completed by telephone.

See Table A for source of data, sample size, and response rate for each survey year. Data from the core NAMCS and EHR mail surveys are combined for 2008, 2009, and 2010. Additional information about NAMCS, including the questionnaires used, is available from: <http://www.cdc.gov/nchs/ahcd.htm>.

Physician and practice characteristics used in this report include physician age (under 35, 35–44, 45–54, 55–64, and 65 and over); sex; specialty type [primary care specialty (general and family practice, internal medicine, pediatrics, and obstetrics and gynecology), surgical specialty (includes all surgical specialties such as urology, plastic surgery, and abdominal surgery), and medical specialty (includes all nonsurgical medical specialties such as dermatology, cardiovascular disease, and neurology)]; practice size (solo, partner, 3–5, 6–10, and 11 or more physicians); breadth of specialization (single-specialty and multispecialty); practice ownership [physician or physician group, health maintenance organization (HMO), community health center, and other]; percentage of the practice's revenue received from Medicaid (less than 5%, 5%–19%, 20% or more); geographic region (Northeast, Midwest, South, and West); and metropolitan status [metropolitan statistical area (MSA) and not an MSA].

Practice characteristics including size, ownership, and breadth of specialization were reported for the location where the sampled physician saw the most ambulatory patients. These estimates may not accurately reflect practice size and breadth if the sampled location is different from other locations.

Both the core NAMCS and the EHR mail survey contained a series of questions about EHR systems including current and planned use of EHR systems, availability of computerized features, intent to apply for a Meaningful Use incentive payment (available in 2010–2012), and participation in exchanging patient clinical summaries electronically with other providers (available in 2011–2012). (For the actual questions used in the survey, see http://www.cdc.gov/nchs/ahcd/ahcd_survey_instruments.htm#namcs.)

The estimate of any type of EHR system was obtained from “yes” responses to the question, “Does this practice use electronic medical records or electronic health records (not including billing records)?” It was assumed that missing data on the question about using an EHR system meant that the responding physician did not use any type of EHR system; similarly, it was assumed that missing data on any of the individual computerized features meant that those specific features were not part of the responding physician's system. These assumptions could result in underestimates of the EHR adoption rate.

The features of computerized systems within physician practices were reported by respondents. All respondents were asked whether their practice had a system with each specific computerized feature, regardless of whether they actually used an EHR system. The list

of computerized features included in the survey changed between 2007 and 2012 to reflect emerging Meaningful Use priorities and definitions. Over the 6-year period, the number of features addressed in the survey ranged from 16 to 24. Data on the following 11 computerized features were consistently collected each year from 2007 through 2012: 1) recording patient history and demographic information, 2) recording patient problem lists, 3) ordering prescriptions, 4) providing warnings of drug interactions or contraindications, 5) electronically sending prescriptions to the pharmacy, 6) ordering laboratory results, 7) electronically sending test orders, 8) viewing laboratory results, 9) viewing imaging results, 10) recording clinical notes, and 11) providing guideline-based interventions or screening test reminders.

Using definitions developed by health information technology experts (3), these detailed features were used to define basic and fully functional systems. The features of a basic system are a subset of the features of a fully functional system. Due to survey item changes across the years, basic and fully functional systems include slightly different features from 2010 through 2012 (Table B). During 2007–2009, a basic system included six features (recording patient history and demographic information, clinical notes, and patient problem lists; viewing laboratory and imaging results; and ordering prescriptions). During 2010–2012, a basic system included one additional feature: for 2010, recording a list of medications, and for 2011 and 2012, recording a list of medications and allergies. During 2007–2009, a fully functional system consisted of 14 features, including all of the features of a basic system, plus 8 additional features: medical history and follow-up notes, providing warnings for drug interactions or contraindications, electronically sending prescriptions to the pharmacy, ordering laboratory tests, electronically sending test orders, providing reminders for guideline-based interventions, providing out-of-range test levels (omitted from 2011 and 2012),

Table B. Survey items defining basic and fully functional electronic medical record or electronic health record systems

Features of EMR or EHR systems	Basic system ¹	Fully functional system ¹
Record patient history and demographic information	Yes	Yes
Patient problem lists	Yes	Yes
Order prescriptions.	Yes	Yes
Warnings for drug interactions or contraindications. . . . .	...	Yes
Prescriptions sent to pharmacy electronically . . . . .	...	Yes
Order lab tests . . . . .	...	Yes
Test orders sent electronically . . . . .	...	Yes
View lab results.	Yes	Yes
Out-of-range values highlighted ². . . . .	...	Yes
View imaging results.	Yes	Yes
Electronic images returned ³. . . . .	...	Yes
Orders for radiology tests ⁴. . . . .	...	Yes
Record clinical notes	Yes	Yes
Medical history and follow-up notes ³. . . . .	...	Yes
List of medications ⁵	Yes	Yes
Provide guideline-based interventions or screening test reminders . . . . .	...	Yes

... Category not applicable.

¹Based on definition presented in *Health Information Technology in the United States: Where We Stand, 2008*, Robert Wood Johnson Foundation.

²Available only in 2007–2010.

³Available only in 2007–2009.

⁴Available on 2010 mail survey, but unavailable on 2010 in-person survey. This item was not included in the 2010 estimate of physicians with fully functional systems due to its unavailability on the in-person survey.

⁵First available in 2010.

NOTES: EMR is electronic medical record. EHR is electronic health record. Survey items are from the National Ambulatory Medical Care Survey.

and having electronic images returned (omitted from 2010–2012). For both basic and fully functional systems, even if a feature was reported as turned off, it was still considered available for use within the system.

Note that changes in the survey items (Table B) might have affected estimates of fully functional systems from 2007 through 2012. The differences, however, were small. For 2007–2012, inclusion of all available items to estimate adoption of these systems resulted in lower percentages (3.8%–23.5%) meeting the fully functional criteria than when defined with the 11 items available every year during the period [4.6%–23.9% (data not shown)]. Changes in estimates of basic systems were minimal because only one item was added. From 2009 to 2010, when the additional feature (recording a list of medications) was collected and included in the definition of a basic system, the difference in estimates was 0.5 percentage points.

This report presents national estimates of EHR adoption among office-based physicians. Because

NAMCS is based on a multistage sample of physicians, compound sampling weights were applied to make national estimates of EHR adoption and corresponding estimates of sampling error (12). The NAMCS physician sample weight includes three basic components: 1) inflation by reciprocals of the sampling probabilities, 2) adjustment for physician nonresponse, and 3) a calibration ratio adjustment between the number of physicians in the sample frame from the time the sample was selected until the time that data were collected. Statements of differences in estimates are based on *t* tests with significance at the *p* less than 0.05 level. A weighted least-squares regression analysis was used to determine the significance of trends by year. For the weighted least-squares test, the null hypothesis is that the slope, β , of the regression line does not significantly differ from zero (i.e., $H_0: \beta = 0$, and $H_A: \beta \neq 0$). In this modified least-squares regression, each estimate is weighted by the inverse of the standard error (13). Terms relating to differences such as “increased” or “decreased” indicate that the difference is statistically

significant. A lack of comment regarding the difference does not mean that the difference was tested and found to be not significant.

Results

Office-based physician characteristics

- **Table 1** shows the percent distribution of office-based physicians for 2007 through 2012 by selected physician characteristics. From 2007 to 2012, the percentage of physicians who were 45 and under decreased while the percentage of physicians who were 54 and over increased. The largest increase occurred among physicians who were 65 and over.
- During the same period, the percentage of physicians who were female increased by 20%, while the percentage of physicians who were male decreased by 7%. In 2012, about 70% of physicians were male.
- For 2007–2012, the percentage of physicians working in practices with 11 or more physicians increased by 84%, while the percentage of physicians working in practices with 2 physicians decreased by 24%. In 2012, about two-fifths of physicians worked in a practice with 6 or more physicians (37.2%).
- The percentage of physicians who worked in multispecialty practices increased by 27% during the same time period. In 2012, the majority of physicians worked in a single-specialty practice (73.9%).
- For 2007–2012, the percentage of physicians working in a physician- or physician group-owned practice decreased by 22%, while the percentage of physicians working in practices owned by a medical or academic health center, or other health care corporation (other ownership) increased by 140%. In 2012, more than one-half of physicians worked in a practice owned by a physician or physician group (63.1%).
- From 2007 to 2012, no significant changes were observed in the

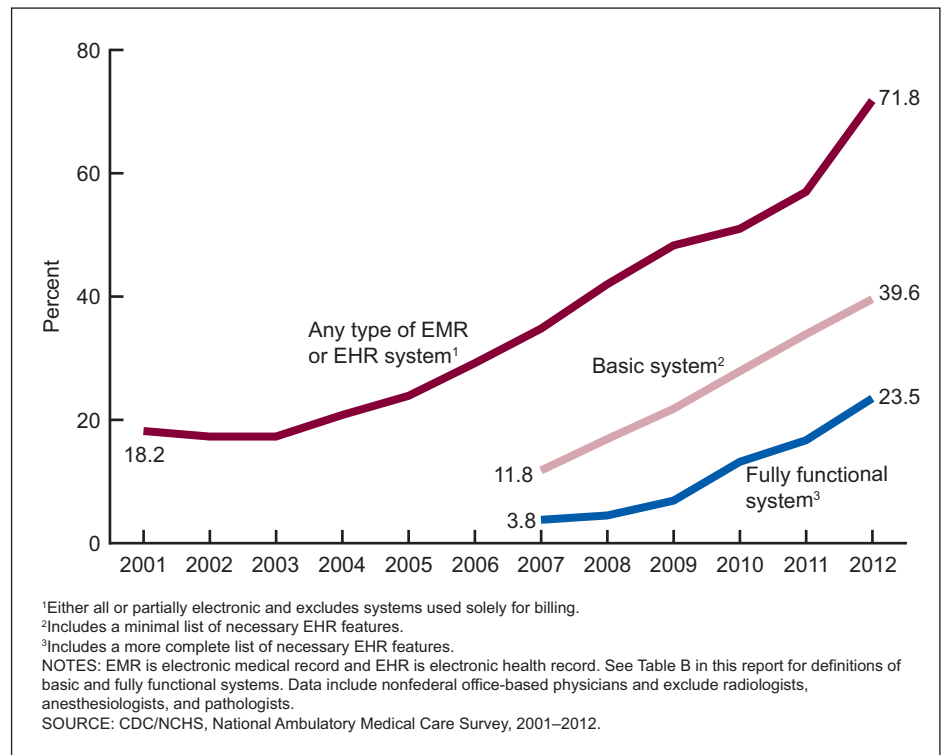


Figure 1. Office-based physicians with an electronic medical record or electronic health record system: United States, 2001–2012

percentage of physicians by specialty type (primary care, surgical, or medical), geographic region, and metropolitan status. In 2012, 48.5% of physicians were in primary care specialties, 22.5% were in surgical care specialties, and 29.1% were in medical care specialties.

- From 2007 to 2012, most physicians worked at a practice located in an MSA, ranging from 87.8% to 90.4%.

Use of any type of EHR system

- Excluding systems used solely for billing, 71.8% of office-based physicians reported using any type of EHR system in 2012, up from 57.0% in 2011 and 34.8% in 2007. From 2001 to 2012, use of any EHR system increased 295% (**Figure 1**).
- From 2007 through 2012, use of any type of EHR system increased in all physician and practice categories, with the exception of HMO-owned practices (**Table 2**).
- The difference in use of any type of EHR system between primary care physicians and nonprimary care

physicians became significant in 2010 (**Figure 2**).

- Use of any type of EHR system was higher among primary care physicians than nonprimary care physicians. In 2012, 74.9% of primary care physicians used any type of EHR system, while 66.5% of physicians with surgical specialties and 70.7% of physicians with medical specialties used any type of EHR system (**Table 2**).
- The difference in use of any type of EHR system between physicians in bigger practices and smaller practices was significant during 2007–2012 (**Figure 2**). In 2007, the percentage using any type of EHR system was 74.3% for physicians working in practices with 11 or more physicians and 20.6% for solo practitioners (**Table 2**). While use of any type of EHR system increased among all practice size categories, the gap in use of any type of EHR system narrowed between physicians in the largest practice size category (11 or more physicians) and solo practitioners between 2007 and 2012, from a 53.7 percentage point

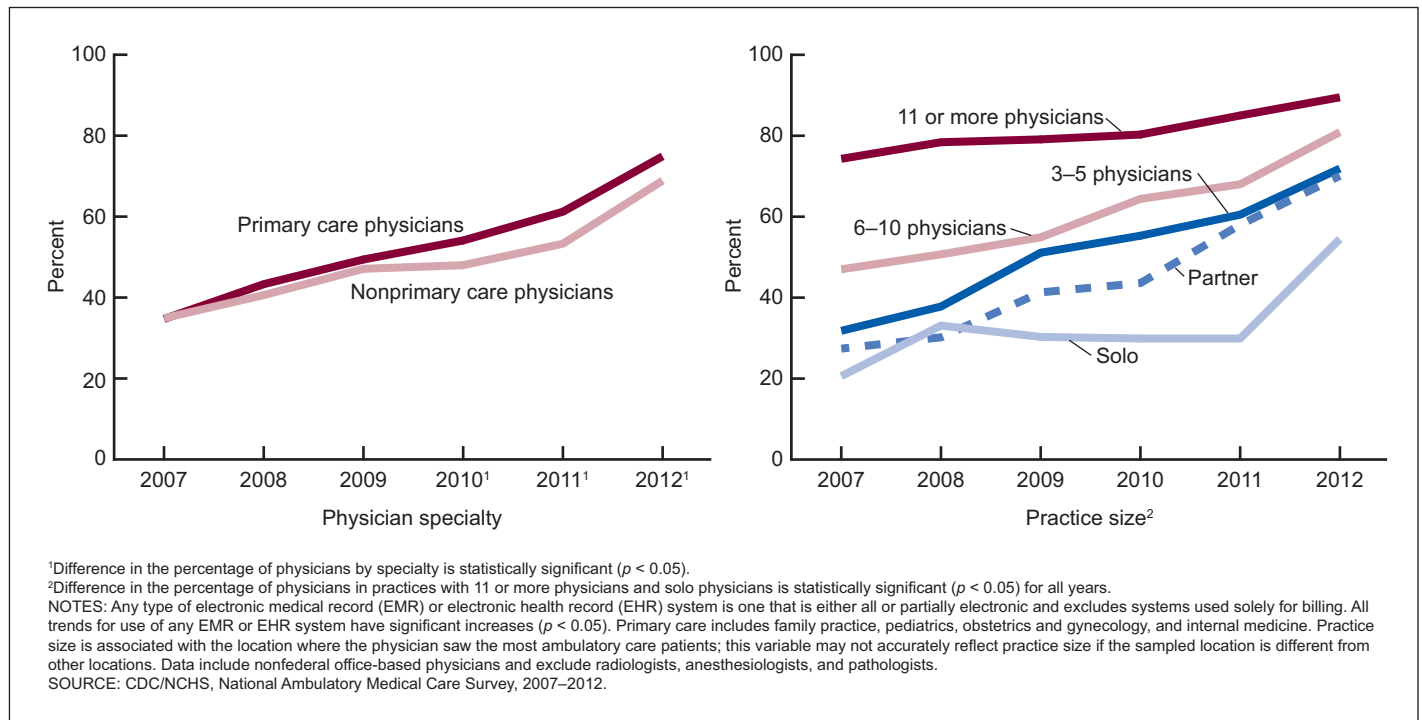


Figure 2. Use of any type of electronic medical record or electronic health record system, by physician specialty and practice size: United States, 2007–2012

difference in 2007 to a 35.0 percentage point difference in 2012.

- Throughout the period of this report, use of any type of EHR system was highest among physicians in HMO-owned practices (86.1%–97.2%) and lowest among physicians in physician-owned practices (31.4%–66.5%) (Table 2). Consequently, the rate of increased use of EHRs was slower among physicians in HMO-owned practices, which led to a smaller gap in EHR adoption between physicians in HMO-owned practices and other ownership categories.
- Each year during 2007–2012, use of any type of EHR system was higher among physicians working in multispecialty practices (52.5%–86.8%) than among physicians working in single-specialty practices (30.3%–66.5%).
- In 2012, among the four geographic regions, physicians in the West had the highest use of any type of EHR system (78.9%) compared with 68.6%–71.0% in the remaining regions).

Adoption of a basic system

- Physician and practice characteristics associated with adoption of a basic system in 2012 were generally the same as those associated with use of any type of EHR system (Table 3).
- In 2012, 39.6% of physicians had an EHR system with features that met the criteria of a basic system, up from 11.8% in 2007 (Figure 1). Increased adoption of a basic system was widespread from 2007 through 2012, with adoption increasing in all physician and practice categories between 2007 and 2012. The increase ranged from 81% among physicians working in HMO-owned practices, where adoption was already high in 2007, to 616% among physicians working in the Northeast (Table 3).
- From 2007 to 2012, adoption of a basic system increased for all physician specialty categories; the rate of increase, however, differed (Table 3). Starting in 2010, adoption of a basic system was significantly higher among primary care physicians

than nonprimary care physicians (Figure 3).

- From 2007 to 2012, adoption of a basic system increased for all practice size categories (Figure 3), but the rate of increase differed among the categories. The difference in adoption of a basic system between the largest practice size category (11 or more) relative to solo practitioners widened from a 28.4 percentage point difference in 2007 to a 39.2 percentage point difference in 2012 (Table 3). In 2007, physicians in practices with six or more physicians (6–10 and 11 or more) were more likely than solo practitioners to adopt a basic system. However, by 2012, the gap between solo practitioners and other physicians was observed even for physicians in practices with three or more physicians (3–5, 6–10, and 11 or more), suggesting that solo practitioners may face unique challenges to EHR adoption.

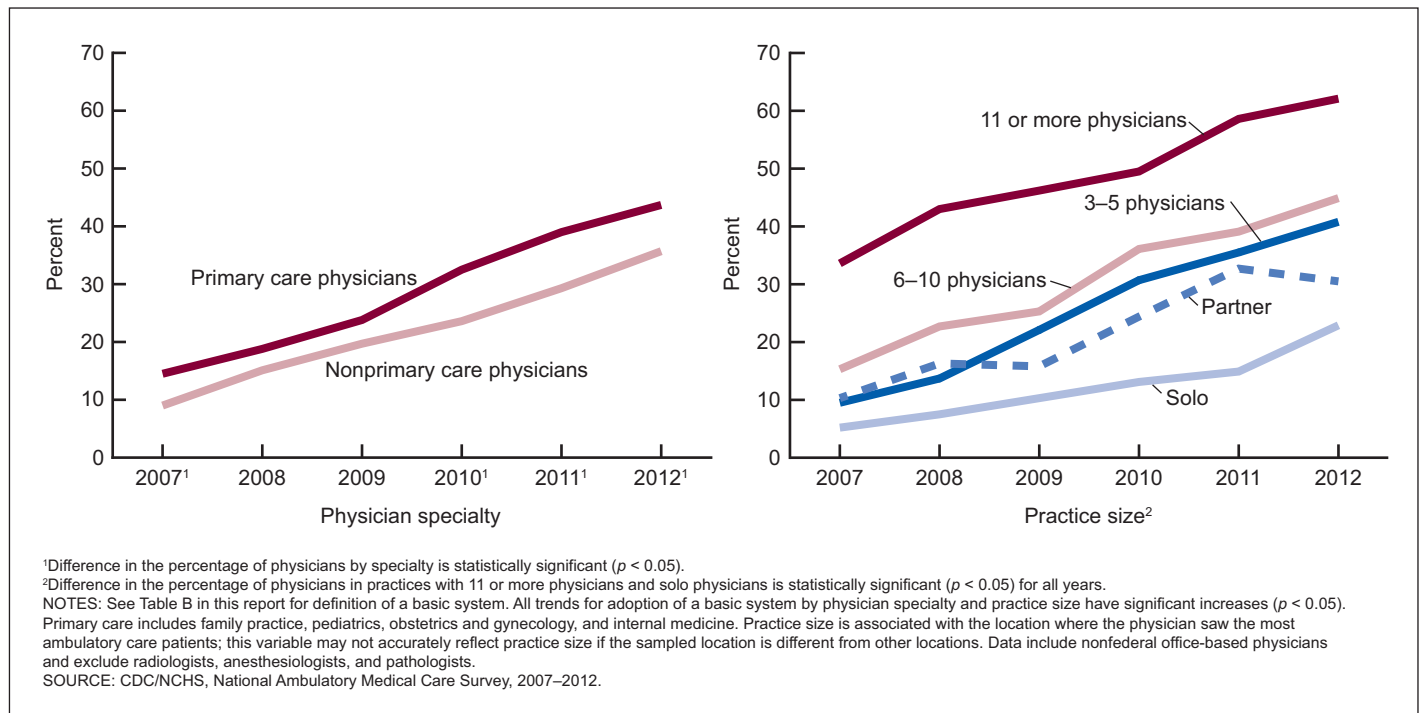


Figure 3. Adoption of a basic electronic medical record or electronic health record system, by physician specialty and practice size: United States, 2007–2012

Adoption of a fully functional system

- From 2007 to 2012, physician and practice characteristics associated with the adoption of a fully functional system were generally the same as those associated with having a basic EHR system (Table 4). The adoption of a fully functional system increased for all physician and practice categories during 2007–2012.
- In 2012, 23.5% of physicians had an EHR system with features meeting the criteria of a fully functional system, up from 3.8% in 2007 (Figure 1).
- For 2007–2012, adoption of a fully functional system increased for both primary care and nonprimary care physicians (Figure 4). Starting in 2009, primary care physicians were significantly more likely than nonprimary care physicians to adopt a fully functional system; the gap in adoption of a fully functional system between primary care and nonprimary care physicians increased from a

3.0 percentage point difference in 2009 to an 8.5 percentage point difference in 2012 (Table 4).

- Adoption of a fully functional system increased among all practice size categories. From 2007 through 2012, the difference in adoption of a fully functional system by physicians in the largest practice size category (11 or more) relative to solo practitioners widened from a 10.4 percentage point difference to a 30.6 percentage point difference. In 2007, physicians in practices with six or more physicians (6–10 and 11 or more) were significantly more likely than solo practitioners to adopt a fully functional system. However, by 2012, the gap in adoption of a fully functional system between solo practitioners and larger practices was observed even for practices with three or more physicians (3–5, 6–10, and 11 or more), again suggesting that solo practitioners may face unique barriers to EHR adoption.

Features of computerized systems

- The survey was initially designed to collect data on computerized features that defined basic systems and fully functional systems (Table B). Starting in 2010, data on additional computerized features were collected to assess physicians' readiness to meet Stage 1 Meaningful Use objectives; this resulted in the survey having different lists of features between 2007 and 2012 (Table 5). Table C presents Meaningful Use Stage 1 Core Set objectives and corresponding 2012 NAMCS survey items on EHR system features. During 2007–2012, data on 11 computerized features were consistently collected each year and are the focus of the trend analysis.
- Overall, 19.5% of all physicians in 2012 had computerized systems ready to support 13 of 15 Meaningful Use Stage 1 Core Set objectives.
- A higher percentage of physicians with fully functional systems had

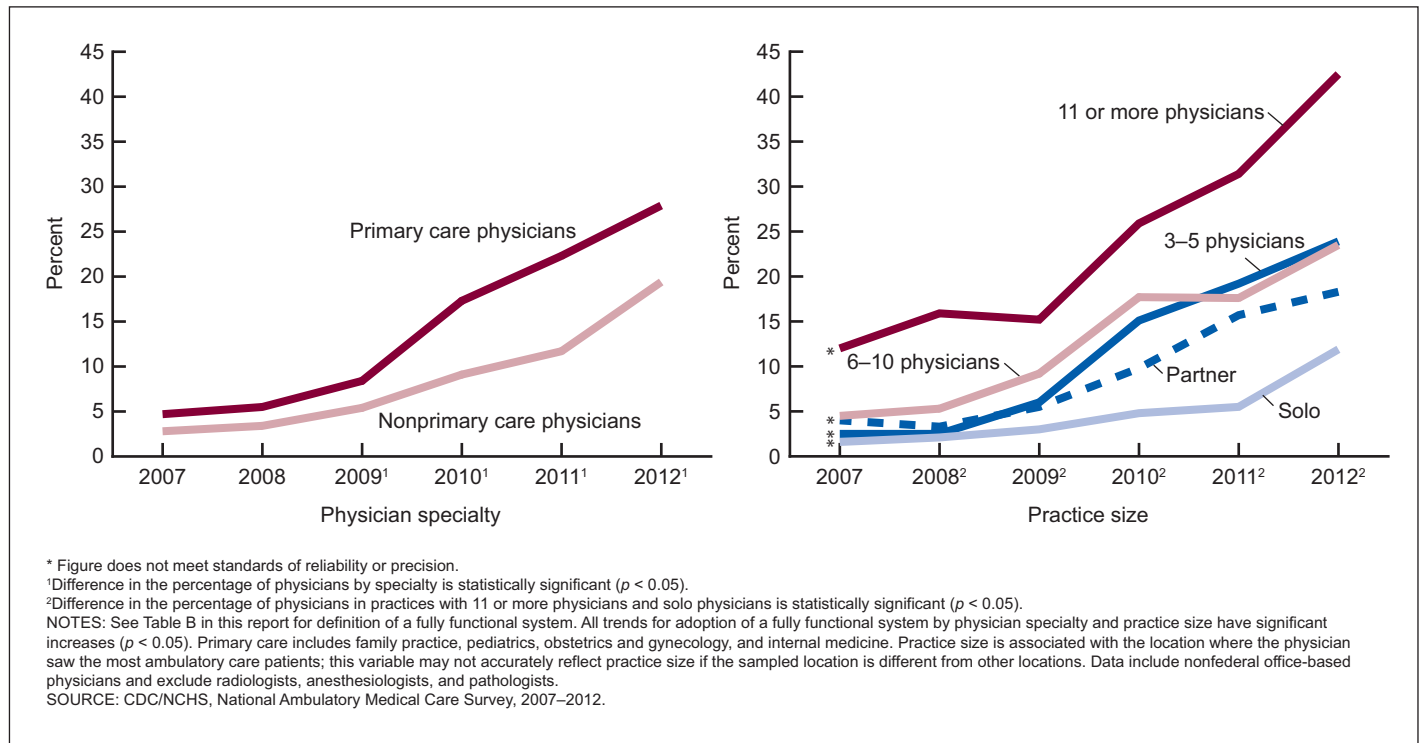


Figure 4. Adoption of a fully functional electronic medical record or electronic health record system, by physician specialty and practice size: United States, 2007–2012

computerized systems ready to meet Stage 1 Core Set objectives (54.9%) than physicians with basic systems (37.5%) and physicians using any type of EHR system (26.8%).

- Among the data on 11 features collected each year, electronically sending prescriptions to the pharmacy had the largest percentage increase in availability (358%), followed by warnings of drug interactions or contraindications (254%), and ordering prescriptions (169%).
- Electronically sending prescriptions to the pharmacy and ordering prescriptions were two of the five features that were most likely to be available in a computerized system in 2012.
- Recording patient history and demographic information had the smallest percentage increase (7%) between 2007 and 2012, perhaps because the availability of this feature was already high (73.9%) in 2007.

Discussion

In this report, adoption of three types of EHR systems was discussed: any type of EHR system, a basic system, and a fully functional system. The first measure was reported by the physician as the EHR system used by the practice, while “basic system” and “fully functional system” were defined by functionalities that the system had. The difference in the percentage of physicians having a basic system and those using any type of EHR system (which could be either all electronic or part electronic and part paper) may reflect differences in the availability and use of specific features of a system, as well as a time lag between installing a new system and using it (14). A previous study found that it took more than 2 years from the installation date for physicians in a large practice to actually use a new commercial EHR system (15).

The federal government has been encouraging adoption of health

information technology by physicians and hospitals for the last decade. The Medicare and Medicaid EHR incentive programs authorized by the 2009 HITECH Act provide incentive payments to health care providers that demonstrate “meaningful use” of certified EHR systems. Starting in 2011, eligible Medicare physicians could receive up to \$44,000 over 5 years (16). Eligible Medicaid physicians could receive up to \$63,000 over a 6-year period that could begin as late as 2016 and run through 2021. The Medicare and Medicaid EHR Incentive Programs are staged in three steps with increasing requirements for participation. Stage 1 of the EHR Incentive Programs began in 2011 and Stage 2 began in 2014.

Basic and fully functional systems were defined prior to the Meaningful Use objectives. Although a fully functional system includes more features than a basic system, it does not include all of the features required for Meaningful Use objectives. Therefore, having a system that meets the criteria

Table C. Meaningful Use Stage 1 Core Set objectives and corresponding survey question: National Ambulatory Medical Care Survey, 2012

Meaningful Use objective	2012 NAMCS ¹
Core Set	Physician has computerized system for:
Computerized provider order entry for medications	Prescription order entry
Drug-drug and drug-allergy interaction checks	Drug interactions or contradictions warnings
Generate and transmit permissible prescriptions electronically	Sending prescription orders electronically to the pharmacy
Record patient demographics	Patient history and demographic information
Maintain up-to-date problem list of current and active diagnoses	Patient problem list
Maintain active medication list	Clinical notes include a list of patient's medications and allergies ²
Maintain active allergy list	Clinical notes include a list of patient's medications and allergies ²
Vital signs	Recording and charting vital signs ³
Smoking status	Recording patient smoking status ³
Implement one clinical decision support rule and the ability to track compliance with rule	Reminders for guideline-based interventions or screening tests AND warnings of drug interactions or contradictions provided
Calculate and transmit CMS quality measure	Reporting clinical quality measures to federal or state agencies (such as CMS or Medicaid) ³
Electronic copy of health information	Providing patients with an electronic copy of their health information ³
Clinical summaries	Providing patients with clinical summaries for each visit ⁴
Exchange key clinical information . . . . .	...
Privacy or security . . . . .	...

... Data not available.
¹In 2012, 19.5% of physicians had EHR systems able to meet 13 of 15 Stage 1 Core Set objectives. Physicians with fully functional systems were able to meet Stage 1 Core Set objectives more frequently (54.9%) than physicians with basic systems (37.5%) and physicians using any type of EHR (26.8%) ($p < 0.05$).
²List of patient's medications and allergies collected separately in 2010 and 2011.
³Available only in 2012.
⁴Available only in 2011 and 2012.
NOTE: NAMCS is National Ambulatory Medical Care Survey. CMS is Centers for Medicare & Medicaid Services. EHR is electronic health record.

of a fully functional system does not necessarily mean the system would meet Meaningful Use objectives. In 2012, about 72% of office-based physicians used any type of EHR system, 39.6% had a system that met the criteria of a basic system, and 23.5% had a system that met the criteria of a fully functional system. In the same year, 19.5% of physicians had computerized systems ready to support 13 of 15 Meaningful Use Stage 1 Core Set objectives. A higher percentage of physicians with fully functional systems had computerized systems ready to meet Stage 1 Core Set objectives (54.9%) than physicians with basic systems (37.5%) and physicians using any type of EHR system (26.8%).

In 2012, adoption of an EHR system varied by physician and practice characteristics. Characteristics associated with adoption were generally similar regardless of whether physicians adopted any type of EHR system, a basic system, or a fully functional system. Adoption was higher among younger physicians compared with older physicians; among primary care physicians compared with nonprimary

care physicians; among physicians in large practices compared with those in smaller practices; among physicians in multispecialty practices compared with those in single-specialty practices, and among physicians in HMO-owned practices compared with those in physician-owned practices.

During 2007–2012, use of any type of EHR system and adoption of a basic system both increased in all categories of physician specialty and practice size. Due to different rates of increase by specialty and practice size, primary care physicians started to have a higher use of any EHR system and adoption of a basic system than nonprimary care physicians in 2010. A widened gap in adoption of fully functional systems by practice size (practices with 11 or more physicians compared with solo practitioners) and by specialty (primary care compared with nonprimary care) was observed starting in 2008 and 2009, respectively. On the other hand, gaps in the use of any type of EHR system narrowed between physicians in practices with 11 or more physicians and all smaller practices between 2007 and 2012.

In conclusion, adoption and use of EHR systems continues. However, only two-fifths of physicians had adopted a basic system by 2012, and less than one-quarter had adopted a fully functional system. The list of features for these two types of EHR systems overlaps with some but not all of the features of an EHR system that are needed to demonstrate meaningful use. A previous report found that of the 65.5% of physicians intending to participate in the Medicare and Medicaid Incentive Programs in 2012, only 26.9% had an EHR system with features that could support 13 of 15 Stage 1 Meaningful Use Core Set objectives (8). These estimates translate into an estimated 18% of physicians who may be eligible for Meaningful Use incentives. However, this is a maximum estimate because some physicians counted in this measure may have an EHR system that does not support the remaining requirements necessary for payment. More generally, rates of EHR adoption continue to vary based on certain physician and practice characteristics, such as practice size and physician specialty.

References

1. Blumenthal D, Tavenner M. The “meaningful use” regulation for electronic health records. *N Engl J Med* 363(6):501–4. 2010.
2. Maxson E, Jain S, Kendall M, Mostashari F, Blumenthal D. The regional extension center program: Helping physicians meaningfully use health information technology. *Ann Intern Med* 153(10):666–70. 2010.
3. Robert Wood Johnson Foundation. Health information technology in the United States: Where we stand, 2008. 2008.
4. Burt CW, Hing E. Use of computerized clinical support systems in medical settings: United States, 2001–03. Advance data from vital and health statistics; no 353. Hyattsville, MD: National Center for Health Statistics. 2005.
5. Burt CW, Hing E, Woodwell D. Electronic medical record use by office-based physicians: United States, 2005. Health E-stat. National Center for Health Statistics. 2006.
6. Burt CW, Sisk JE. Which physicians and practices are using electronic medical records? *Health Aff (Millwood)* 24(5):1334–43. 2005.
7. Hing E, Burt CW, Woodwell DA. Electronic medical record use by office-based physicians and their practices: United States, 2006. Advance data from vital and health statistics; no 393. Hyattsville, MD: National Center for Health Statistics. 2007.
8. Hsiao CJ, Hing E. Use and characteristics of electronic health record systems among office-based physician practices: United States, 2001–2012. NCHS data brief, no 111. Hyattsville, MD: National Center for Health Statistics. 2012.
9. Hsiao CJ, Hing E, Socey TC, Cai B. Electronic medical record/electronic health record systems of office-based physicians: United States, 2009 and preliminary 2010 state estimates. Health E-stat. National Center for Health Statistics. 2010.
10. Hsiao CJ, Hing E, Socey TC, Cai B. Electronic health record systems and intent to apply for meaningful use incentives among office-based physician practices: United States, 2001–2011. NCHS data brief, no 79. Hyattsville, MD: National Center for Health Statistics. 2011.
11. Hsiao CJ, Decker SL, Hing E, Sisk JE. Most physicians were eligible for federal incentives in 2011, but few had EHR systems that met meaningful-use criteria. *Health Aff (Millwood)* 31(5):1100–7. 2012.
12. RTI International. SUDAAN (Release 9.0) [computer software]. 2004.
13. Sirkem MG, Shimizu I, French DK, Brock DB. Manual on standards and procedures for reviewing statistical reports. Hyattsville, MD: National Center for Health Statistics. 1990.
14. McClellan SR, Casalino LP, Shortell SM, Rittenhouse DR. When does adoption of health information technology by physician practices lead to use by physicians within the practice? *J Am Med Inform Assoc* 20(e1):e26–32. 2013.
15. Fleming NS, Culler SD, McCorkle R, Becker ER, Ballard DJ. The financial and nonfinancial costs of implementing electronic health records in primary care practices. *Health Aff (Millwood)* 30(3):481–9. 2011.
16. Department of Health and Human Services, Centers for Medicare & Medicaid Services. Medicare and Medicaid Programs; electronic health record incentive program. Final rule. *Fed Regist* 75(144):44314–588. 2010.

Table 1. Percent distribution of office-based physicians: United States, 2007–2012

Physician or practice characteristic	2007 percent distribution (SE) ¹	2008 percent distribution (SE) ¹	2009 percent distribution (SE) ¹	2010 percent distribution (SE) ¹	2011 percent distribution (SE) ¹	2012 percent distribution (SE) ¹	Percent change between 2007 and 2012 percentages ²
Age of physician							
Under 35 years ³	8.2 (0.9)	2.8 (0.5)	3.3 (0.5)	3.1 (0.4)	2.6 (0.4)	2.5 (0.3)	–69.5
35–44 years ³	28.1 (1.4)	26.9 (1.8)	23.7 (0.9)	22.8 (0.8)	23.0 (1.0)	22.7 (1.0)	–19.2
45–54 years ³	35.0 (1.5)	34.6 (1.8)	31.9 (1.1)	32.4 (0.9)	28.3 (1.1)	31.5 (1.1)	–10.0
55–64 years ³	20.0 (1.1)	24.2 (1.4)	29.7 (1.0)	28.7 (0.9)	32.1 (1.2)	30.0 (1.1)	50.0
65 years and over ³	8.5 (0.9)	11.2 (0.9)	11.2 (0.7)	12.9 (0.7)	14.0 (0.9)	13.2 (0.8)	55.3
Unknown	* (..)	*0.4 (0.1)	*0.2 (0.1)	*0.1 (0.1)	– (..)	– (..)	...
Physician specialty type⁴							
Primary care	49.8 (1.0)	50.9 (1.8)	50.7 (1.0)	49.4 (0.9)	47.3 (1.2)	48.5 (1.2)	–2.6
Surgical	22.2 (0.9)	20.2 (1.0)	20.4 (0.7)	21.4 (0.7)	20.7 (1.0)	22.5 (1.0)	1.4
Medical	28.1 (1.0)	28.8 (2.1)	28.9 (0.9)	29.3 (0.8)	31.9 (1.2)	29.1 (1.1)	3.6
Physician sex							
Female ³	25.3 (1.3)	25.0 (1.4)	26.3 (1.0)	26.5 (0.8)	26.7 (1.1)	30.3 (1.1)	19.8
Male ³	74.7 (1.3)	74.8 (1.4)	73.7 (1.0)	73.5 (0.8)	73.3 (1.1)	69.7 (1.1)	–6.7
Unknown	– (..)	*0.1 (0.1)	– (..)	– (..)	– (..)	– (..)	...
Practice size (number of physicians)⁵							
Solo	30.7 (1.6)	30.7 (1.7)	30.6 (1.1)	32.0 (1.0)	28.4 (1.2)	28.8 (1.1)	–6.2
Partner ³	12.3 (1.0)	14.1 (1.8)	11.2 (0.7)	10.5 (0.7)	10.2 (0.7)	9.3 (0.7)	–24.4
3–5 ³	29.9 (1.5)	27.6 (2.0)	25.3 (1.3)	26.1 (0.9)	26.4 (1.0)	24.6 (1.0)	–17.7
6–10	16.4 (1.2)	16.3 (1.1)	18.6 (1.0)	17.8 (0.7)	18.2 (0.9)	17.7 (0.9)	7.9
11 or more ³	10.6 (1.2)	11.3 (1.2)	14.1 (1.2)	13.6 (0.7)	16.8 (0.9)	19.5 (0.9)	84.0
Breadth of specialization⁵							
Single-specialty ³	79.0 (1.5)	79.6 (1.5)	76.8 (1.2)	78.0 (0.8)	75.6 (1.1)	73.9 (1.0)	–6.5
Multispecialty ³	20.6 (1.5)	20.2 (1.5)	22.3 (1.1)	21.6 (0.8)	24.4 (1.1)	26.1 (1.0)	26.7
Unknown	0.4 (0.2)	*0.2 (0.1)	0.9 (0.2)	0.3 (0.1)	– (..)	– (..)	...
Practice ownership^{5,6}							
Physician or physician group ³	80.6 (1.4)	79.1 (1.6)	77.3 (1.1)	75.2 (0.9)	62.7 (1.2)	63.1 (1.1)	–21.7
HMO	2.9 (0.5)	3.1 (0.9)	2.2 (0.3)	2.1 (0.3)	3.0 (0.5)	2.8 (0.5)	–3.4
Community health center	3.5 (0.6)	3.2 (0.4)	4.4 (0.7)	3.5 (0.4)	3.7 (0.4)	3.4 (0.4)	–2.9
Other ^{3,7}	12.1 (1.1)	13.7 (1.3)	15.2 (1.0)	18.6 (0.9)	29.2 (1.1)	29.1 (1.0)	140.5
Unknown	* (..)	*0.9 (0.5)	0.9 (0.3)	0.6 (0.1)	1.3 (0.4)	1.5 (0.3)	...
Percentage revenue from Medicaid							
Less than 5% ³	36.8 (1.9)	34.9 (2.0)	33.9 (1.2)	35.3 (1.0)	31.5 (1.2)	30.8 (1.1)	–16.3
5%–19%	29.7 (1.9)	31.9 (2.1)	30.5 (1.2)	29.1 (0.9)	27.5 (1.0)	27.9 (1.0)	–6.1
20% or more	22.1 (1.6)	22.3 (1.7)	22.5 (1.1)	23.8 (0.9)	26.0 (1.0)	25.6 (1.0)	15.8
Unknown ³	11.3 (1.0)	10.9 (0.9)	13.1 (0.8)	11.8 (0.6)	14.9 (0.9)	15.7 (0.9)	38.9
Geographic region							
Northeast	20.1 (1.4)	19.7 (1.3)	21.1 (1.1)	20.7 (0.8)	20.9 (0.3)	22.2 (0.2)	10.4
Midwest	21.2 (1.4)	21.9 (1.7)	20.4 (1.1)	19.8 (0.9)	20.9 (0.3)	21.2 (0.3)	0.0
South	36.4 (1.6)	36.3 (2.2)	34.3 (1.4)	34.9 (0.9)	35.9 (0.3)	34.2 (0.2)	–6.0
West	22.3 (1.0)	22.0 (1.2)	24.2 (1.2)	24.5 (0.7)	22.4 (0.4)	22.4 (0.3)	0.4
Metropolitan status							
Metropolitan statistical area	87.8 (1.8)	90.4 (1.6)	89.6 (1.4)	89.4 (0.9)	88.6 (0.5)	89.2 (0.5)	1.6
Not a metropolitan statistical area	12.2 (1.8)	9.6 (1.6)	10.4 (1.4)	10.6 (0.9)	11.4 (0.5)	10.8 (0.5)	–11.5

* Figure does not meet standards of reliability or precision.

... Category not applicable.

– Quantity zero.

¹Based on 1,743 physicians in 2007, 2,338 physicians in 2008, 2,646 physicians in 2009, 6,121 physicians in 2010, 4,326 physicians in 2011, and 4,545 physicians in 2012. Data include nonfederal office-based physicians who see patients in an office setting and exclude radiologists, anesthesiologists, and pathologists.²Differences tested only if both estimates were reliable.³Significant difference between 2007 and 2012 ($p < 0.05$).⁴Primary care includes family practice, pediatrics, obstetrics and gynecology, and internal medicine. Surgical includes all surgical specialties such as urology, plastic surgery, and abdominal surgery. Medical includes all nonsurgical medical specialties such as dermatology, cardiovascular disease, and neurology. For the complete list of all physician specialties and specialty types, see the public-use data file documentation available from: http://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NAMCS/doc2010.pdf.⁵Practice size and breadth of specialization were associated with the location where the physician saw the most ambulatory care patients. These variables may not accurately reflect practice size and breadth if the sampled location is different from other locations.⁶Self-reported by physicians.⁷Includes medical or academic health center, other hospital, other health care corporation, and other.

NOTES: SE is standard error. HMO is health maintenance organization. Estimates based on fewer than 30 cases in the sample data are not presented and are represented by an asterisk (*). Estimates based on 30 or more cases include an asterisk (*) if the relative standard error of the estimate exceeds 30%.

Table 2. Percentage of office-based physicians using any type of electronic medical record or electronic health record system: United States, 2007–2012

Physician or practice characteristic	2007 percent (SE) ¹	2008 percent (SE) ¹	2009 percent (SE) ¹	2010 percent (SE) ¹	2011 percent (SE) ¹	2012 percent (SE) ¹	Percent change between 2007 and 2012 percentages ²
All physicians	34.8 (1.6)	42.0 (1.9)	48.3 (1.3)	51.0 (1.1)	57.0 (1.2)	71.8 (1.0)	106.3
Age of physician							
Under 35 years	47.9 (6.4)	61.7 (8.4)	65.3 (6.8)	68.7 (5.1)	78.5 (5.1)	83.8 (5.7)	74.9
35–44 years	41.1 (2.9)	51.9 (4.0)	56.4 (2.6)	62.3 (1.9)	69.6 (2.3)	81.1 (1.7)	97.3
45–54 years	34.0 (2.4)	39.5 (3.4)	53.7 (2.1)	54.5 (1.9)	60.2 (2.2)	76.5 (1.7)	125.0
55–64 years	28.7 (2.6)	37.8 (3.1)	42.3 (2.2)	45.0 (1.9)	49.8 (2.2)	66.8 (2.1)	132.8
65 years and over	19.3 (4.5)	28.9 (3.5)	25.9 (2.7)	31.2 (2.6)	42.6 (3.5)	53.6 (3.3)	177.7
Unknown	* (..)	80.2 (11.9)	93.6 (6.9)	* (..)	– (..)	– (..)	...
Physician specialty type ³							
Primary care	34.7 (2.2)	43.3 (2.2)	49.4 (1.9)	54.1 (1.4)	61.2 (1.6)	74.9 (1.4)	115.9
Nonprimary care	34.9 (2.4)	40.6 (3.3)	47.1 (1.7)	48.0 (1.4)	53.3 (1.8)	68.8 (1.5)	97.1
Surgical	36.5 (3.0)	46.4 (2.7)	47.4 (2.1)	47.6 (2.1)	53.1 (2.7)	66.5 (2.4)	82.2
Medical	33.7 (2.9)	36.6 (4.8)	46.8 (2.3)	48.2 (1.9)	53.4 (2.4)	70.7 (2.0)	109.8
Physician sex							
Female	36.1 (2.7)	44.3 (3.1)	48.9 (2.3)	53.2 (1.8)	62.0 (2.2)	76.2 (1.7)	111.1
Male	34.4 (1.8)	41.1 (2.2)	48.1 (1.5)	50.2 (1.3)	55.2 (1.5)	69.8 (1.3)	102.9
Unknown	– (..)	* (..)	– (..)	– (..)	– (..)	– (..)	...
Practice size (number of physicians) ⁴							
Solo	20.6 (2.3)	33.1 (3.1)	30.3 (1.8)	29.9 (1.7)	29.9 (2.1)	54.5 (2.3)	164.6
Partner	27.4 (4.0)	30.2 (5.2)	41.3 (3.2)	43.6 (3.2)	58.0 (3.7)	70.1 (3.3)	155.8
3–5	31.8 (3.1)	37.8 (3.1)	51.1 (2.3)	55.3 (1.9)	60.5 (2.2)	71.9 (2.0)	126.1
6–10	47.0 (4.1)	50.7 (3.7)	54.9 (2.9)	64.4 (2.1)	68.0 (2.5)	80.9 (2.0)	72.1
11 or more	74.3 (4.2)	78.4 (3.4)	79.1 (2.6)	80.3 (2.1)	85.0 (2.0)	89.5 (1.6)	20.5
Breadth of specialization ⁴							
Single-specialty	30.3 (1.4)	36.8 (2.0)	42.8 (1.4)	44.8 (1.2)	49.5 (1.4)	66.5 (1.3)	119.5
Multispecialty	52.5 (4.0)	62.2 (3.2)	67.6 (2.8)	73.4 (2.0)	80.2 (1.9)	86.8 (1.5)	65.3
Unknown	* (..)	74.1 (15.8)	* (..)	* (..)	– (..)	– (..)	...
Practice ownership ^{4,5}							
Physician or physician group	31.4 (1.8)	37.1 (1.9)	43.5 (1.4)	45.8 (1.3)	50.0 (1.5)	66.5 (1.4)	111.8
HMO	86.1 (6.6)	92.4 (3.7)	96.2 (3.3)	96.0 (2.6)	99.6 (0.3)	97.2 (1.7)	12.9
Community health center	40.0 (8.3)	54.3 (7.9)	59.6 (8.3)	60.7 (6.4)	77.4 (4.3)	81.0 (6.0)	102.5
Other ⁶	46.3 (4.5)	57.9 (4.7)	62.2 (3.1)	65.4 (2.1)	66.2 (1.9)	80.0 (1.7)	72.8
Unknown	– (..)	* (..)	51.2 (14.0)	43.4 (10.4)	*33.5 (10.1)	64.1 (9.6)	...
Percentage revenue from Medicaid							
Less than 5%	32.6 (3.1)	40.4 (3.1)	43.7 (2.2)	47.3 (1.8)	45.4 (2.3)	64.9 (2.1)	99.1
5%–19%	34.3 (3.0)	42.8 (3.6)	48.5 (2.3)	53.3 (2.1)	59.5 (2.1)	73.7 (1.7)	114.9
20% or more	34.7 (3.4)	41.4 (4.1)	48.9 (3.1)	47.6 (2.1)	60.7 (2.2)	71.9 (1.9)	107.2
Unknown	43.4 (4.3)	46.1 (4.8)	58.4 (3.1)	63.1 (2.4)	70.9 (3.1)	81.5 (2.3)	87.8
Geographic region							
Northeast	24.2 (3.3)	41.0 (3.1)	44.9 (2.7)	48.8 (2.3)	54.5 (2.7)	70.2 (2.3)	190.1
Midwest	35.6 (3.2)	43.8 (4.7)	44.9 (2.6)	55.9 (1.9)	60.5 (2.1)	71.0 (1.8)	99.4
South	35.1 (2.5)	37.5 (3.3)	45.9 (2.3)	47.4 (1.9)	52.6 (1.8)	68.6 (1.7)	95.4
West	43.1 (3.9)	48.5 (3.1)	57.4 (2.8)	54.1 (2.5)	63.4 (3.4)	78.9 (2.5)	83.1
Metropolitan status							
Metropolitan statistical area	35.0 (1.9)	41.6 (1.9)	49.0 (1.3)	50.8 (1.2)	56.4 (1.3)	72.0 (1.1)	105.7
Not a metropolitan statistical area	33.5 (5.8)	45.8 (7.4)	41.8 (4.6)	52.7 (3.1)	61.7 (2.4)	69.5 (2.3)	107.5

* Figure does not meet standards of reliability or precision.

... Category not applicable.

– Quantity zero.

¹Based on 1,743 physicians in 2007, 2,338 physicians in 2008, 2,646 physicians in 2009, 6,121 physicians in 2010, 4,326 physicians in 2011, and 4,545 physicians in 2012. Data include nonfederal office-based physicians who see patients in an office setting and exclude radiologists, anesthesiologists, and pathologists.²Differences tested only if both estimates were reliable. All available differences between 2007 and 2012 are significant ($p < 0.05$), except for HMO ownership.

³Primary care includes family practice, pediatrics, obstetrics and gynecology, and internal medicine. Surgical includes all surgical specialties such as urology, plastic surgery, and abdominal surgery. Medical includes all other nonsurgical medical specialties such as dermatology, cardiovascular disease, and neurology. For the complete list of all physician specialties and specialty types, see the public-use data file documentation available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NAMCS/doc2010.pdf.

⁴Practice size and breadth of specialization were associated with the location where the physician saw the most ambulatory care patients. These variables may not accurately reflect practice size and breadth if the sampled location is different from other locations.

⁵Self-reported by physicians.

⁶Includes medical or academic health center, other hospital, other health care corporation, and other.

NOTES: SE is standard error. HMO is health maintenance organization. Estimates based on fewer than 30 cases in the sample data are not presented and are represented by an asterisk (*). Estimates based on 30 or more cases include an asterisk (*) if the relative standard error of the estimate exceeds 30%.

Table 3. Percentage of office-based physicians with a basic system: United States, 2007–2012

Physician or practice characteristic	2007 percent (SE) ¹	2008 percent (SE) ¹	2009 percent (SE) ¹	2010 percent (SE) ¹	2011 percent (SE) ¹	2012 percent (SE) ¹	Percent change between 2007 and 2012 percentages ²
All physicians	11.8 (1.1)	16.9 (1.3)	21.8 (1.2)	27.9 (1.0)	33.9 (1.2)	39.6 (1.1)	235.6
Age of physician							
Under 35 years.	18.8 (4.1)	24.6 (10.3)	41.0 (9.2)	44.0 (5.8)	52.8 (7.2)	46.3 (5.9)	146.3
35–44 years.	17.9 (2.5)	24.9 (2.9)	24.3 (2.1)	33.9 (1.9)	41.6 (2.5)	45.2 (2.4)	152.5
45–54 years.	9.0 (1.2)	12.7 (1.6)	24.6 (1.7)	30.3 (1.7)	35.6 (2.1)	42.8 (2.0)	375.6
55–64 years.	8.1 (1.7)	17.0 (2.6)	17.8 (1.5)	24.3 (1.6)	29.8 (2.1)	35.9 (2.1)	343.2
65 years and over	5.2 (2.1)	8.0 (1.8)	13.7 (2.3)	15.7 (2.2)	23.9 (3.0)	29.3 (2.9)	463.5
Unknown	– (..)	* (..)	* (..)	– (..)	– (..)	– (..)	...
Physician specialty type ³							
Primary care	14.5 (1.6)	18.8 (1.8)	23.8 (1.8)	32.5 (1.4)	39.0 (1.6)	43.7 (1.6)	201.4
Nonprimary care	9.0 (1.2)	15.1 (1.9)	19.7 (1.3)	23.6 (1.3)	29.3 (1.6)	35.7 (1.6)	296.7
Surgical	10.7 (1.6)	19.0 (2.8)	19.3 (1.5)	22.5 (1.7)	29.3 (2.4)	33.9 (2.4)	216.8
Medical	7.7 (1.4)	12.3 (1.8)	20.0 (1.8)	24.3 (1.7)	29.3 (2.2)	37.1 (2.2)	381.8
Physician sex							
Female.	15.7 (2.1)	17.8 (2.8)	19.4 (2.1)	28.9 (1.6)	35.4 (2.2)	45.9 (2.1)	192.4
Male	10.5 (1.1)	16.5 (1.4)	22.6 (1.3)	27.6 (1.2)	33.4 (1.4)	36.8 (1.3)	250.5
Unknown	– (..)	* (..)	– (..)	– (..)	– (..)	– (..)	...
Practice size (number of physicians) ⁴							
Solo.	5.2 (1.0)	7.5 (1.2)	10.3 (1.4)	13.1 (1.4)	14.9 (1.8)	22.9 (1.9)	340.4
Partner.	10.3 (2.5)	16.3 (4.2)	15.8 (2.5)	24.4 (2.9)	32.7 (3.6)	30.5 (3.4)	196.1
3–5	9.5 (1.7)	13.7 (1.6)	22.1 (2.1)	30.7 (1.7)	35.5 (2.2)	40.8 (2.2)	329.5
6–10	15.3 (2.4)	22.7 (3.4)	25.3 (2.2)	36.1 (2.2)	39.1 (2.6)	44.9 (2.7)	193.5
11 or more	33.6 (5.8)	43.0 (4.6)	46.2 (3.9)	49.5 (2.6)	58.6 (3.0)	62.1 (2.5)	84.8
Breadth of specialization ⁴							
Single-specialty	9.7 (1.0)	12.9 (1.2)	17.6 (1.1)	22.6 (1.1)	26.8 (1.2)	31.9 (1.2)	228.9
Multispecialty	19.9 (3.7)	32.8 (3.4)	36.5 (3.1)	47.0 (2.2)	55.9 (2.5)	61.2 (2.2)	207.5
Unknown	– (..)	* (..)	* (..)	* (..)	– (..)	– (..)	...
Practice ownership ^{4,5}							
Physician or physician group	8.8 (1.0)	12.8 (0.9)	18.0 (1.1)	23.9 (1.2)	26.9 (1.4)	32.5 (1.3)	269.3
HMO	49.0 (9.1)	68.3 (8.2)	71.7 (7.2)	84.5 (4.7)	96.2 (2.3)	88.5 (5.3)	80.6
Community health center.	*21.6 (8.7)	*19.0 (6.2)	*27.1 (9.6)	31.3 (6.2)	31.2 (5.9)	40.4 (6.3)	...
Other ⁶	20.6 (4.2)	28.8 (4.5)	32.4 (3.1)	37.0 (2.1)	43.5 (2.1)	50.6 (2.0)	145.6
Unknown	– (..)	* (..)	* (..)	33.1 (9.9)	*19.5 (7.1)	*30.9 (11.1)	...
Percentage revenue from Medicaid							
Less than 5%.	11.5 (1.6)	14.3 (1.7)	18.9 (1.8)	25.6 (1.8)	23.5 (2.0)	30.0 (2.1)	160.9
5%–19%.	11.8 (1.6)	18.7 (2.6)	21.7 (1.6)	28.4 (1.8)	37.9 (2.0)	45.1 (2.0)	282.2
20% or more	10.6 (2.8)	15.7 (3.0)	24.0 (2.8)	26.7 (1.7)	35.6 (2.3)	38.8 (2.0)	266.0
Unknown	16.0 (3.0)	23.0 (4.2)	25.7 (2.8)	36.1 (2.5)	45.5 (3.3)	49.9 (3.3)	211.9
Geographic region							
Northeast	5.6 (1.5)	15.7 (2.2)	16.6 (2.2)	23.4 (1.8)	30.4 (2.5)	40.1 (2.5)	616.1
Midwest	14.0 (2.6)	17.6 (2.9)	21.1 (1.9)	30.7 (1.8)	37.7 (2.0)	44.6 (1.9)	218.6
South.	11.2 (1.9)	13.3 (1.9)	19.1 (1.7)	24.0 (1.8)	29.0 (1.6)	35.7 (1.7)	218.8
West	16.1 (2.6)	23.4 (3.6)	30.7 (3.3)	35.2 (2.3)	41.5 (3.4)	40.1 (3.1)	149.1
Metropolitan status							
Metropolitan statistical area	11.9 (1.1)	16.6 (1.3)	21.9 (1.2)	27.6 (1.1)	33.4 (1.3)	39.5 (1.2)	231.9
Not a metropolitan statistical area	*11.1 (5.0)	*20.2 (6.4)	20.6 (2.9)	30.8 (2.8)	37.6 (2.5)	40.3 (2.5)	...

– Quantity zero.

... Category not applicable.

* Figure does not meet standards of reliability or precision.

¹Based on 1,743 physicians in 2007, 2,338 physicians in 2008, 2,646 physicians in 2009, 6,121 physicians in 2010, 4,326 physicians in 2011, and 4,545 physicians in 2012. Data include nonfederal office-based physicians who see patients in an office setting and exclude radiologists, anesthesiologists, and pathologists.²Differences tested only if both estimates were reliable. All available differences between 2007 and 2012 are significant ($p < 0.05$).³Primary care includes family practice, pediatrics, obstetrics and gynecology, and internal medicine. Surgical includes all surgical specialties such as urology, plastic surgery, and abdominal surgery. Medical includes all nonsurgical medical specialties such as dermatology, cardiovascular disease, and neurology. For the complete list of all physician specialties and specialty types, see the public-use data file documentation available from: http://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NAMCS/doc2010.pdf.

⁴Practice size and breadth of specialization were associated with the location where the physician saw the most ambulatory care patients. These variables may not accurately reflect practice size and breadth if the sampled location is different from other locations.

⁵Self-reported by physicians.

⁶Other ownership includes medical or academic health center, other hospital, other health care corporation, and other.

NOTES: SE is standard error. HMO is health maintenance organization. Basic systems through 2009 included six features (recording patient history and demographic information, clinical notes, and patient problem lists; viewing laboratory and imaging results; and ordering prescriptions). In 2010, basic systems included one additional feature, a medications list, and for 2011–2012, a medications and allergies list. Estimates based on fewer than 30 cases in the sample data are not presented and are represented by an asterisk (*). Estimates based on 30 or more cases include an asterisk (*) if the relative standard error of the estimate exceeds 30%.

Table 4. Percentage of office-based physicians with a fully functional system: United States, 2007–2012

Physician or practice characteristic	2007 percent (SE) ¹	2008 percent (SE) ¹	2009 percent (SE) ¹	2010 percent (SE) ¹	2011 percent (SE) ¹	2012 percent (SE) ¹	Percent change between 2007 and 2012 percentages ²
All physicians	3.8 (0.6)	4.5 (0.6)	6.9 (0.7)	13.2 (0.7)	16.7 (0.9)	23.5 (1.0)	518.4
Age of physician							
Under 35 years.	*5.8 (2.4)	*20.5 (10.5)	*6.7 (3.0)	16.9 (4.4)	28.2 (7.2)	24.8 (4.7)	...
35–44 years.	6.2 (1.6)	5.9 (1.1)	8.5 (1.4)	17.4 (1.5)	21.7 (2.1)	26.5 (2.2)	327.4
45–54 years.	3.5 (0.8)	3.1 (0.7)	7.9 (1.2)	15.0 (1.3)	14.7 (1.5)	25.6 (1.8)	631.4
55–64 years.	*1.3 (0.6)	4.6 (0.9)	5.7 (1.0)	11.3 (1.2)	15.9 (1.7)	22.8 (1.9)	...
65 years and over	*0.6 (0.6)	*1.0 (0.6)	*4.4 (1.4)	4.4 (1.2)	12.2 (2.3)	14.7 (2.3)	...
Unknown	* (..)	– (..)	– (..)	– (..)	– (..)	– (..)	...
Physician specialty type ³							
Primary care	4.7 (1.0)	5.5 (1.0)	8.4 (1.0)	17.3 (1.2)	22.3 (1.4)	27.9 (1.4)	493.6
Nonprimary care	2.8 (0.7)	3.4 (0.7)	5.4 (0.7)	9.1 (0.8)	11.7 (1.2)	19.4 (1.4)	592.9
Surgical	3.9 (1.1)	4.3 (0.9)	5.6 (0.9)	7.7 (1.1)	11.5 (1.7)	15.4 (1.9)	294.9
Medical	*1.9 (0.6)	*2.8 (0.9)	5.3 (1.0)	10.2 (1.1)	11.8 (1.7)	22.5 (2.0)	...
Physician sex							
Female.	5.5 (0.7)	5.9 (1.7)	5.7 (1.0)	16.0 (1.4)	18.3 (1.8)	29.9 (2.0)	443.6
Male	3.2 (1.5)	4.0 (0.5)	7.4 (0.8)	12.2 (0.8)	16.2 (1.1)	20.7 (1.1)	546.9
Unknown	– (..)	* (..)	– (..)	– (..)	– (..)	– (..)	...
Practice size (number of physicians) ⁴							
Solo.	*1.6 (0.6)	2.1 (0.6)	3.0 (0.9)	4.8 (1.0)	5.5 (1.0)	11.9 (1.4)	...
Partner.	*4.0 (1.5)	*3.3 (1.2)	5.5 (1.6)	9.8 (2.2)	15.7 (3.1)	18.3 (3.0)	...
3–5	*2.5 (0.8)	2.5 (0.7)	6.0 (1.1)	15.1 (1.4)	19.2 (1.9)	23.9 (2.0)	...
6–10	4.5 (1.3)	5.3 (1.4)	9.2 (1.6)	17.7 (1.7)	17.6 (2.0)	23.5 (2.2)	422.2
11 or more	*12.0 (4.1)	15.9 (3.7)	15.2 (2.3)	25.9 (2.6)	31.4 (2.9)	42.5 (2.7)	...
Breadth of specialization ⁴							
Single-specialty	3.0 (0.5)	3.1 (0.6)	4.7 (0.5)	10.2 (0.7)	11.0 (0.8)	16.9 (1.0)	463.3
Multispecialty	*6.8 (2.3)	9.8 (1.9)	15.0 (2.0)	24.0 (1.9)	34.6 (2.4)	42.2 (2.3)	...
Unknown	– (..)	* (..)	* (..)	* (..)	– (..)	– (..)	...
Practice ownership ^{4,5}							
Physician or physician group	2.7 (0.6)	3.5 (0.5)	5.2 (0.7)	10.2 (0.8)	12.4 (1.0)	17.4 (1.1)	544.4
HMO	*27.1 (8.4)	*27.7 (11.3)	53.4 (7.6)	78.7 (5.0)	89.1 (5.2)	80.6 (7.1)	...
Community health center.	*1.9 (1.7)	*8.0 (4.7)	*5.2 (3.1)	18.5 (5.4)	16.1 (3.6)	26.4 (5.9)	...
Other ⁶	*5.9 (2.0)	*4.4 (1.4)	9.2 (1.7)	16.9 (1.7)	19.0 (1.6)	31.0 (1.8)	...
Unknown	– (..)	– (..)	* (..)	*9.8 (4.5)	*10.1 (5.0)	*17.9 (10.6)	...
Percentage revenue from Medicaid							
Less than 5%.	*4.3 (1.3)	5.0 (1.2)	6.5 (1.2)	11.0 (1.1)	11.8 (1.5)	16.6 (1.7)	...
5%–19%.	3.2 (0.8)	2.4 (0.7)	7.5 (1.1)	12.5 (1.3)	18.9 (1.7)	28.8 (1.9)	800.0
20% or more	*1.6 (0.7)	3.3 (0.9)	5.4 (1.1)	12.9 (1.3)	16.5 (1.6)	22.0 (1.7)	...
Unknown	7.8 (1.9)	*11.1 (3.5)	9.4 (1.8)	21.7 (2.3)	23.5 (2.9)	29.9 (3.1)	283.3
Geographic region							
Northeast	1.6 (0.5)	4.3 (1.2)	3.9 (1.0)	11.8 (1.5)	12.4 (1.9)	21.4 (2.1)	1237.5
Midwest	*3.2 (1.0)	4.1 (1.2)	5.9 (1.1)	14.6 (1.7)	20.0 (1.6)	30.0 (1.7)	...
South.	*3.3 (1.1)	2.8 (0.8)	5.4 (0.9)	10.3 (1.2)	13.0 (1.2)	18.3 (1.4)	...
West	7.0 (2.0)	7.7 (1.9)	12.6 (2.0)	17.3 (1.5)	23.7 (2.8)	27.2 (2.9)	288.6
Metropolitan status							
Metropolitan statistical area	4.2 (0.7)	4.5 (0.7)	7.0 (0.7)	13.4 (0.8)	16.5 (1.0)	23.2 (1.1)	452.4
Not a metropolitan statistical area	*0.8 (0.6)	*4.4 (2.2)	6.0 (1.4)	11.5 (1.4)	18.7 (2.1)	25.6 (2.3)	...

* Figure does not meet standards of reliability or precision.

... Category not applicable.

– Quantity zero.

¹Based on 1,743 physicians in 2007, 2,338 physicians in 2008, 2,646 physicians in 2009, 6,121 physicians in 2010, 4,326 physicians in 2011, and 4,545 physicians in 2012. Data include nonfederal office-based physicians who see patients in an office setting and exclude radiologists, anesthesiologists, and pathologists.²Differences tested only if both estimates were reliable. All available differences between 2007 and 2012 are significant ($p < 0.05$).³Primary care includes family practice, pediatrics, obstetrics and gynecology, and internal medicine. Surgical includes all surgical specialties such as urology, plastic surgery, and abdominal surgery. Medical includes all nonsurgical medical specialties such as dermatology, cardiovascular disease, and neurology. For the complete list of all physician specialties and specialty types, see the public-use data file documentation available from: http://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NAMCS/doc2010.pdf.

⁴Practice size and breadth of specialization were associated with the location where the physician saw the most ambulatory care patients. These variables may not accurately reflect practice size and breadth if the sampled location is different from other locations.

⁵Self-reported by physicians.

⁶Other ownership includes medical or academic health center, other hospital, other health care corporation, and other.

NOTES: SE is standard error. HMO is health maintenance organization. Estimates based on fewer than 30 cases in the sample data are not presented and are represented by an asterisk (*). Estimates based on 30 or more cases include an asterisk (*) if the relative standard error of the estimate exceeds 30%. Fully functional systems through 2009 included 14 features (patient history and demographic information, clinical notes, and patient problem lists; viewing laboratory and imaging results; ordering prescriptions; medical history and follow-up notes; providing warnings for drug interactions or contraindications; electronically sending prescriptions to the pharmacy; ordering laboratory tests; electronically sending test orders; providing reminders for guideline-based interventions; providing out-of-range test levels; and having electronic images returned). Fully functional systems in 2010 did not include electronic images returned, but did include a medications list. Fully functional systems for 2011 and 2012 did not include electronic images returned and out-of-range test levels, but did include a medications and allergies list.

Table 5. Percentage of office-based physicians reporting selected electronic medical record or electronic health record system features: United States, 2007–2012

Features reported	2007 percent (SE) ¹	2008 percent (SE) ¹	2009 percent (SE) ¹	2010 percent (SE) ¹	2011 percent (SE) ¹	2012 percent (SE) ¹	Percent change between 2007 and 2012 percentages ²
Record patient history and demographic information	73.9 (1.8)	77.9 (1.7)	82.7 (1.0)	74.3 (0.9)	72.4 (1.1)	79.3 (1.0)	7.3
Patient problem lists	27.7 (1.5)	33.9 (1.6)	40.5 (1.3)	49.0 (1.1)	54.2 (1.2)	65.8 (1.1)	137.5
Order prescriptions	29.6 (1.5)	36.2 (1.8)	45.6 (1.2)	57.1 (1.0)	64.8 (1.2)	79.5 (0.9)	168.6
Warnings for drug interactions or contraindications . . .	18.8 (1.3)	26.2 (1.6)	34.8 (1.1)	43.6 (1.1)	50.8 (1.2)	66.5 (1.1)	253.7
Prescriptions sent to pharmacy electronically	16.0 (1.2)	22.9 (1.5)	31.9 (1.1)	43.8 (1.1)	54.6 (1.2)	73.3 (1.0)	358.1
Order laboratory tests	28.5 (1.4)	30.6 (1.6)	38.4 (1.3)	48.5 (1.1)	51.0 (1.2)	62.5 (1.1)	119.3
Test orders sent electronically	16.7 (1.2)	19.5 (1.4)	24.9 (1.1)	32.0 (1.0)	35.3 (1.2)	44.7 (1.2)	167.7
Provide standard order sets related to a particular condition or procedure	--- (..)	--- (..)	--- (..)	--- (..)	36.3 (1.2)	46.6 (1.2)	...
View laboratory results	44.8 (1.7)	52.3 (1.8)	58.3 (1.2)	62.5 (1.0)	67.4 (1.2)	72.9 (1.1)	62.7
Out-of-range values highlighted	29.9 (1.7)	40.0 (1.9)	44.9 (1.3)	46.2 (1.1)	--- (..)	--- (..)	...
Results incorporated into EMR/EHR	--- (..)	--- (..)	--- (..)	42.2 (1.1)	44.6 (1.2)	--- (..)	...
EMR/EHR automatically graphs patient's laboratory results over time.	--- (..)	--- (..)	--- (..)	--- (..)	--- (..)	42.7 (1.2)	...
View imaging results	36.9 (1.6)	45.2 (1.9)	49.2 (1.3)	51.5 (1.1)	56.4 (1.2)	59.1 (1.2)	60.2
Electronic images returned	16.7 (1.0)	23.0 (1.9)	24.8 (1.1)	--- (..)	--- (..)	--- (..)	...
View data on quality of care measures	--- (..)	--- (..)	--- (..)	--- (..)	30.2 (1.1)	42.8 (1.2)	...
Record clinical notes	34.8 (1.4)	41.2 (1.7)	47.3 (1.4)	56.8 (1.0)	61.6 (1.2)	72.8 (1.0)	109.2
Medical history and follow-up notes	26.9 (1.4)	35.0 (1.7)	42.0 (1.5)	--- (..)	--- (..)	--- (..)	...
List of medications	--- (..)	--- (..)	--- (..)	49.7 (1.1)	³ 56.5 (1.2)	³ 68.3 (1.1)	...
List of allergies (including allergies to medication) . . .	--- (..)	--- (..)	--- (..)	48.8 (1.1)	---	---	...
Provide guideline-based interventions or screening test reminders	25.9 (1.5)	29.5 (1.6)	34.0 (1.2)	37.9 (1.0)	40.0 (1.2)	50.2 (1.2)	93.8
Report to immunization registries electronically	--- (..)	--- (..)	--- (..)	26.9 (1.1)	26.8 (1.1)	32.0 (1.1)	...
Report in standards specified by Meaningful Use criteria	--- (..)	--- (..)	--- (..)	--- (..)	--- (..)	19.2 (0.9)	...
Public health reporting	13.8 (1.1)	13.1 (1.1)	13.8 (0.8)	--- (..)	12.1 (0.8)	--- (..)	...
Notifiable diseases sent electronically	6.1 (0.8)	4.8 (0.8)	5.2 (0.5)	--- (..)	4.5 (0.5)	--- (..)	...
Provide patients with clinical summaries for each visit. . .	--- (..)	--- (..)	--- (..)	--- (..)	38.3 (1.2)	56.1 (1.2)	...
Exchange secure message(s) with patients	--- (..)	--- (..)	--- (..)	--- (..)	28.2 (1.1)	39.5 (1.1)	...
Record and chart vital signs.	--- (..)	--- (..)	--- (..)	--- (..)	--- (..)	68.6 (1.1)	...
Record patient smoking status	--- (..)	--- (..)	--- (..)	--- (..)	--- (..)	68.7 (1.1)	...
Report clinical quality measures to federal or state agencies	--- (..)	--- (..)	--- (..)	--- (..)	--- (..)	36.6 (1.1)	...
Generate lists of patients with particular health conditions	--- (..)	--- (..)	--- (..)	--- (..)	--- (..)	52.6 (1.2)	...
Provide patients with an electronic copy of their health information	--- (..)	--- (..)	--- (..)	--- (..)	--- (..)	51.1 (1.2)	...

--- Data not available.

... Category not applicable.

¹Based on 1,743 physicians in 2007, 2,338 physicians in 2008, 2,646 physicians in 2009, 6,121 physicians in 2010, 4,326 physicians in 2011, and 4,545 physicians in 2012. Data include nonfederal office-based physicians who see patients in an office setting and exclude radiologists, anesthesiologists, and pathologists.²Differences tested only if both estimates were reliable. All available differences between 2007 and 2012 are significant ($p < 0.05$).³List of medications and allergies combined for 2011 and 2012.

NOTES: SE is standard error. EMR is electronic medical record. EHR is electronic health record. Specific features are reported as available even if they were turned off.

**U.S. DEPARTMENT OF
HEALTH & HUMAN SERVICES**

Centers for Disease Control and Prevention
National Center for Health Statistics
3311 Toledo Road, Room 5419
Hyattsville, MD 20782

FIRST CLASS MAIL
POSTAGE & FEES PAID
CDC/NCHS
PERMIT NO. G-284

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

For more NCHS NHSRs, visit:
<http://www.cdc.gov/nchs/products/nhsr.htm>.



National Health Statistics Reports ■ Number 75 ■ May 20, 2014

Suggested citation

Hsiao CJ, Hing E, Ashman J. Trends in electronic health record system use among office-based physicians: United States, 2007–2012. National health statistics reports; no 75. Hyattsville, MD: National Center for Health Statistics. 2014.

Copyright information

All material appearing in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

National Center for Health Statistics

Charles J. Rothwell, M.S., M.B.A., *Director*
Jennifer H. Madans, Ph.D., *Associate Director
for Science*

Division of Health Care Statistics

Clarice Brown, M.S., *Director*

For e-mail updates on NCHS publication releases, subscribe online at: <http://www.cdc.gov/nchs/govdelivery.htm>.
For questions or general information about NCHS: Tel: 1–800–CDC–INFO (1–800–232–4636) • TTY: 1–888–232–6348
Internet: <http://www.cdc.gov/nchs> • Online request form: <http://www.cdc.gov/cdc-info/requestform.html>

DHHS Publication No. 2014–1250 • CS247154