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ELECTRONIC PRESCRIBING

CMS Should Address Inconsistencies in Its Two Incentive Programs That Encourage the Use of Health Information Technology

G A O

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Why GAO Did This Study

Congress established two CMS-administered programs—the Electronic Prescribing Program and the Electronic Health Records (EHR) Program—that provide incentive payments to eligible Medicare providers who adopt and use health information technology, and penalties for those who do not. The Medicare Improvements for Patients and Providers Act of 2008 required GAO to report on the Electronic Prescribing Program. To do so, GAO examined how CMS determines which providers receive incentive payments and avoid penalties from that program and how many providers received incentive payments in 2009. Also, GAO was asked to examine how the requirements of the two programs compare. GAO reviewed relevant laws and regulations, interviewed CMS officials, and analyzed CMS data on incentive payments made for 2009, which were the most recent data available for a full year.

What GAO Recommends

GAO is recommending that the CMS Administrator take four actions, including (1) encourage physicians and other providers in the Electronic Prescribing Program to adopt certified technology and (2) expedite efforts to remove the overlap in reporting requirements for physicians who may be eligible for incentive payments or subject to penalties under both programs. CMS generally agreed with three recommendations and disagreed with a fourth recommendation, which GAO clarified based on CMS's comments.

View GAO-11-159 or key components. For more information, contact Linda T. Kohn at (202) 512-7114 or kohnl@gao.gov

What GAO Found

CMS analyzes information reported by eligible providers on their Medicare Part B claims—which are used to submit charges for covered services—to determine which Medicare providers should receive Electronic Prescribing Program incentive payments or be subject to penalties. In 2009—the first year the program provided incentive payments—CMS paid approximately $148 million in incentive payments to about 8 percent of the approximately 600,000 Medicare providers who had an applicable patient visit—that is, supplied 1 of 33 CMS-designated services typically provided in the office or outpatient setting. For 2009, CMS examined Part B claims to determine whether, after each applicable patient visit, providers marked any one of three electronic prescribing reporting codes used to report information on the adoption and use of electronic prescribing systems. To receive an incentive payment that year, the provider had to report the codes for at least 50 percent of applicable patient visits, and at least 10 percent of the provider's total allowed Medicare Part B charges for the year had to be from the applicable patient visits. CMS made changes in the reporting requirements for 2010. For example, the agency reduced the number of reporting codes to one and required that individual providers report the code after at least 25 applicable visits, instead of for 50 percent of applicable visits. From 2012 through 2014, the Electronic Prescribing Program will assess penalties on providers that do not adopt and use electronic prescribing. Individual providers will have to submit the electronic prescribing reporting code at least 10 times in the first 6 months of 2011 to avoid penalties in 2012.

Although GAO found similarities in the technology and reporting requirements for both programs, GAO also found that the requirements of the two programs are inconsistent in several areas. The EHR Program provides incentives from 2011 to 2016 and introduces penalties beginning in 2015, while the Electronic Prescribing Program provides incentives from 2009 to 2013 and provides for penalties from 2012 to 2014, when the program ends. Both the EHR and Electronic Prescribing Programs require providers to adopt and use technology that can perform similar electronic prescribing–related activities. However, the EHR Program requires providers to adopt and use certified EHR systems that meet criteria established by HHS, which include electronic prescribing–related capabilities, while the Electronic Prescribing Program does not have a certification requirement. As a result, providers have no assurance that the systems they invest in will meet the Electronic Prescribing Program's requirements. Additionally, the two programs have established separate reporting requirements related to electronic prescribing, potentially requiring physicians—the largest and only group of providers eligible to earn incentive payments in both programs—to report to both programs from 2011 through 2014. CMS recognizes that this duplication places additional burden on physicians; however, CMS is still in the process of developing a strategy to address this duplication.

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Congressional Committees

According to the Department of Health and Human Services (HHS), widespread use of health information technology could improve the quality of care received by patients and reduce health care costs. One such technology, electronic prescribing, can be used, for example, to electronically transmit a prescription or prescription-related information between a health care provider and a pharmacy or to provide other technological capabilities, such as alerting a provider to a potential interaction between a drug and the patient's existing medications. Health care providers can access electronic prescribing technological capabilities by adopting stand-alone electronic prescribing systems or electronic health record[1] systems that include an electronic prescribing component. Others have reported that stand-alone electronic prescribing systems can cost up to $2,500 annually per provider, and EHR systems can cost approximately $25,000 to $45,000 per provider with additional annual costs to operate and maintain the system.[2]

Congress has established two programs, administered by the Centers for Medicare & Medicaid Services (CMS), that aim to increase the use of electronic prescribing in Medicare by providing incentive payments or penalties for certain providers who participate in the Medicare Program.[3] The time frames for the two programs overlap, and each program has established the following requirements that providers must meet in order to receive incentive payments under Medicare and avoid program

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[1]An electronic health record is a collection of information about the health of an individual or the care provided, including patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports.

[2]See, for example, American Medical Association, *Comparison of Stand-Alone Versus EMR Systems*, available at http://www.ama-assn.org/assets/eprescribing/downloadable_resources/standalone-versus-emr.pdf (accessed Dec. 9, 2010).

[3]Not all providers that bill Medicare are eligible for incentive payments or penalties under both programs. According to CMS, almost 1 million physicians and other nonphysician providers billed Medicare in 2009. See CMS, *Data Compendium, 2009 Edition*, available at https://www.cms.gov/DATACOMPENDIUM/15_2009_DATA_COMPENDIUM.ASP, accessed on October 26, 2010. The types of providers eligible for incentive payments or penalties under the two programs are not identical.

penalties: (1) technological requirements that specify the types of health care information technology providers must adopt; and (2) reporting requirements that describe the information that providers report to CMS to demonstrate that they have not only adopted, but also used, the requisite health care information technology. For both of these programs, physicians are the largest group of eligible providers that may earn incentive payments or be subject to penalties.

The first program, established by the Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) and referred to here as the Electronic Prescribing Program, provides incentive payments from 2009 through 2013 to certain Medicare providers—physicians and other health care providers, such as physician assistants and nurse practitioners—who have prescribing authority and who adopt and use systems that meet CMS's definition of a qualified electronic prescribing system.[4,5] From 2012 through 2014, the program may apply a payment adjustment, or penalty, on the program's eligible providers that do not adopt and use such systems.[6] With incentive payments scheduled to end in 2013 and penalties scheduled to end in 2014, the Electronic Prescribing Program will cease to provide positive and negative incentives to encourage eligible providers to electronically prescribe after 2014.

The second incentive program was established by the Health Information Technology for Economic and Clinical Health (HITECH) Act, as part of the American Recovery and Reinvestment Act of 2009 (Recovery Act).[7] HITECH established a program, referred to here as the Electronic Health

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[4]Pub. L. No. 110-275, § 132(a), 122 Stat. 2494, 2527.

[5]A qualified electronic prescribing system must have several technological capabilities, including the ability to perform the following: generate a complete medication list; generate and transmit prescriptions electronically, and conduct alerts; provide information on formulary or tiered formulary medications, patient eligibility, and authorization requirements; and provide information on lower-cost, therapeutically appropriate alternatives (if any). Additionally, a qualified electronic prescribing system must be consistent with CMS's Part D electronic prescribing standards.

[6]Pub. L. No. 110-275, § 132(b), 122 Stat. 2529 (as amended by the American Recovery and Reinvestment Act of 2009 [Recovery Act], Pub. L. No. 111-5, § 4101(f), 123 Stat. 115, 476 [providing that payment adjustments end after 2014]). In this report we use the term "penalty" to denote a reduction in reimbursement to a non-compliant provider and not the assessment of a fine or civil money penalty.

[7]Pub. L. No. 111-5, div. B, tit. IV, §4101(a), 123 Stat. 115, 467 (div. A, tit. XIII and div. B, tit. IV of Pub. L. No. 111-5 may be cited as the Health Information Technology for Economic and Clinical Health Act (HITECH Act)).

Records (EHR) Program, that provides incentive payments from 2011 through 2016 to Medicare physicians that adopt and "meaningfully use"[8] certified EHR technology, which includes electronic prescribing technological capabilities.[9] Beginning in 2015, the EHR Program may apply a payment adjustment, or penalty, on eligible providers that do not adopt and meaningfully use certified EHR technology.[10]

MIPPA requires us to report on the implementation of the incentives for electronic prescribing established by MIPPA by September 1, 2012.[11] In addition, because of the overlapping time frames of the programs, we were asked to obtain information on the relationship between the Electronic Prescribing Program and the EHR Program. As agreed with committee staff, our specific objectives for this report were to examine (1) how CMS determines which providers should receive incentive payments and avoid penalties from the Electronic Prescribing Program and how many providers received such incentive payments in 2009, and (2) how the requirements in the EHR Program and the Electronic Prescribing Program compare to each other. MIPPA also directed us to report on information related to reductions in avoidable medical errors and estimated savings to Medicare resulting from the use of electronic prescribing. In response, we provide information in appendix II on how others have measured whether or to what extent electronic prescribing improves quality or reduces costs.

To address both objectives, we reviewed relevant provisions in MIPPA and the Recovery Act, and regulations and other published material pertaining

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[8]In a general sense, Congress defined "meaningful use" in this context to mean that the user of health information technology demonstrates to the satisfaction of the Secretary of HHS that the technology is certified and being used in a meaningful manner, that the technology is connected in a manner that provides for the electronic exchange of health information to improve the quality of health care, and that such information is submitted in a form and manner specified by the Secretary. See Pub. L. No. 111-5, § 4101(a) 123 Stat. 467, 469-470.

[9]The HITECH Act also established incentive programs for eligible providers participating in Medicaid, Medicare Advantage organizations—private companies that provide Medicare health insurance coverage to beneficiaries for hospital, physician, and other services—and hospitals that participate in Medicare or Medicaid and that adopt and meaningfully use EHR technology. These programs are outside the scope of this report. See Pub. L. No. 111-5, §§ 4101, 4102, 4201, 123 Stat. 467, 477, 489.

[10]Pub. L. No. 111-5, § 4101(b), 123 Stat. 472.

[11]Pub. L. No. 110-275, § 132(c), 1223 Stat. 2530.

to the Electronic Prescribing[12] and EHR Programs.[13] We also interviewed officials from CMS and from the Office of the National Coordinator for Health Information Technology (ONC) in HHS. ONC reports to the Secretary of HHS and plays a role in the EHR Program by establishing the standards and specifications that providers' systems must meet for the EHR Program, coordinating with CMS on the development of the meaningful use criteria, and creating and administering the certification program that authorizes organizations to certify EHR technology. To report how many providers received payments in 2009, we analyzed CMS data on (1) 2009 Electronic Prescribing Program participation as determined by CMS and (2) providers' state locations.[14] For more information on our data analysis, see appendix III. To ensure the reliability of the various data we analyzed, we interviewed CMS officials, reviewed CMS documentation, and conducted electronic testing to identify obvious errors. On the basis of these activities, we determined that CMS data were sufficiently reliable for our analysis. To compare the EHR Program and the Electronic Prescribing Program, we examined similarities and differences in the two programs' technology and reporting requirements and identified inconsistencies that may limit the effectiveness of the programs. Because the EHR Program is broader than electronic prescribing, we focused our comparison on the electronic prescribing–related aspects of that program's technology and reporting requirements. We also interviewed knowledgeable stakeholders, including officials from HHS's Agency for Healthcare Research and Quality and the Department of Veterans Affairs (VA). To obtain information about studies that measured whether or to

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[12]See Medicare Program; Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2009, preamble II.O2., 73 Fed. Reg. 69726, 69847 (Nov. 19, 2008) (program year 2009); Medicare Program; Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2010, preamble II.G.5., 74 Fed. Reg. 61738, 61849 (Nov. 25, 2009) (program year 2010); and Medicare Program; Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2011, preamble VII.F.2, 75 Fed. Reg. 73170, 73551 (Nov. 29, 2010) (program year 2011).

[13]See Establishment of the Temporary Certification Program for Health Information Technology, 75 Fed. Reg. 36158 (June 24, 2010) (temporary certification provisions to be codified at 45 C.F.R. part 170); Medicare and Medicaid Programs; Electronic Health Record Incentive Program, 75 Fed. Reg. 44314 (July 28, 2010) (standards and certifications provisions to be codified at 42 C.F.R. part 495), and Health Information Technology: Initial Set of Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 75 Fed. Reg. 44590 (July 28, 2010) (certification provisions to be codified at 45 C.F.R. part 170).

[14]As of the date of this report, the most recent complete-year data available for the Electronic Prescribing Program were for 2009.

what extent electronic prescribing improves quality or reduces costs, we interviewed organizations, such as CVS Caremark, and reviewed published studies.[15]

We conducted this performance audit from February 2010 through February 2011 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

HHS and others have promoted electronic prescribing as one way to improve the quality of health care that beneficiaries receive and as one way to reduce costs. Health care costs are typically paid for by health care payers, such as CMS in the Medicare Program. In traditional, or paper-based, prescribing, health care providers that are licensed to issue prescriptions for drugs (e.g., physicians or physician assistants in some states) write a prescription, and the beneficiary takes that prescription to a dispenser (e.g., pharmacy) to be filled. In contrast, electronic prescribing consists of a licensed health care provider using a computer or hand-held device to write and transmit a prescription directly to the dispenser. Before doing so, the health care provider can request the beneficiary's eligibility, formulary,[16] benefits, and medication history. This information can be used to improve quality and reduce costs. For example, a health care provider can use this information to avoid potentially adverse drug events such as drug-to-drug or drug-to-allergy interactions and to prescribe less-expensive medications, such as lower-cost generic drugs. Figure 1 illustrates the flow of information during the electronic prescribing process and identifies areas in this process that may result in improvements in the quality of health care provided to beneficiaries and reductions in costs to health care payers. Appendix II provides information from studies measuring whether or to what extent electronic prescribing improves quality or reduces costs.

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[15]We did not independently review these studies or the electronic prescribing technologies referenced in them; their inclusion is not intended to endorse the methods, practices, or technologies used.

[16]A formulary is a list of generic and brand name prescription drugs, grouped by therapeutic class.

Figure 1: Electronic Prescribing Information Flow and How Electronic Prescribing May Improve the Quality of Health Care Provided to Beneficiaries and Reduce Costs to Health Care Payers

The provider can identify a patient's record and enter patient information in the electronic prescribing system.

The electronic prescribing system can be used to confirm or obtain the following information related to the beneficiary:
- the beneficiary's enrollment in a health plan;
- the beneficiary's formulary and benefits; and
- a list of medications previously dispensed to the beneficiary.

The provider can update the electronic prescribing system with the beneficiary's current medications and allergies.

Potential Quality Effects: By maintaining an updated medication history, the provider may be able to better monitor medication adherence and potential side effects. Maintaining an updated medication history can help prevent the prescription of duplicate medications and help beneficiaries transition through health care settings.

To order the medication using the electronic prescribing system, the provider specifies certain information such as dosage, quantity, and directions.

Potential Cost Savings: By having access to formulary information, the provider may be able to select a less-expensive medication, such as a lower-cost generic drug.

The electronic prescribing system may allow a comparison between the medication ordered and the patient's information (e.g., body weight, age, diagnoses, and medication history) and also check the order for completeness.

Potential Quality Effects and Cost Savings: Alerting the provider to (a) potential contraindications, adverse reactions, or duplicate therapy, and (b) possible problems with the medication order such as missing or incorrect dosage and frequency, may prevent patient harm or costly medical treatments, or both.

After reviewing any alerts provided by the electronic prescribing system, the provider changes the prescription or authorizes the prescription, or both.

The provider can transmit the medication order electronically to the pharmacy.

Potential Quality Effects: A prescription transmitted electronically is not handwritten, which helps prevent errors caused by illegibility.

Sources: GAO (data); Art Explosion (clip art).

Eligibility for the Electronic Prescribing and EHR Programs

The types of Medicare providers eligible to earn incentive payments or who may be subject to penalties in the EHR and Electronic Prescribing Programs were established in statute, and although they overlap they are not identical. Specifically, only physicians, who are the largest population among each program's eligible providers, can earn incentive payments or be subject to penalties from both programs, but they cannot receive incentive payments or be subject to penalties from both programs during the same year. Other health care providers, such as nurse practitioners and physician assistants, are only eligible to receive incentive payments or

are subject to penalties from the Electronic Prescribing Program.[17] (See fig. 2.)

Figure 2: Types of Providers Eligible to Receive Incentives and Who May Be Subject to Penalties under the Electronic Prescribing and EHR Programs

Electronic Prescribing Program	EHR Program
Eligible providers must be physicians or other providers, including nurse practitioners or physician assistants.[a]	Eligible providers are physicians under the Medicare Program, the definition of which includes chiropractors.[b]

Source: GAO analysis of MIPPA and the Recovery Act.

[a]To receive incentive payments or be subject to penalties under the Electronic Prescribing Program, providers must have prescribing authority, which varies by state. Although chiropractors are identified as eligible providers in the Electronic Prescribing Program, chiropractors do not have prescribing authority and, therefore, are not able to earn incentive payments from the program.

[b]See Pub. L. No. 111-5 § 4101, 123 stat. 467, 472 (adding SSA § 1848(o)(5)(C)). Medicare physicians who perform substantially all of their services in hospital inpatient or emergency room settings are excluded from the provisions of the EHR Program. Pub. L. No. 111-5 § 4101 as amended by the Continuing Extension Act of 2010, Pub. L. No. 111-157, § 5, 124 Stat. 1116, 1117 (clarifying HITECH Act provision providing for nonapplication of EHR incentives). CMS has determined "substantially all" to mean 90 percent or more of the eligible provider's services are performed in a hospital inpatient or emergency room setting. See 42 C.F.R. § 495.4 (as added by 75 Fed. Reg. 44314, 44565).

Incentive Payments and Penalties in the Electronic Prescribing and EHR Programs

There is some overlap in the time frames for incentive payments and penalties for the Electronic Prescribing and EHR Programs. Incentive payments for the Electronic Prescribing Program are available from 2009 through 2013. Incentive payments for the EHR Program begin in 2011 and may be available until 2016, depending on which calendar year the provider initially receives an incentive payment from the program. Incentive payments for both programs are determined by multiplying the provider's total allowed charges for provider services covered by Medicare Part B[18] for the year by the incentive percent authorized by statute. However, in the EHR Program the year in which the provider first adopts and meaningfully uses the EHR technology determines the maximum annual incentive payment a provider can earn and the total number of years incentive payments are available. For both programs, incentive

[17]Chiropractors are eligible providers in the EHR Program, but because they do not have prescribing authority, they are not able to obtain incentive payments and are not subject to penalties from the Electronic Prescribing Program.

[18]Medicare Part B pays for physician, outpatient hospital, home health care, and certain other services.

payments are disbursed after providers demonstrate that they met the applicable program requirements. Figure 3 displays the timeline and maximum incentive payments and penalties for both programs. (App. IV provides additional detail on the annual and total incentive payments an eligible provider could receive from the EHR Program based on the initial year the provider receives an incentive payment.) By law, providers cannot receive an incentive payment for both programs during the same year.[19,20]

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[19]Pub. L. No. 111-5, §4101(f)(2), 123 Stat. 477.

[20]Providers cannot receive incentive payments from the Electronic Prescribing Program the same year they receive incentive payments from the Medicare EHR Program. Providers that are eligible for both the Medicare and Medicaid EHR Programs must choose the program from which they will receive incentive payments. Until 2015, providers eligible for both the Medicare and Medicaid EHR Program may switch programs only once after the first incentive payment is initiated. If those providers are eligible for and receive incentive payments from the Medicaid EHR Program they are also permitted to receive incentive payments from the Electronic Prescribing Program.

Figure 3: Incentives and Penalties for Eligible Providers in the Electronic Prescribing and EHR Programs

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018+
Electronic Prescribing Program										
Incentive • Percentage of Part B charges	2%	2%	1%	1%	0.5%					
Penalty • Percentage of Part B charges				-1%	-1.5%	-2%				
EHR Program										
Incentive • 75 percent of Part B charges, up to a maximum amount			Up to $18,000	Up to $18,000	Up to $15,000	Up to $12,000	Up to $8,000	Up to $4,000		
Penalty • Percentage of Part B charges							-1%[a]	-2%	-3%	-3%
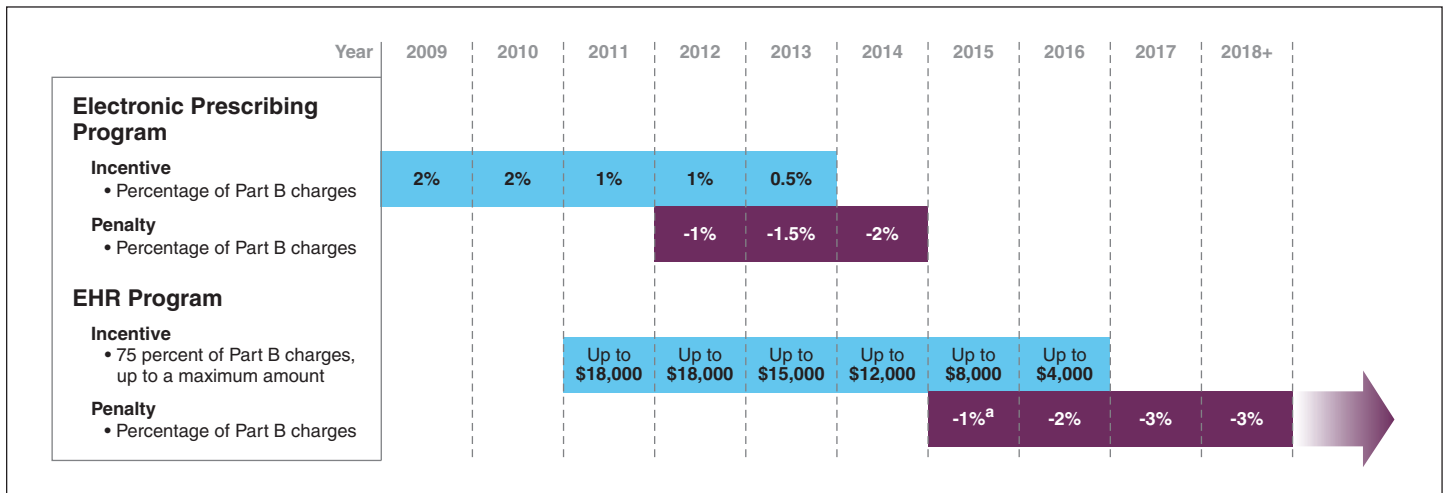
Source: GAO analysis of MIPPA and the Recovery Act.

Notes: (1) The percentages in this figure are applied to total allowed Part B charges for providers that meet the programs' requirements. (2) In the EHR Program, the total and annual incentive payment amounts depend on the year the provider initially receives an incentive payment. See app. IV. Providers that adopt and meaningfully use in 2015 or later receive no incentive payments, but would also not be subject to the penalty, which begins in 2015. (3) In the EHR Program, CMS will increase the incentive payments that would otherwise apply by 10 percent each year for providers that predominantly furnish services in geographic areas designated as health professional shortage areas, such as areas that have a shortage of primary medical care. (4) In the EHR Program, for 2018 and subsequent years, the law provides for CMS to increase the penalty by 1 percentage point from the previous year, up to a maximum of 5 percent, if less than 75 percent of eligible providers meet the EHR Program's requirements.

[a]Providers who are subject to penalties from the Electronic Prescribing Program in 2014 and who are subject to penalties from the EHR Program will face a higher penalty from the EHR Program in 2015—2 percent instead of 1 percent.

Penalties for the Electronic Prescribing Program and the EHR Program may be automatically applied to providers that fail to meet the programs' requirements.[21] Penalties for the Electronic Prescribing Program begin in 2012 and end after 2014. Penalties for the EHR Program begin in 2015, and

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[21]On a case-by-case basis, CMS may exempt certain providers from penalties assessed by either the Electronic Prescribing or EHR Programs if it determines that complying with each program's reporting requirements would result in a significant hardship to the provider. See 42 U.S.C. §§ 1395w-4(a)(5)(B) (Electronic Prescribing Program), (7)(B) (EHR Program).

there is no statutory end-point provided for when the penalties will end.[22] Since the Electronic Prescribing Program ends after 2014 and penalties for the EHR Program do not begin until 2015, providers will not receive penalties from both programs during the same year. However, providers who are subject to penalties from the Electronic Prescribing Program in 2014 and who are subject to penalties from the EHR Program in 2015 will face a higher penalty from the EHR Program—2 percent instead of 1 percent.[23] Similar to the incentive payments, penalties for not adopting a program's technologies are also calculated by multiplying the provider's total allowed charges for provider services covered by Medicare Part B by the penalty percent authorized by statute. Penalties will be assessed by reducing the reimbursement that the provider would ordinarily receive for furnishing Part B services by the applicable penalty percentage.[24]

The amount of incentive payments or penalties eligible providers may receive depends on the year in which the provider chooses to begin participating in—that is, meeting the requirements of—either or, if eligible, both programs. In general, the earlier a provider begins participating in the program, the more incentive payments the provider will earn and the fewer penalties the provider will be assessed. Figure 4 below presents three scenarios of participation in the Electronic Prescribing and EHR Programs between 2009 and 2018. In each scenario, we assume that the provider is eligible for both programs and has $24,000 in total allowed Medicare Part B charges each year.[25]
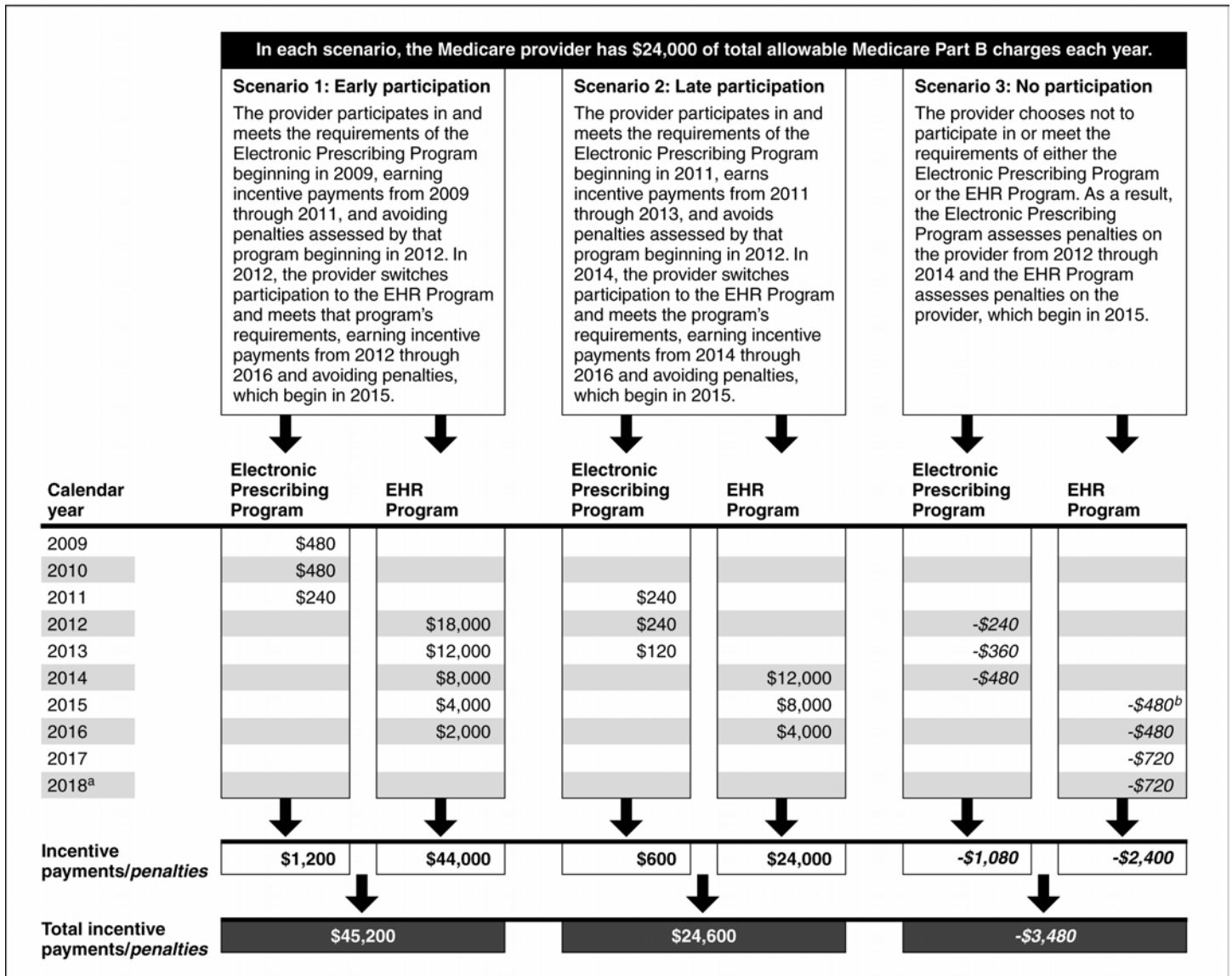
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[22]If CMS finds that less than 75 percent of providers meet the EHR Program's requirements, CMS may increase the penalty percentage in the EHR Program beginning in 2018 by up to 1 percent per year, with a maximum penalty of 5 percent. See 42 U.S.C. §§ 1395w-4(a)(7)(A)(iii).

[23]In technical comments provided on a draft of this report, HHS stated that this provision of the EHR Program promotes participation in the Electronic Prescribing Program.

[24]The Electronic Prescribing Program will assess penalties prospectively—that is, concurrently with claims submissions. A CMS official told us that the agency has not yet determined how it will assess penalties in the EHR Program. Similar to the Electronic Prescribing Program, CMS could assess penalties for the EHR Program concurrently with claims submission.

[25]A provider who earns at least $24,000 in total allowed Medicare Part B charges in 2011 or 2012 and earns incentive payments from the EHR program in 2011 or 2012 will earn the maximum payments from that program, because the annual incentive payment amount is equal to 75 percent of the allowed charges, up to the annual limits displayed in app. IV.

Figure 4: Electronic Prescribing and EHR Program Participation Scenarios and Resulting Incentive Payments and Penalties

In each scenario, the Medicare provider has $24,000 of total allowable Medicare Part B charges each year.

Scenario 1: Early participation
The provider participates in and meets the requirements of the Electronic Prescribing Program beginning in 2009, earning incentive payments from 2009 through 2011, and avoiding penalties assessed by that program beginning in 2012. In 2012, the provider switches participation to the EHR Program and meets that program's requirements, earning incentive payments from 2012 through 2016 and avoiding penalties, which begin in 2015.

Scenario 2: Late participation
The provider participates in and meets the requirements of the Electronic Prescribing Program beginning in 2011, earns incentive payments from 2011 through 2013, and avoids penalties assessed by that program beginning in 2012. In 2014, the provider switches participation to the EHR Program and meets the program's requirements, earning incentive payments from 2014 through 2016 and avoiding penalties, which begin in 2015.

Scenario 3: No participation
The provider chooses not to participate in or meet the requirements of either the Electronic Prescribing Program or the EHR Program. As a result, the Electronic Prescribing Program assesses penalties on the provider from 2012 through 2014 and the EHR Program assesses penalties on the provider, which begin in 2015.

Calendar year	Scenario 1 Electronic Prescribing Program	Scenario 1 EHR Program	Scenario 2 Electronic Prescribing Program	Scenario 2 EHR Program	Scenario 3 Electronic Prescribing Program	Scenario 3 EHR Program
2009	$480					
2010	$480					
2011	$240		$240			
2012		$18,000	$240		-$240	
2013		$12,000	$120		-$360	
2014		$8,000		$12,000	-$480	
2015		$4,000		$8,000		-$480[b]
2016		$2,000		$4,000		-$480
2017						-$720
2018[a]						-$720
Incentive payments/*penalties*	$1,200	$44,000	$600	$24,000	-$1,080	-$2,400
Total incentive payments/*penalties*	$45,200		$24,600		-$3,480	

Source: GAO analysis of MIPPA and the Recovery Act.

Notes: (1) See fig. 3 for information on the incentive payments and penalties that eligible providers are subject to for both programs. (2) In the EHR Program, the total and annual incentive payment amounts depend on the initial year the provider receives an incentive payment from the EHR Program, and these specific amounts are provided in app. IV. In the EHR Program, CMS will increase the incentive payments by 10 percent each year for providers that predominantly furnish services in geographic areas designated as health professional shortage areas, such as areas that have a shortage of primary medical care.

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ªAfter 2018, providers that do not participate in or meet the EHR Program's requirements will continue to be assessed penalties. In the EHR Program, for 2018 and subsequent years, the law provides for CMS to increase the penalty by 1 percentage point from the previous year, up to a maximum of 5 percent, if less than 75 percent of eligible providers meet the EHR Program's requirements.

ᵇProviders who are subject to penalties from the Electronic Prescribing Program in 2014 and who are subject to penalties from the EHR Program will face a higher penalty from the EHR Program in 2015—2 percent instead of 1 percent.

Reporting Requirements for the EHR Program

CMS will develop the reporting requirements that providers will have to meet for the EHR Program in three stages. To date, CMS has only developed the reporting requirements that eligible providers will have to meet to receive incentive payments for the first stage, which will apply to providers first obtaining incentive payments from the EHR Program from 2011 through 2014.[26] By the end of 2011, CMS expects to develop reporting requirements for receiving incentives in the second stage and, by the end of 2013, develop reporting requirements for receiving incentives in the third stage.[27] CMS has stated that it may include information on the reporting requirements that eligible providers must meet to avoid penalties at the same time it issues regulations describing the third-stage requirements. CMS intends to make the reporting requirements more stringent over time as EHR technology and providers' use of that technology becomes more sophisticated.

To receive an incentive payment for the EHR Program, eligible providers must meet or exceed a total of 20 reporting requirements established by CMS.[28] Of the 20 reporting requirements, 15 are mandatory, and providers must choose an additional 5 from a menu of 10 other reporting requirements.[29] The reporting requirements encompass a variety of activities related to the delivery of health care to encourage providers to

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[26]For providers who first obtain incentive payments from the EHR Program in 2011, 2012, or 2013, the stage-one reporting requirements will apply to their first 2 years of participation. For providers who first obtain incentive payments from the EHR Program in 2014, the stage-one reporting requirements will apply only to the first year of participation. The years in which stage-two requirements will apply for providers will depend on the first year they obtain incentive payments. CMS has not yet determined what stages will apply to providers for years 2015 and beyond.

[27]See 75 Fed. Reg. 44321.

[28]To obtain incentive payments from the EHR Program in 2011, providers must meet or exceed the reporting requirements in a continuous 90-day period. After 2011, eligible providers must meet or exceed the reporting requirements over a full year.

[29]Certain providers may be exempted from reporting requirements that fall outside the scopes of their practices.

capture the following types of information in their EHR systems: patient demographics and clinical conditions, use of clinical decision support,[30] and the coordination of care across health care settings. See app. V for a complete list of the stage-one reporting requirements for receiving incentive payments.

The reporting requirements that CMS develops for the second and third stages of the EHR Program may be influenced by the Patient Protection and Affordable Care Act of 2010 (PPACA), which directed CMS to develop a plan to integrate the reporting requirements used in the EHR Program with the information that CMS collects from eligible providers in the Physician Quality Reporting System (PQRS).[31] Similar to the EHR and Electronic Prescribing Programs, CMS, as directed by Congress, implemented PQRS to provide incentive payments to eligible providers who satisfactorily reported data on various quality measures and impose penalties on those providers who did not.[32] Specifically, PPACA directed CMS to develop an integration plan by January 1, 2012, that would identify reporting requirements that could be used to demonstrate meaningful use for the EHR Program and also be used to demonstrate quality of care provided to individuals for PQRS.

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[30]Clinical decision support can include checks for allergies, drug–drug interactions, overly high doses, and clinical conditions, as well as other patient-specific dose checking.

[31]Pub. L. No. 111-148, § 3002, 124 Stat. 363.

[32]PQRS, formerly known as the Physician Quality Reporting Initiative or PQRI, was established by the Tax Relief and Health Care Act of 2006 (Pub. L. No. 109-432, div. B, § 101(b), 120 Stat. 2922, 2975) as modified by MIPPA (Pub. L. No. 110-275, § 131(b), 122 Stat. 2521) and the Patient Protection and Affordable Care Act of 2010 (Pub. L. No. 110-148, § 3002, 124 Stat. 363). Through PQRS, incentive payments are available to physicians and other eligible providers through 2014, and penalties will be assessed on providers that do not report any quality measures after 2014. In a given year, providers may obtain incentive payments from PQRS in addition to either the Electronic Prescribing Program or the EHR Program.

CMS Analyzed Medicare Part B Claims to Pay Electronic Prescribing Program Incentive Payments to about 8 Percent of Certain Medicare Providers for 2009

To determine which providers should receive the Electronic Prescribing Program's incentive payments, CMS analyzes information reported by providers on their Medicare Part B claims, which are used to submit charges for covered services. To determine which providers are subject to penalties, which begin in 2012, CMS will also analyze information reported by providers on their Part B claims, but the requirements for avoiding penalties are different than those for obtaining incentive payments. In 2009, CMS paid incentive payments to about 8 percent of certain Medicare providers—that is, of the over 597,000 Medicare providers who had at least one applicable visit during 2009—and another 7 percent of those same Medicare providers participated in the Electronic Prescribing Program but did not receive incentive payments.

CMS Analyzes Information Reported by Providers on Part B Claims to Determine Which Providers Should Receive Incentive Payments and Avoid Penalties

Incentive payments for the Electronic Prescribing Program are available from 2009 through 2013, and to determine which providers meet the program's requirements and should receive the payments, CMS analyzes information reported by providers on their Part B claims.[33] Specifically, for 2009, CMS first examined 2009 Part B claims to determine whether, after each applicable patient visit, providers marked any one of three electronic prescribing reporting codes used to report information on the adoption and use of electronic prescribing systems.[34] For 2009, the three electronic prescribing reporting codes were:

- the provider had a qualified electronic prescribing system and used it to generate all prescriptions during the visit;

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[33]Congress directed CMS to use electronic prescribing quality measures established for PQRS in 2008 to determine which eligible providers would receive incentive payments for the Electronic Prescribing Program in 2009. Pub. L. No. 110-275 §132, 122 Stat. 2527 (adding SSA § 1848(m) (3)(B)(ii)). After Congress established the Electronic Prescribing Program, the electronic prescribing measure was removed from PQRS. The Electronic Prescribing Program and PQRS have other similarities. For example, the types of providers eligible for both programs are identical. However, eligibility for the Electronic Prescribing Program is further restricted to providers that have prescribing authority.

[34]Providers reported the electronic prescribing codes on the claims they submitted for reimbursement for the services performed during the applicable patient visit. An applicable patient visit is any patient visit identified by certain services included on a provider's Part B claims. For 2009, CMS designated 33 services as applicable visits for the Electronic Prescribing Program, which were typically services provided in the office or outpatient settings.

- the provider had a qualified electronic prescribing system but did not use it to generate one or more prescriptions during the visit for one of the following reasons: the patient requested a paper prescription, the pharmacy could not receive an electronic transmission, or the prescription was for a narcotic or other controlled substance and could therefore not be electronically prescribed;[35] and

- the provider had a qualified electronic prescribing system but did not generate any prescriptions during the visit.

  By submitting any one of the three electronic prescribing reporting codes to CMS, providers attested that they met the program's technology requirement by adopting a qualified electronic prescribing system and are eligible to earn incentive payments from the program.

  Second, CMS analyzed the 2009 Part B claims to determine which of the providers who submitted the electronic prescribing reporting codes also met or exceeded both components of the following reporting requirement:[36]

- the provider submitted one of the three electronic prescribing reporting codes at least 50 percent of the time that the provider had an applicable visit; and

- at least 10 percent of the provider's total allowed Medicare Part B charges for the year were from the services designated as applicable patient visits.

  If the provider met or exceeded the reporting requirement, CMS gave the provider an incentive payment for 2009, which the agency calculated as

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[35]Beginning on June 1, 2010, the Drug Enforcement Administration first authorized the electronic prescription of certain controlled substances. See Electronic Prescriptions for Controlled Substances, 75 Fed. Reg. 16236 (Mar. 31, 2010) (to be codified in various sections at 21 C.F.R. parts 1300, 1304, 1306 and 1311). Prior to this date, such authority did not exist.

[36]CMS made this determination in 2010.

2 percent of the provider's total allowed Medicare Part B charges for the year and by applying a small adjustment factor.[37,38]

For 2010, to increase the adoption of electronic prescribing technology, CMS made some changes to the Electronic Prescribing Program's reporting requirement that providers had to meet in order to receive an incentive payment. CMS eliminated the three electronic prescribing reporting codes for 2009 and replaced them with a single code for providers to submit to CMS. The new code indicates that after each applicable visit[39] the provider generated and transmitted at least one prescription during the visit using a qualified electronic prescribing system.[40] The agency stated that it believed that this change would simplify reporting. CMS also changed the first portion of the reporting requirement related to how frequently providers must submit the new electronic prescribing code in order to receive an incentive payment. Instead of requiring that providers submit the electronic prescribing reporting code at least 50 percent of the time that they had an applicable visit—the requirement in 2009—CMS required that an individual provider submit the new electronic prescribing reporting code for at least 25 visits. CMS noted

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[37]Because providers can belong to multiple unrelated health care practices, CMS determined which providers met or exceeded the reporting requirement using each unique combination of providers' national provider identifier numbers—a unique number that identifies each provider—and tax identification numbers—a unique number that identifies each entity that bills CMS for Medicare reimbursements on behalf of the provider. If the unique combination of national provider identifier and tax identification number met the reporting requirement, to calculate the incentive payment, CMS multiplied the total allowed Medicare Part B charges for the year for that national provider identifier and tax identification number combination by 2 percent. CMS made the payment to the practice represented by the tax identification number associated with the provider.

[38]CMS included the adjustment factor—1.036 percent—to account for claims submitted by providers for 2009 that were not final at the time the agency determined the incentive payment amounts.

[39]CMS made some modifications to the list of services designated as applicable visits for 2010, for a total of 56 services. For example, compared to the services designated as applicable visits, beginning in 2010, CMS added services that occur in a nursing home or home care setting. As a result, more providers may meet the 10 percent participation threshold in 2010 than would have in 2009, which may increase the number of providers that receive the incentive payment in those years.

[40]In 2010, providers were not permitted to report the electronic prescribing code if the electronic prescribing system transmitted the prescription by fax. However, providers were permitted to report the electronic prescribing code if the provider's electronic prescribing system transmits the prescription to the pharmacy electronically, but the pharmacy network converts the electronic prescription into a fax because the pharmacy cannot receive electronic prescription transmittals.

that the agency believes that meeting the 2010 reporting requirement is achievable by a majority of eligible providers. If providers participated in the Electronic Prescribing Program as a group practice containing 200 or more providers—a new option in 2010—the practice had to submit the electronic prescribing reporting code for at least 2,500 applicable visits before all of the providers in the practice could receive incentive payments.[41] When it proposed the change to at least 25 and at least 2,500 visits for individual providers and group practices, respectively, CMS noted that it assumed that once a provider has invested in an electronic prescribing system, integrated the use of that system into the practice's work flows, and used that system to some extent, the provider is likely to continue to use the electronic prescribing system for most of the prescriptions generated. The other component of the reporting requirement remained unchanged from 2009: at least 10 percent of the provider's or practice's total allowed Medicare Part B charges for the year were from the services designated as applicable visits. Finally, as an individual or as part of a group practice, providers could report the electronic prescribing code on their Part B claims, as they did in 2009, or they could do so using one of two alternative reporting mechanisms CMS created.[42]

CMS has described how it will determine which providers should receive incentive payments for 2011, but the agency has not yet indicated how it will determine which providers should receive incentive payments for

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[41]To participate in the Electronic Prescribing Program as a group practice, the practice must also participate in CMS's PQRS as a group practice. For 2010, 27 group practices notified CMS that they would participate in the Electronic Prescribing Program under the group practice reporting option. If CMS determines that a group practice will receive an incentive payment, the agency determines the incentive payment amount based upon the total allowed Medicare Part B charges for the year for all providers in the group practice even if some providers in the group did not submit the electronic prescribing reporting code during the year.

[42]The two alternative reporting mechanisms available in 2010 were certain registries or EHR systems. A registry is an organization identified by CMS that collects the electronic prescribing reporting codes from providers and submits aggregated information to CMS. CMS approved certain EHR systems for the Electronic Prescribing Program and those systems are not necessarily systems certified for use in CMS's EHR Program. For 2010, CMS approved 40 registries as organizations able to submit the electronic prescribing code and seven EHR vendors with products that providers could use to submit the electronic prescribing code. In technical comments provided on a draft of this report, HHS noted that these two reporting mechanisms were significant additions to the program. However, at the time of our work, it was unclear how many providers would use these alternative reporting mechanisms for the 2010 period because providers were not required to notify CMS in advance of their intention to use either mechanism.

2012 or 2013.[43] CMS will determine which providers meet the program's requirements and should receive an incentive payment in 2011 generally using the same methods the agency used in 2010. However, one important change CMS made for 2011—one that is consistent with changes the agency is making to PQRS—is that CMS expanded the definition of group practice to include practices containing 2 through 199 individuals and will require those group practices to report the electronic prescribing code for a minimum of between 75 and 1,875 applicable visits, depending on the size of the group practice.[44] The requirement for group practices of 200 or more providers is unchanged; those practices must report the code for at least 2,500 applicable visits.

From 2012 through 2014, the Electronic Prescribing Program will assess penalties on individual providers and group practices that do not adopt and use electronic prescribing. To avoid these penalties in 2012, individual providers and group practices will have to meet certain reporting requirements. Individual providers will have to submit the electronic prescribing reporting code on their Part B claims for at least 10 applicable visits between January 1, 2011, and June 30, 2011.[45,46] However, CMS will not penalize certain individuals in 2012 if they do not prescribe or do so infrequently.[47] In addition, both individual providers and groups that practice in rural areas or areas with a limited number of pharmacies that accept electronic transmissions will be exempt from penalties. The

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[43]See 75 Fed. Reg. 73551.

[44]Group practices of 2-10 providers must report the electronic prescribing code for at least 75 applicable visits; 11-25 providers must report the code for at least 225 applicable visits; 26-50 providers must report the code for at least 475 applicable visits; 51-100 providers must report the code for at least 925 applicable visits; and 101-199 providers must report the code for at least 1,875 applicable visits.

[45]CMS has noted that the data collection period would help the agency make the determination of whether the penalty applies in advance of 2012 in order to apply the penalty in 2012 concurrently with claims submission. See 75 Fed. Reg. 40208.

[46]Although CMS allowed individual providers and group practices to report the electronic prescribing code through one of two alternatives to Part B claims—that is, a registry or certain EHR systems—to obtain incentive payments in 2010 and 2011, CMS will not analyze electronic prescribing code submissions reported through these alternative mechanisms to determine which providers will be subject to penalties in 2012.

[47]CMS will not apply the penalty to individual providers if they meet one of the following criteria during the reporting period: (a) are not physicians, nurse practitioners, or physician assistants and therefore generally do not have prescribing authority; (b) have less than 100 applicable visits; or (c) have less than 10 percent of their total allowed Medicare Part B charges from the services designated as applicable visits.

reporting requirement for individuals and the exemption criteria are consistent with the agency's statement that it does not want to penalize providers with low prescribing volumes.[48] Group practices will have to submit the electronic prescribing reporting code on their Part B claims the same number of times required to receive incentive payments in 2011, but they must do so within the 6-month period from January 1, 2011, through June 30, 2011.[49] For example, group practices containing 200 or more providers will have to submit the electronic prescribing reporting code at least 2,500 times from January 1, 2011, through June 30, 2011. CMS has noted that it did not think that group practices would be disadvantaged by having to meet the reporting requirement in a 6-month period to avoid the penalty in 2012 rather than in a 12-month period to earn an incentive in 2011 because the agency requires group practices to submit the electronic prescribing reporting code fewer times on average to earn an incentive payment than it requires for individual providers to submit to earn an incentive payment.[50]

CMS has not yet established all the requirements for providers to avoid penalties in 2013 or 2014.[51] However, for 2013, CMS has indicated that it will not penalize individual providers or group practices that year if they reported the electronic prescribing code the minimum number of times required to qualify for incentive payments in 2011.[52] Additionally, CMS indicated that it may publish an alternative reporting requirement that providers could meet to avoid penalties in 2013. A CMS official that we interviewed told us that the agency could, for example, require individual providers to submit the electronic prescribing reporting code at least 10 times between January 1, 2012, and June 30, 2012, in order to avoid penalties in 2013.

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[48]See 75 Fed. Reg. 73551.

[49]CMS will not apply the penalty to group practices that have less than 10 percent of their total allowed Medicare Part B charges from the services designated as applicable visits.

[50]See 75 Fed. Reg. 73563.

[51]If CMS takes the same approach to establish the requirements providers must meet to avoid penalties in 2013 and 2014 as the agency took to avoid penalties in 2012, CMS will propose requirements providers must meet to avoid penalties in 2013 in July 2011 and finalize the requirements in November 2011, and will propose requirements providers must meet to avoid penalties in 2014 in July 2012 and finalize the requirements in November 2012.

[52]See 75 Fed. Reg. 73565.

CMS is exploring an alternative to using electronic prescribing code submissions to determine which providers should receive incentive payments or penalties. As a part of CMS's Medicare Part D, which provides outpatient prescription drug benefits for Medicare beneficiaries, CMS has required that Part D plan sponsors[53] submit additional data on the claims they send to Medicare for reimbursement. CMS officials believe that Medicare Part D data could be used at some point instead of the electronic prescribing reporting code to determine which providers should receive incentive payments.[54] However, CMS officials have concerns about the reliability of data from Part D claims, and note that these concerns should be resolved before the data can be used.[55] CMS does not have specific plans or a time frame for implementing such a change.

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[53]CMS contracts with private companies—such as health insurance companies and companies that manage pharmacy benefits—to provide prescription drug benefits to Medicare beneficiaries. These companies are referred to as Part D plan sponsors.

[54]Since April 1, 2009, prescription drug plan sponsors were required to submit Part D claims with the individual provider's national provider identifier included, if available. Since January 1, 2010, pharmacies have submitted a data field—called the prescription origin code—on Part D claims for new prescriptions that indicates whether the prescription was received by the pharmacy electronically, by facsimile, by telephone, or in hardcopy. CMS required prescription drug plan sponsors to submit the origin code on the Part D claim and the drug plan sponsors are requiring that the pharmacies in their network complete that data field.

[55]In technical comments provided on a draft of this report, HHS noted that if CMS used Part D data instead of the electronic prescribing reporting codes, CMS would not be able to determine whether the electronic prescribing system used by the provider met the capabilities of a qualified electronic prescribing system.

CMS Paid about 8 Percent of Certain Medicare Providers Electronic Prescribing Program Incentive Payments for 2009

CMS paid Electronic Prescribing Program incentive payments for 2009 to about 8 percent (about 47,500) of the over 597,000 Medicare providers who had at least one applicable visit during 2009.[56,57] Each of these approximately 47,500 providers received incentive payments equal to 2 percent of their total allowable Medicare Part B charges in 2009, with payments totaling approximately $148 million. The mean payment was about $3,120, the median payment was about $1,700, and the five highest payments were between about $54,500 and $67,500. CMS disbursed these payments to providers for 2009 in September and October 2010. CMS officials expect that the number of Medicare providers reporting the electronic prescribing reporting code in 2010 will increase over 2009 and noted that lowering the reporting requirement for 2010 to submitting the applicable electronic prescribing reporting code for at least 25 visits may increase the number of providers receiving incentive payments. CMS officials also told us that the penalties, which do not begin until 2012, might have a bigger effect on participation than the incentive payments.

For the 2009 Electronic Prescribing Program, the percentage of Medicare providers who received incentive payments and the average incentive payment varied by state. (See fig. 5 and fig. 6.) Although Minnesota and Wisconsin had the largest share of providers receiving incentive payments at about 17 and 15 percent, respectively, providers in those two states also

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[56]While CMS determined which providers met or exceeded the reporting requirement using each unique combination of providers' national provider identifier numbers and tax identification numbers, we analyzed 2009 Electronic Prescribing Program participation at the national provider identifier level only so that we could present results for unduplicated providers. The number 597,000 represents a count of all Medicare providers who had at least one applicable visit in 2009. However, not all of these providers have prescribing authority. Consequently, there may be some individuals included in the count of 597,000 providers that were not eligible for an electronic prescribing incentive payment.

[57]The number of providers that received incentive payments from CMS for the 2009 Electronic Prescribing Program differs from an estimate made by Surescripts, a company that operates a network connecting providers, pharmacists, and patients by electronically routing prescriptions, providing electronic access to patient benefit and formulary information, and providing electronic access to patients' medication histories. Surescripts reported in September 2010 that more than 200,000 office-based providers (physicians, nurse practitioners, and physician assistants) had transmitted prescriptions electronically. One possible reason for the difference is that the Surescripts estimate counts any provider who transmitted at least one prescription electronically in a 30-day period whereas CMS's estimate is based on both elements of the 2009 reporting requirement. See Surescripts, "1 In 3 Prescriptions Are Now E-Prescriptions in Massachusetts as Number of E-Prescribing Physicians Grows to 200,000 Nationwide," press release (Sept. 21, 2010). Downloaded on September 21, 2010, from http://www.surescripts.com/media/683832/092110_safe_rx_final_release_quote.pdf.
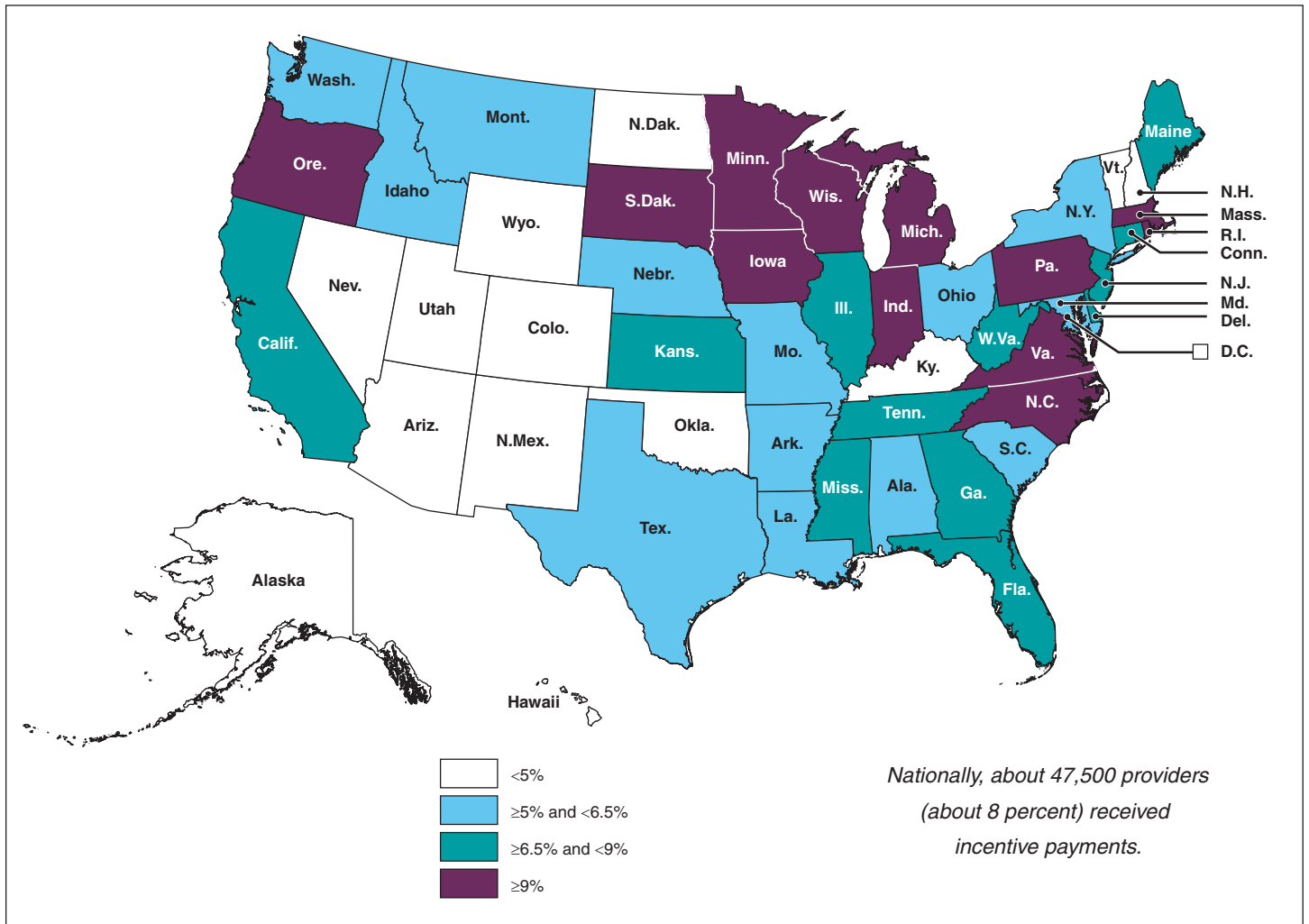
received the lowest mean incentive payment at about $740 and $1,500, respectively. Alaska and North Dakota had the smallest share of providers receiving incentive payments at about 2 percent each. Providers in Florida and South Carolina had the highest mean incentive payments at about $5,800 and $4,700, respectively. According to a report prepared for CMS about the 2009 Electronic Prescribing Program, the physician specialties with the largest number of providers that earned incentive payments were family practice and internal medicine, and the nonphysician specialties with the largest number of providers that earned incentive payments were nurse practitioners and physician assistants.[58]
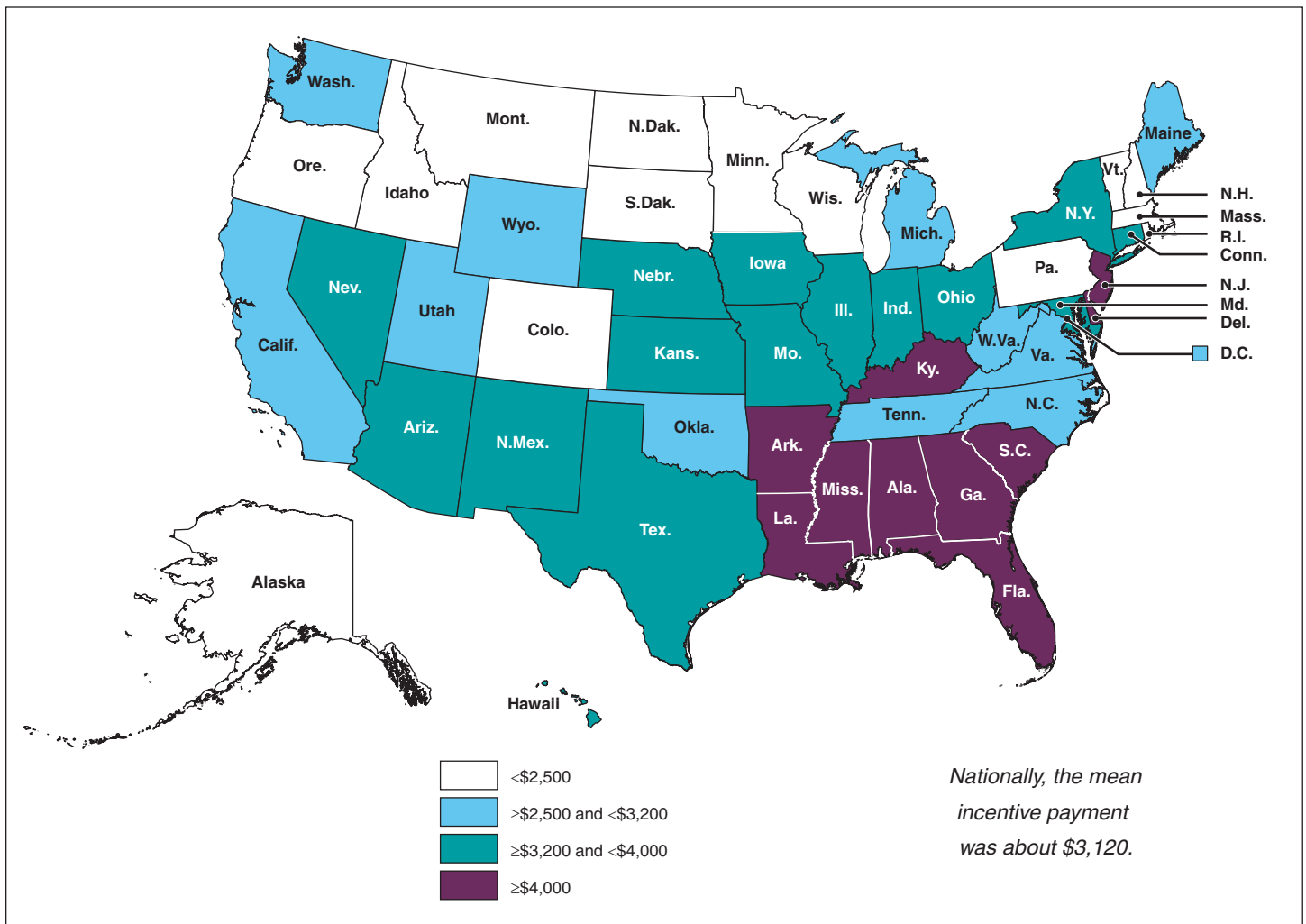
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[58]Buccaneer, *PQRI 2009 Electronic Prescribing (eRx) Final Program Monitoring and Evaluation Report* (Oct. 22, 2010). In contrast to the way we determined provider, this report determined provider at the national provider identifier and the taxpayer identification number basis.

Figure 5: Percentage of Medicare Providers Who Received 2009 Electronic Prescribing Program Incentive Payments, by State

Legend:
- <5%
- ≥5% and <6.5%
- ≥6.5% and <9%
- ≥9%

Nationally, about 47,500 providers (about 8 percent) received incentive payments.

Sources: GAO analysis of CMS data; Map Resources (map).

Figure 6: Mean Incentive Payments from the 2009 Electronic Prescribing Program, by State
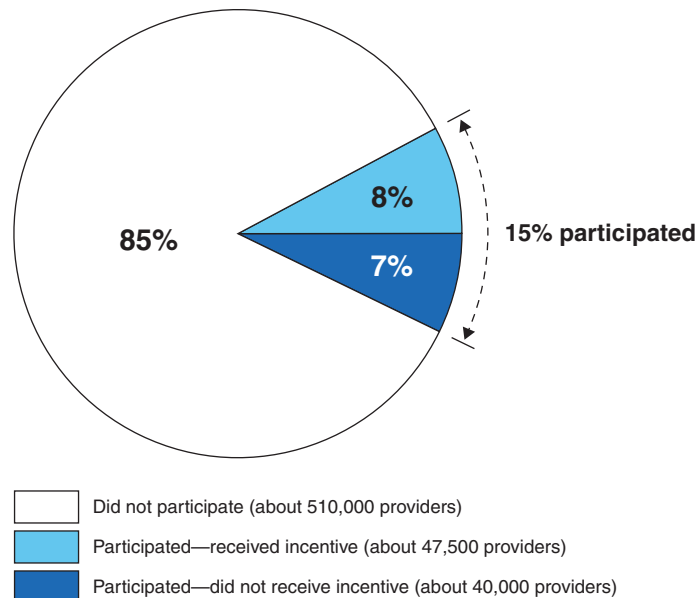

Legend:

- ☐ <$2,500
- ☐ ≥$2,500 and <$3,200
- ☐ ≥$3,200 and <$4,000
- ☐ ≥$4,000

Nationally, the mean incentive payment was about $3,120.

Sources: GAO analysis of CMS data; Map Resources (map).

About 87,500 Medicare providers—approximately 15 percent of Medicare providers who had at least one applicable visit during 2009—participated in the program in 2009 by reporting the electronic prescribing reporting codes to CMS. However, about 40,000 of those participating providers—approximately 7 percent of Medicare providers who had at least one applicable visit during 2009—did not receive incentive payments because they did not meet or exceed both components of the reporting

requirement.[59] (See fig. 7.) Specifically, these providers (a) submitted the electronic prescribing reporting codes less than 50 percent of the time that they had an applicable visit, (b) had less than 10 percent of their total allowed Medicare Part B charges for the year from the services designated as applicable visits, or (c) both (a) and (b) occurred. The vast majority of the about 40,000 Medicare providers that participated in the program but did not receive incentive payments submitted the electronic prescribing codes less than 50 percent of the time they had an applicable visit.

Figure 7: Electronic Prescribing Program, 2009

Did not participate (about 510,000 providers)

Participated—received incentive (about 47,500 providers)

Participated—did not receive incentive (about 40,000 providers)

Source: GAO analysis of CMS data.

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[59]In 2009, about 66 percent of the time that the three electronic prescribing reporting codes were submitted, the provider included the one code indicating that no prescriptions were generated during the visit.

While the Requirements in the EHR and Electronic Prescribing Programs Are Similar in Some Cases, Aspects of These Requirements Are Not Consistent

We compared the electronic prescribing–related technology and reporting requirements in the EHR Program with the requirements in the Electronic Prescribing Program. The EHR Program provides incentives from 2011 to 2016 and introduces penalties beginning in 2015, while the Electronic Prescribing Program provides incentives from 2009 to 2013 and introduces penalties beginning in 2012. In comparing the programs' requirements, we found some similarities but also areas where the requirements of the programs are not consistent.

Technology requirement. Both the EHR and Electronic Prescribing Programs require eligible providers to adopt and use technology that meets certain requirements. The EHR Program requires providers to adopt certified EHR technology and the Electronic Prescribing Program requires providers to adopt qualified electronic prescribing systems. (For more details, see fig. 8.)

Figure 8: Technology Requirement for the EHR and Electronic Prescribing Programs, 2011

EHR Program[a]	Electronic Prescribing Program
Providers must adopt and use certified EHR technology, which is technology that meets certain certification criteria established by HHS's ONC. The certification criteria describe the minimum related standards and implementation specifications. Each reporting requirement, including those related to electronic prescribing, is linked to certification criteria.	Providers must adopt and use systems that meet CMS's definition of a qualified electronic prescribing system. A qualified electronic prescribing system must be able to perform the following technical capabilities: (1) generate a complete medication list; (2) generate and transmit prescriptions electronically, and conduct alerts; (3) provide information on formulary or tiered formulary medications, patient eligibility, and authorization requirements; and (4) provide information on lower-cost, therapeutically appropriate alternatives (if any).[b]

Source: GAO analysis of CMS and ONC data.

Notes: Where applicable, systems used for the EHR and Electronic Prescribing Programs will be consistent with CMS's Part D electronic prescribing standards. For example, systems for both programs use the National Council for Prescription Drug Programs' standard on prescription transmission.

[a]In addition to 2011, this requirement also applies for the duration of the first stage of the EHR Program, which remains in effect from 2012 to 2014.

[b]According to CMS, the ability of an electronic prescribing system to receive tiered formulary information would suffice for the requirement to provide information on lower-cost alternatives in 2011 or until this function is more widely available in the marketplace. See 75 Fed. Reg. 73556.

Certified EHR systems and qualified electronic prescribing systems must be able to perform similar electronic prescribing–related activities. For example, both types of systems must be able to generate and transmit prescriptions electronically, check for potential drug and allergy interactions, and provide formulary information.

The technology that providers must adopt and use for the EHR Program must pass a certification process, which is used to designate a technology as having met the program's technology requirements. For the EHR Program, HHS's ONC, through the work of several advisory committees, established a set of standards and specifications for EHR technology and then created a program that will certify EHR technology for use in the EHR Program based upon those standards and specifications.[60] According to ONC's Web site, the certification process will ensure that the EHR technology that providers adopt and use has the technological capabilities necessary for providers to obtain incentive payments or avoid penalties from the EHR Program.[61,62] Further, the agency notes that certifying EHR technology to these standards enhances the interoperability of health information technology—that is, the ability of different systems or components to exchange information and to use the information that has been exchanged.[63] EHRs that conform to interoperability standards allow health information to be created, managed, and consulted by authorized health care providers across more than one health care organization, thus providing patients and their caregivers the necessary information required for optimal care.

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[60]ONC reports to the Secretary of HHS and plays a role in the EHR Program by establishing the standards and specifications that providers' systems must meet for the EHR Program, coordinating with CMS on the development of the meaningful use criteria, and creating and administering the certification program that authorizes third-party organizations to certify EHR technology. As of November 2010, these third-party organizations had certified 73 EHR products. The following committees contributed to the establishment of the standards and specifications for the EHR Program: the American Health Information Community, the Certification Commission for Health Information Technology, the Health Information Technology Standards Panel, and the HIT Policy and Standards Committees.

[61]Office of the National Coordinator for Health Information Technology, "Temporary Certification Program," Available at http://healthit.hhs.gov/portal/server.pt?open=512&objID=2885&parentname=CommunityPage&parentid=72&mode=2&in_hi_userid=12059&cached=true (accessed Dec. 13, 2010).

[62]In April 2010, the Health IT Policy Committee, a federal advisory committee that advises ONC on health IT policy issues, made several recommendations to HHS on the topic of patient safety, including recommendations related to the EHR certification criteria. The committee recommended that the EHR certification criteria require software vendors to maintain records on all patient safety concerns reported by their customers and that vendors establish processes to promptly provide all affected customers with safety alerts.

[63]Office of the National Coordinator for Health Information Technology, "Standards & Certification Criteria Final Rule," Available at http://healthit.hhs.gov/portal/server.pt?open=512&objID=1195&parentname=CommunityPage&parentid=97&mode=2&in_hi_userid=11673&cached=true (accessed Dec. 13, 2010).

The EHR Program's certification process is designed to produce a list of certified EHR systems and certified EHR modules, which ONC has made available to the public on its Web site. Accordingly, this information should allow providers to identify and adopt systems that meet the EHR Program's technological requirements.[64] A module is a component of an EHR system that meets at least one of the certification criteria established by ONC.[65] Individual EHR modules can be certified and integrated with other certified EHR modules to form a complete, certified EHR system. At the time of our review, technologies certified for use in the EHR Program—that is, complete EHR systems or combinations of modules that collectively can perform the capabilities that constitute a qualified electronic prescribing system—appeared to also meet the Electronic Prescribing Program's technological requirements.[66] Although according to ONC officials, certified EHR technology is not required to provide information on lower-cost alternatives—which is a component of the Electronic Prescribing Program's technology requirement—CMS has indicated that an electronic prescribing system that does not conform to that component of the Electronic Prescribing Program's technology requirement would still meet the definition of a qualified system in 2011 and until this function is more widely available in the marketplace.[67]

Although providers seeking incentive payments or trying to avoid penalties from the Electronic Prescribing Program must adopt and use qualified electronic prescribing systems, according to a CMS official the Electronic Prescribing Program does not have a process like the EHR Program's to identify and certify which electronic prescribing systems meet the

[64]Providers seeking incentive payments from the EHR Program must also report the name of the EHR system they are using to CMS.

[65]All modules certified for use in the EHR Program must meet all privacy and security standards established by ONC.

[66]Under the EHR Program, certified EHR technology must also be able to support medication reconciliation, however, this is not a technological requirement for the Electronic Prescribing Program.

[67]See 75 Fed. Reg. 73556.

requirements of a qualified system.[68] As a result, providers may not be certain which systems meet the program's technological requirement.[69]

Reporting requirements. Both the EHR Program and Electronic Prescribing Program require eligible providers to report certain information about their electronic prescribing activities to CMS in order to receive incentive payments, which began in 2009 for the Electronic Prescribing Program and began in 2011 for the EHR Program. (See fig. 9 for a summary of the two programs' electronic prescribing–related reporting requirements.) However, we also found that the electronic prescribing–related reporting requirements in the EHR Program are more rigorous. Providers seeking incentive payments from the EHR Program have at least five reporting requirements related to electronic prescribing,[70] while providers in the Electronic Prescribing Program have only one reporting requirement.[71] Moreover, the EHR Program requires providers to report more-detailed information—namely, information on their use of various electronic prescribing–related technological capabilities—a requirement that should increase their use of these capabilities.[72] Additionally, while CMS has established reporting

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[68]A CMS official in the Office of Clinical Standards and Quality, which administers the Electronic Prescribing Program, told us that CMS did not have the resources to develop a certification process for the Electronic Prescribing Program. CMS does not collect information on which electronic prescribing systems providers are using.

[69]In technical comments provided on a draft of this report, HHS noted that, with the assistance of their electronic prescribing system's vendor, providers should be able to determine whether their electronic prescribing system contains the technical capabilities of a qualified system. While this is an option for providers, it may be unnecessary, given the existence of the list of certified EHR systems and certified EHR modules on ONC's Web site.

[70]Providers wanting to obtain incentive payments for the EHR Program will have to meet a total of 20 reporting requirements, which include five mandatory and up to two additional reporting requirements related to electronic prescribing.

[71]For the Electronic Prescribing Program, when providers report the electronic prescribing code, they are attesting that they used a qualified electronic prescribing system, which has the technological capabilities listed in fig. 8.

[72]Recent studies have shown that not all providers who adopt electronic prescribing systems routinely use all of the technological capabilities those systems provide, which may result in missed opportunities to improve quality and control costs. For example, a 2010 study reported that fewer than 60 percent of physicians surveyed had access to three advanced electronic prescribing features, and less than a quarter routinely used all three features. See J.M. Grossman, "Even When Physicians Adopt E-Prescribing, Use of Advanced Features Lags," Center for Studying Health System Change, Issue Brief, no. 133 (2010): 1-5.

requirements providers must meet in order to avoid the penalties under the Electronic Prescribing Program that begin in 2012, CMS has not yet identified what providers must report in order to avoid penalties under the EHR Program, but plans to do so in future rulemakings.

Figure 9: Electronic Prescribing–Related Reporting Requirements for the EHR and Electronic Prescribing Programs, 2011

Electronic Prescribing–Related Reporting Requirements to Receive an Incentive Payment

EHR Program[a]	Electronic Prescribing Program
Generate and transmit more than 40 percent of permissible prescriptions electronically.[b, c]	Individual providers must report the electronic prescribing code for at least 25 applicable visits. Submitting the code indicates the provider electronically transmitted at least one prescription during a visit using a qualified electronic prescribing system. Providers that choose to report to CMS as part of a group practice must report the electronic prescribing code for at least 75 to 2,500 applicable visits, depending upon the size of the group practice.[d] For individuals or groups, 10 percent of their total Part B charges must be designated as applicable patient visits.
Enter medication order into Computerized Physician Order Entry system for more than 30 percent of patients with at least one medication in their medication lists.[b, e]	Not a reporting requirement.
Enter medication lists or indicate no current prescriptions for more than 80 percent of patients.	Not a reporting requirement.[f]
Enter medication allergy lists or indicate no known medication allergies for more than 80 percent of patients.	Not a reporting requirement.
Enable the EHR system's ability to check a prescription for potential drug–drug and drug–allergy interactions.	Not a reporting requirement.[f]
Perform medication reconciliation for more than 50 percent of all transitions of care.[g, h]	Not a reporting requirement.
Enable the EHR system's ability to check a prescription against a formulary and maintain access to at least one internal or external drug formulary for the entire EHR reporting period.[b]	Not a reporting requirement.[f]

Electronic Prescribing–Related Reporting Requirements to Avoid a Penalty

EHR Program	Electronic Prescribing Program
CMS has yet not determined what providers will be required to report in order to avoid penalties, which begin in 2015.	To avoid the penalty in 2012: Individual providers must report the electronic prescribing code for at least 10 applicable visits between January 1, 2011, and June 30, 2011, using a qualified electronic prescribing system.[i] Providers that choose to report to CMS as part of a group practice must report the electronic prescribing code for at least 75 to 2,500 applicable visits between January 1, 2011, and June 30, 2011, depending upon the size of the group practice.[d]

Source: GAO analysis of CMS data.

Notes: For the EHR Program, the five bolded requirements above are mandatory and the two nonbolded requirements are additional requirements that providers may choose to report. Providers wanting to obtain incentive payments for the EHR Program will have to meet a total of 20 reporting requirements (15 mandatory and an additional 5 that they choose from a menu of 10 additional requirements). See app. V for a complete list of the reporting requirements. Certain reporting requirements may not apply to all eligible providers; in such cases, eligible providers would report to CMS which reporting requirements did not apply to their practices. For example, chiropractors—who do not have prescribing authority—would report to CMS that the reporting requirements listed above did not apply to their practices.

[a]In addition to 2011, these requirements also apply for the duration of the first stage of the EHR Program, which remains in effect from 2012 to 2014.

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ᵇProviders who write fewer than 100 prescriptions during the reporting period would be exempt from this reporting requirement.

ᶜA prescription is considered permissible if it is not subject to Department of Justice restrictions on the electronic prescription of narcotics or other controlled substances.

ᵈGroup practices of 2-10 providers must report the electronic prescribing code for at least 75 applicable visits; 11-25 providers must report the code for at least 225 applicable visits; 26-50 providers must report the code for at least 475 applicable visits; 51-100 providers must report the code for at least 925 applicable visits; 101-199 providers must report the code for at least 1,875 applicable visits; and 200 or more providers must report the code for at least 2,500 applicable visits.

ᵉComputerized physician order entry refers to systems used for medication-ordering designed to help ensure that medication orders are standardized, legible, and complete.

ᶠWhen providers report the electronic prescribing code, they are attesting that they used a qualified electronic prescribing system, which has the technological capability that corresponds to this EHR Program reporting requirement.

ᵍMedication reconciliation is the electronic comparison of two or more medication lists in instances such as when a patient's provider or setting of care changes.

ʰProviders who do not receive a transition of care during the reporting period would be exempt from this reporting requirement.

ⁱCertain individual providers may be exempt from receiving a penalty under the Electronic Prescribing Program. For example, a provider with fewer than 100 applicable patient visits between January 1, 2011, and June 30, 2011, would be exempt from receiving a penalty.

We also found that the two programs' reporting requirements are not consistent because they make certain Medicare providers subject to both programs' reporting requirements during the same year. Specifically, physicians—the largest population among each program's eligible providers—may choose to participate in the EHR Program in 2011 because the potential incentive payment will likely be higher under that program than under the Electronic Prescribing Program in 2011.[73] However, to avoid the penalty assessed by the Electronic Prescribing Program in 2012, CMS will require physicians to meet the Electronic Prescribing Program's reporting requirement in 2011,[74] even if they elect to participate in the EHR Program in 2011.[75] Public comments on the agency's proposed requirements for the 2011 Electronic Prescribing Program included the

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[73]For example, a physician with $24,000 in Medicare Part B allowable charges in 2011 would receive an $18,000 incentive payment under the EHR Program compared to a $240 incentive payment under the Electronic Prescribing Program. (See fig. 3.) About 1 percent of the providers who earned incentive payments from the Electronic Prescribing Program in 2009 earned more than $18,000.

[74]CMS will determine if providers should receive a penalty in 2012 from the Electronic Prescribing Program based on whether or not the provider met certain reporting requirements in 2011.

[75]Certain physicians that do not prescribe or do so infrequently will not be subjected to penalties, regardless of whether or not they meet the Electronic Prescribing Program's reporting requirement.

concern that providers are burdened by having to submit electronic prescribing data more than once. In response, CMS stated that it will study possible methods of aligning the two programs and will include this information in the integration plan it is already required to develop by January 1, 2012, to integrate the reporting requirements in the EHR Program and PQRS, CMS's quality measures program.[76] However, if CMS adheres to this schedule, the agency will not be able to remove the reporting burden placed on physicians subject to penalties from the Electronic Prescribing Program in 2013, given that the requirements for avoiding penalties in 2013 would likely be proposed in July 2011 and finalized in November 2011. If CMS includes possible methods of aligning the two programs in the integration plan, any action to propose and finalize requirements will take place sometime after January 1, 2012, well beyond the date for making changes to the program in 2013. In technical comments provided on a draft of this report, HHS noted that it plans to include possible methods of aligning the two programs for the 2012 program year (and possibly for the 2013 program year) in rulemaking during 2011.[77]

Both the EHR Program and Electronic Prescribing Program require providers seeking incentive payments to attest that they have met the programs' reporting requirements. In the EHR Program, providers will submit the results of their performance on each of the reporting requirements once per program year, while providers in the Electronic Prescribing Program attest that they adopted and used a qualified electronic prescribing system by reporting the electronic prescribing code to CMS. At least with reference to the EHR Program, CMS has acknowledged that attestation may create a potential for fraud and abuse and noted that the agency is developing an audit strategy to address this risk.[78] CMS officials from the Office of E-Health Standards and Services told us they plan to make guidance on this strategy available by May 2011.

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[76]See 75 Fed. Reg. 73561.

[77]HHS added that one option that may be considered is using Part D data, which would alleviate the need for providers to report to the Electronic Prescribing Program to avoid penalties from that program. However, as we have reported, CMS officials have raised several concerns—concerns echoed by the agency in comments made on our draft report—about the reliability of Part D data to determine which providers should receive incentive payments. CMS officials told us that these data reliability concerns should be resolved before Part D data can be used to determine which providers should receive incentive payments under the Electronic Prescribing Program.

[78]See 75 Fed. Reg. 44324.

In the case of the Electronic Prescribing Program, an official from CMS's Office of Clinical Standards and Quality, which administers that program, told us that the agency did not audit electronic prescribing codes submitted by providers for 2009 and does not have plans to develop an audit strategy for the program. However, this official did tell us that CMS reserves the right to audit any program participant.[79]

Conclusions

Health information technology, such as electronic prescribing, has the potential to improve the quality of care received by patients and also reduce costs for the health care system. To help encourage the adoption of such technologies among Medicare providers, Congress first established the Electronic Prescribing Program and then the EHR Program, both of which provide incentive payments to eligible providers that adopt and use the appropriate health information technologies and impose penalties on those eligible providers that fail to do so.

Despite both programs having a goal to expand the adoption and use of health information technologies by health providers, and in particular, physicians—the largest and only group of providers eligible to earn incentive payments in both programs—we found inconsistencies in the requirements. We believe these inconsistencies may limit the programs' effectiveness in encouraging the use of health information technologies. First, we found that because the Electronic Prescribing Program lacks a certification process like that established for the EHR Program, physicians and other health care providers who want to obtain incentive payments or avoid penalties from the former program have no assurance that the systems they invest in will meet that program's technology requirements. In contrast, physicians who invest in certified EHR systems can be assured that in doing so they would meet the current requirements of both programs. In addition, physicians that invest in certified EHR modules integrated together to perform the electronic prescribing–related capabilities could also be assured that they meet the current requirements of the Electronic Prescribing Program and that the adopted technology could later be integrated with other certified modules to form a complete, certified EHR system. This inconsistency between the programs has the potential to create uncertainty among physicians as to what technology

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[79]In addition, the HHS Office of Inspector General has the authority to conduct audits and investigations of HHS-regulated entities. See 5 U.S.C. app. 3. However, Inspectors General may not carry out program operating responsibilities. See 5 U.S.C. app. 3, § 9(a).

they should adopt, because although the Electronic Prescribing Program ends after 2014, the EHR Program continues; encouraging physicians to adopt certified electronic prescribing technology now may also help facilitate their later transition between the programs. Nonphysician health care providers who are not eligible to earn incentive payments from the EHR Program could adopt certified technology and in so doing could have assurance that the electronic prescribing technology they invest in meets the Electronic Prescribing Program's technology requirements. Second, we also found that the two programs have established separate reporting requirements related to electronic prescribing, requiring some physicians who elect to report to the EHR Program to report to both programs in 2011 and potentially requiring physicians to report to both programs through 2014, when penalties for the Electronic Prescribing Program end. CMS recognizes that this duplication places additional burden on physicians, and we believe this duplication could affect the decision of physicians to adopt and use health information technology. However, CMS is still in the process of studying possible ways to address this duplication, and if the agency wants to eliminate the burden for providers in 2012, it would need to do so during its 2011 rulemaking. In addition, CMS has not been consistent in the steps it has taken to ensure the appropriate use of these programs' resources. Namely, CMS plans to establish an audit program for the EHR Program—under which the maximum incentive payment for a provider will generally not exceed $18,000 per year—to address potential fraud and abuse that might arise from the use of self-attestations, but CMS does not have plans to develop a similar approach in the Electronic Prescribing Program, under which CMS paid providers up to approximately $67,500 for 2009.

The Electronic Prescribing Program began before the EHR Program, so CMS has already had the opportunity to encounter and learn from challenges in implementation. For example, in the first year of the Electronic Prescribing Program, only about 8 percent of providers received incentive payments, and CMS changed some of the program's requirements in the second year to encourage greater adoption and use of electronic prescribing technology. For the EHR Program, it is too soon to know how many providers will adopt EHR systems. However, given that the electronic prescribing–related reporting requirements in the EHR Program are more rigorous than the reporting requirement in the Electronic Prescribing Program, CMS may find that it needs to modify the EHR Program requirements to better encourage the adoption and use of EHR systems. Because implementation of the Electronic Prescribing Program preceded the EHR Program, CMS has an opportunity to use the experiences gained in implementing the Electronic Prescribing Program to

inform its implementation of the EHR Program in order to determine how to best encourage the adoption and use of health information technology among Medicare providers. One approach could be to incorporate these experiences into the integration plan the agency is already required to develop by January 1, 2012, to integrate the reporting requirements in the EHR Program and PQRS.

Recommendations for Executive Action

To help improve the effectiveness of the Electronic Prescribing and EHR Programs to encourage the adoption of health information technologies among Medicare providers, the Administrator of CMS should take the following three actions:

- Encourage physicians and other health care providers in the Electronic Prescribing Program to adopt certified electronic prescribing technology.

- Expedite efforts to remove the overlap in reporting requirements for physicians who may be eligible for incentive payments or subject to penalties under both the Electronic Prescribing and EHR Programs by, for example, aligning the reporting requirements so that successfully qualifying for incentive payments or for avoiding penalties under the EHR Program would likewise result in meeting the requirements for the Electronic Prescribing Program.

- Identify factors that helped or hindered implementation of the Electronic Prescribing Program to help support the ongoing implementation of the EHR Program. CMS could include consideration of such factors in the integration plan that the agency is required to develop by January 1, 2012.

To help ensure that Electronic Prescribing Program resources are used appropriately, the Administrator of CMS should develop a risk-based strategy to audit a sample of providers who received incentive payments from the Electronic Prescribing Program to help ensure that providers who receive incentive payments meet that program's requirements. A risk-based strategy could, for example, focus on those providers who received larger incentive payments.

Agency and External Party Comments and Our Evaluation

We obtained written comments on our draft report from HHS on behalf of CMS, which are reprinted in appendix VI. CMS agreed in full with two recommendations, agreed in principle with one recommendation, and disagreed with a fourth recommendation.

CMS disagreed with our first recommendation that the agency direct providers in the Electronic Prescribing Program to use technology certified as an EHR system or module(s). While CMS said that it concurred with the notion that eligible providers should be able to use certified EHR systems for the Electronic Prescribing Program, it did not agree that it should direct eligible providers to use prescribing technology that has been certified as an EHR system. CMS said that doing so could result in Electronic Prescribing Program participants having to replace their qualified electronic prescribing systems with systems certified under the EHR Program. We do not recommend that CMS direct those providers who are already participating in the Electronic Prescribing Program to replace their current systems with certified systems. On the contrary, the intent of our recommendation is to have CMS encourage providers in the Electronic Prescribing Program who have not yet adopted electronic prescribing systems, or who plan on upgrading their existing systems, to choose systems that have already been certified through the EHR Program's certification process. We continue to assert our recommendation because, as we noted in our draft report, this certification process identifies a list of available systems that meet the certification requirements and provides assurance that the technology physicians and other health care providers adopt would meet the technology requirements of the Electronic Prescribing Program. Additionally, the physicians who later participate in the EHR Program could be assured that the technology also meets the requirements in the EHR Program. In our draft report, we noted that there is no comparable process in the Electronic Prescribing Program, and as a result, providers have no assurance that the systems they invest in for the EHR Program will meet that program's technology requirements. Given that the Electronic Prescribing Program ends after 2014 while the EHR Program will continue, encouraging providers to adopt certified electronic prescribing technology now may also help facilitate physicians' transition between the programs. We have clarified the recommendation to state that CMS should encourage physicians and other health care providers in the Electronic Prescribing Program to adopt certified electronic prescribing technology.

CMS agreed with our second recommendation that it expedite efforts to remove the overlap in reporting requirements for physicians eligible for both programs, and noted that it plans to address this overlap in rulemaking during 2011, where applicable. We support CMS's efforts to expeditiously remove the overlap in the reporting requirements as we recommended.

CMS agreed with our third recommendation that it would be helpful for the agency to identify factors that helped or hindered implementation of the Electronic Prescribing Program to help support the ongoing implementation of the EHR Program. While CMS identified factors that may be affecting implementation of electronic prescribing, other factors that may have broader applicability to the implementation of the EHR Program could include the effect of penalties on technology adoption, measuring compliance with program requirements, and validating self-reported attestations.

CMS agreed in principle with our fourth recommendation that CMS develop a risk-based strategy to audit a sample of providers who received incentive payments from the Electronic Prescribing Program. In response CMS said that it agrees that an audit of a sample of providers may be needed, however, it disagreed that such a strategy should necessarily focus on eligible providers who received large incentive payments, noting that such an audit process, if implemented, could select providers at random. As we recommended, we believe that an audit strategy should be implemented for this program. We recommended a risk-based audit strategy because although many providers received modest incentive payments in 2009, some providers received payments at least three times as high as the maximum annual incentive payment in the EHR Program. However, if implemented by CMS, a random audit would be consistent with the intent of our recommendation. CMS also noted that because it is considering using Part D data in the future to determine which providers should receive incentive payments for this program, use of these data could also alleviate the need for an audit. However, as we noted in our draft report, CMS officials raised several concerns—concerns echoed in its comments on our draft report—about the reliability of Part D data to determine which providers receive incentive payments. As we reported, CMS officials told us that these data reliability concerns should be resolved before Part D data can be used to determine which providers should receive incentive payments for this program.

HHS has also provided technical comments, which we incorporated as appropriate. We also provided excerpts of our report to the VA, Blue Cross Blue Shield of Massachusetts, CVS Caremark, the Florida Agency for Health Care Administration, and organizations that participated in the Southeastern Michigan ePrescribing Initiative, which provided technical comments that we incorporated as appropriate.

We are sending copies of this report to the Secretary of HHS, the Administrator of CMS, and the National Coordinator for Health Information Technology in HHS and interested congressional committees. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staffs have questions about this report, please contact me at (202) 512-7114 or at kohnl@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VII.

Linda T. Kohn
Director, Health Care

Appendix I: List of Committees

The Honorable Max Baucus
Chairman
The Honorable Orrin G. Hatch
Ranking Member
Committee on Finance
United States Senate

The Honorable Tom Harkin
Chairman
The Honorable Michael B. Enzi
Ranking Member
Committee on Health, Education, Labor, & Pensions
United States Senate

The Honorable Fred Upton
Chairman
The Honorable Henry A. Waxman
Ranking Member
Committee on Energy and Commerce
House of Representatives

The Honorable Dave Camp
Chairman
The Honorable Sander M. Levin
Ranking Member
Committee on Ways and Means
House of Representatives

Appendix II: Effect of Electronic Prescribing on Quality or Cost

This appendix addresses congressional interest in how others have measured whether or to what extent electronic prescribing improves quality or reduces cost.[1] For example, the Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) directed us to report on information related to reductions in avoidable medical errors and estimated savings to Medicare resulting from the use of electronic prescribing.[2] To address these issues, we obtained information from organizations about research they conducted, funded, or participated in that measured the effects of electronic prescribing on quality, cost, or both. Specifically, we obtained information from the following organizations: Blue Cross Blue Shield of Massachusetts, CVS Caremark, the Florida Agency for Health Care Administration, and the Southeastern Michigan ePrescribing Initiative.[3] In addition, we reviewed 29 published studies that measured the effects of electronic prescribing on quality, cost, or both.[4]

Our information collection, review of published studies, and summaries contained in this appendix focused on specific aspects of quality and cost that we believed were most similar to the policy goals underlying the development of the Electronic Prescribing Program and the Electronic Health Records (EHR) Program.[5]

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[1]We did not independently review these studies or the electronic prescribing technologies referenced in them; their inclusion is not intended to endorse the methods, practices, or technologies used.

[2]Pub. L. No. 110-275, § 132(c), 1223 Stat. 2530.

[3]To select a nongeneralizable sample of four organizations, we first conducted internet research to identify organizations that appeared to have measured the effect of electronic prescribing implementation on quality, cost, or both. Through this process, we identified five types of organizations that appeared to have measured the effects: state Medicaid programs, health insurance companies, pharmacy benefit managers, collaborative groups, and state employee benefit plans. In selecting our nongeneralizable sample, we identified organizations that represented four of the five types of organizations that appeared to have measured the effects. Through this process, we confirmed that the organizations that we sampled had indeed measured the effects of electronic prescribing on quality, cost, or both.

[4]To identify these articles, we conducted a literature search of articles published from January 1, 2005, to May 14, 2010, and supplemented that search with articles that we identified during the course of our work. We limited our review to studies conducted in the United States.

[5]The studies we reviewed may have reported outcomes and findings not summarized in this appendix.

- Quality. We included studies that reported findings related to beneficiary quality, such as reductions in avoidable medical errors.

- Cost. We included studies that reported findings related to savings to health care payers, which are those parties generally responsible for paying claims for health care services, because we believed they would be the most applicable to determining the effects of electronic prescribing on costs for Medicare. We did not review studies that estimated potential savings for providers, such as savings associated with reductions in time spent writing prescriptions or resolving questions about prescriptions.

The studies evaluated the effects of a variety of different types of electronic prescribing technology, such as stand-alone electronic prescribing systems and EHR systems that include electronic prescribing–related functions. According to the Healthcare Information and Management Systems Society (HIMSS), EHR systems also typically include information such as patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports. Additionally, computerized physician order entry (CPOE) systems (also referred to as computerized provider order entry systems or computerized prescriber order entry systems) allow for electronic ordering of medications and may include other functions, such as ordering laboratory procedures and referrals. Hospitals may employ CPOE systems as part of a strategy to reduce medication errors. Some organizations and published studies evaluated the effects of electronic prescribing systems that had clinical decision support (CDS) capabilities, which can include checks for allergies, drug–drug interactions, overly high doses, clinical conditions, and other patient-specific dose checking, and can provide access to information on patient medical histories, pharmacy eligibility, and formulary and benefits. It is important to note that the electronic prescribing systems evaluated by the organizations we obtained information from and published studies we reviewed may have had technical capabilities that differ from the technological requirements in the Electronic Prescribing Program or the EHR Program.

Methodology

The studies utilized a variety of different methodologies, including the following: (1) pre-post methodologies, which compare dimensions of quality or cost before and after the implementation of electronic prescribing systems or CPOE systems; (2) comparison methodologies, which are used to compare dimensions of quality, cost, or both between a control group (i.e., one that does not electronically prescribe) and an

intervention group (i.e., one that does electronically prescribe); and (3) cost simulations and cost-benefit analyses that projected the costs and savings of implementing electronic prescribing systems.

How Electronic Prescribing Was Determined

Some studies identified compared a population of providers that electronically prescribed to a population that did not (e.g., handwrote prescriptions). For example, some studies identified a population of providers who had access to electronic prescribing systems and compared them to a population of other providers who did not have access to electronic prescribing systems, while other studies identified prescriptions before CPOE implementation and compared those prescriptions to prescriptions transmitted after CPOE implementation. Other studies only looked at populations of providers known to be electronic prescribers. Other studies were designed to evaluate the effect of advanced features of the electronic prescribing system. For example, one study by Steel et al. was designed to compare medication ordering behavior when no alert was triggered by the CPOE system to ordering behavior after alerts were triggered.

Outcomes Measured

The organizations we interviewed and published studies we reviewed examined a variety of different outcomes in order to evaluate the effect on quality, cost, or both. Examples of the outcomes measured to evaluate the effect of electronic prescribing on health care quality include the following:

- medication order changes resulting from information provided by the electronic prescribing system, such as alerts for potentially inappropriate medications or formulary information, or changes resulting from problems with the quality of the prescription such as errors identified by the electronic prescribing system related to dosage, directions, or illegibility;

- changes in potential or actual adverse drug events (ADE); and

- provider satisfaction that the electronic prescribing system was improving safety.

Examples of the outcomes measured to evaluate the effect of electronic prescribing on cost include the following:

- drug costs or other outcomes that have cost implications, such as formulary compliance or generic utilization; and

- follow-up health care costs resulting from reductions in adverse drug events.

Reported Findings

In terms of health care quality, some studies found differences in medication error rates when electronic prescribing was used. For example, a study conducted by Weingart et al. and funded by Blue Cross Blue Shield of Massachusetts estimated that medication safety alerts prevented an estimated 402 ADEs (49 serious or life threatening, 125 significant, and 228 minor) and that alerts that resulted in physicians canceling or changing the medication order may have prevented deaths in 3 cases, permanent disability in 14 cases, and temporary disability in 31 cases. Another study by Devine et al. reported that rates of errors in prescriptions declined from 18.2 percent before to 8.2 percent after implementation of a CPOE system. However, some studies found no significant differences in medication error rates before and after the implementation of electronic prescribing systems.

Some of the evaluations that focused on prescription drug costs showed savings when electronic prescribing systems were used. For example, a cost-benefit analysis conducted by Byrne et al. estimated that the use of Veterans Health Information Systems and Technology Architecture (VistA), which includes electronic prescribing and CDS capabilities of the Department of Veterans Affairs (VA) health system electronic health records, contributed to a cumulative $4.64 billion in value due to the prevention of unnecessary hospitalizations and outpatient visits resulting from prevented ADEs. In this study, the total net value of the VA's investments in the VistA components modeled was estimated to exceed $3.09 billion. A study by McMullin et al. of an electronic prescribing system that provided patient formulary information shifted prescriber behavior from selecting drugs from eight high-cost therapeutic groups to less-expensive alternatives. However, a study by Ross et al. found no significant difference in formulary compliance between electronic prescribers (83.2 percent) and paper prescribers (82.8 percent).

Of the studies we reviewed in which the electronic prescribing systems were reported to have CDS capabilities—such as drug–drug, drug–allergy alerts, or drug–formulary checks—most reported health care quality or cost effects. For example, a study by DesRoches et al. reported that providers who adopted EHR with electronic prescribing decision support capabilities averted potentially dangerous drug–drug interactions. One study by Galanter et al. found that the likelihood of contraindicated drugs being administered to patients of inadequate kidney function decreased by

42 percent after electronic prescribing CDS alerts were implemented. Ko et al. surveyed providers and found that the majority viewed drug–drug interaction alerts as increasing their potential to more safely prescribe medications. Another study by Kaushal et al. attributes the implementation of a CPOE with CDS as leading to an estimated $28.5 million in savings—$12.9 million from decreased adverse drug events and $6 million from decreased drug costs—however, the study also estimated that the cost to develop, implement, and operate the CPOE system was $11.8 million.

Summaries of Evaluations Obtained from Organizations

Blue Cross Blue Shield of Massachusetts

Beginning in 2003, Blue Cross Blue Shield of Massachusetts contracted with software vendors to provide electronic prescribing software, which included CDS, free of charge to high-volume prescribers in their provider network. Blue Cross Blue Shield of Massachusetts continues to sponsor a limited number of electronic prescribing software licenses free of charge. As of September 2010, Blue Cross Blue Shield of Massachusetts estimated that 60 percent of its network physicians were electronically prescribing.

Study #1: Prescribing Patterns

Methodology	A pre-post study comparing 1,932 Blue Cross Blue Shield of Massachusetts's providers that were using an electronic prescribing device to the providers in the network that were not electronically prescribing (control group). The preintervention period was calendar year 2003 and the postintervention period was 2006.
How electronic prescribing was determined	Whether the prescriber used an electronic prescribing device, as determined from data obtained from Blue Cross Blue Shield of Massachusetts's pharmacy benefits manager.
Outcome(s) measured	(1) Prescribing patterns by drug tier.[6] (2) Savings in drug costs as a result of different prescribing patterns.
Reported findings	(1) Prescribers who used an electronic prescribing device prescribed more generic and on-formulary prescriptions. (2) Prescribers saved Blue Cross Blue Shield of Massachusetts 5 percent on drug costs relative to those prescribers that did not use an electronic prescribing device.
Other issues	Blue Cross Blue Shield of Massachusetts noted that some of the individuals in the control group may have been electronically prescribing but they assumed in the study that they were not because of the absence of data.

Study #2: Fischer, M.A., C. Vogeli, M. Stedman, T. Ferris, M.A. Brookhart, and J.S. Weissman. "Effect of Electronic Prescribing With Formulary Decision Support on Medication Use and Cost." _Archives of Internal Medicine_, vol. 168, no. 22. (2008): 2433-39.

Methodology	Blue Cross Blue Shield of Massachusetts provided pharmacy claims data used by the researchers in a pre-post study of the implementation of electronic prescribing software with formulary decision support. The study consisted of an intervention group of 1,198 prescribers who wrote at least one electronic prescription, and a control group of 34,453 prescribers who did not electronically prescribe. Claims data were collected for 18 months—6 months before the intervention (October 2003 through March 2004) and 12 months postintervention (April 2004 through March 2005)—and data on electronic prescriptions were collected in the 12 month postintervention period.
How electronic prescribing was determined	Whether the prescriber wrote at least one electronic prescription, as captured by the electronic prescribing system.
Outcome(s) measured	(1) The change in the proportion of prescriptions for three formulary tiers before and after electronic prescribing was implemented; and (2) the potential savings associated with this change.

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[6]In tiered systems, insurers identify preferred medications, often generic medications, and designate them as Tier 1, with the lowest copayment. Tier 2 medications generally require a higher copayment, may include moderately priced brand-name medications. Tier 3 medications are generally expensive brand-name medications for which generic alternatives are available in lower copayment tiers.

Reported findings	(1) Electronic prescribing led to a 3.3 percent increase in Tier 1 prescribing—that is, those medications with the lowest copayment. (2) On the basis of average costs, the study estimated that implementation of electronic prescribing software with formulary decision support could lead to a savings of $845,000 per 100,000 patients.

Study #3: Weingart, S.N., B. Simchowitz, H. Padolsky, T. Isaac, A.C. Seger, M. Massagli, R.B. Davis, and J.S. Weissman. "An Empirical Model to Estimate the Potential Impact of Medication Safety Alerts on Patient Safety, Health Care Utilization, and Cost in Ambulatory Care." *Archives of Internal Medicine*, vol. 169, no. 16. (2009): 1465-73.

Methodology	Blue Cross Blue Shield of Massachusetts funded and provided some data for a study that estimated the quality improvement and savings associated with medication safety alerts. The study examined 1,833,254 prescriptions written using a commercial electronic prescribing system by 2,321 clinicians for 60,352 patients. During the study period (January through June 2006), 279,476 drug–drug interaction alerts were generated. For each drug–drug interaction, expert panelists examined whether it might result in an adverse drug event and the severity of that event. The study used published sources and payer data to estimate the costs to third-party payers associated with different types of health care services due to adverse drug events.
How electronic prescribing was determined	All prescriptions were generated from the electronic prescribing system. The company that developed the electronic prescribing system provided researchers information on all drug–drug interactions generated and data on the prescribers' action on receiving the alert.
Outcome(s) measured	(1) The likelihood and severity of the potential ADE that the alert prevented, and (2) cost savings estimated from reduced health care utilization.
Reported findings	(1) The study estimated that medication safety alerts prevented an estimated 402 adverse drug events (49 serious or life threatening, 125 significant, and 228 minor). Alerts that physicians "accepted," meaning the physician either cancelled the prescription or changed to an alternative medication, may have prevented deaths in 3 cases, permanent disability in 14 cases, and temporary disability in 31 cases. (2) Due to lower utilization of health care services the study estimated annual savings to be $402,619.

CVS Caremark

Beginning in 2000, CVS Caremark made electronic prescribing available through its proprietary iScribe system to interested providers by download from a Web site. In late 2004, CVS Caremark supported electronic prescribing by providing software, hardware, installation, training, and service to providers on behalf of health care payers.

Study #1: Hutchins, D.S., M. Lewis, R. Velazquez, and J. Berger. "E-Prescribing Reduces Beers Prescribing Among the Elderly." CVS Caremark, May 22, 2007.

Methodology	A control group study of 383,855 prescription claims written for 14,557 persons over 65 years of age between April 2002 and June 2005 by over 3,700 providers, 70 of whom implemented an electronic prescribing tool that alerted them to the prescribing of "Beers List" medications to patients over 65 years of age.[7]
How electronic prescribing was determined	Whether the prescription was dispensed before or after a provider adopted the electronic prescribing tool.

[7]The Beers List was initially created to help clinicians determine which medications should be avoided in nursing home patients. This list also includes medications that are potentially inappropriate for general populations of older adults.

Outcome(s) measured	Whether use of the specific electronic prescribing tool had an effect on the prescribing of potentially inappropriate drugs from the Beers List to the elderly.
Reported findings	Use of the specific electronic prescribing tool that provided alerts specific to Beers List medications can reduce prescribing of those medications among the elderly.

Study #2: Hutchins, D.S., J.N. Liberman, J. Berger, S. Jan, M. M. Johnson. "The Impact of an Electronic Prescribing Solution on the Selection and Prescribing of Cost-Effective Therapeutic Options." CVS Caremark, 2009.

Methodology	A pre-post control group study of over 9 million claims in seven drug classes prescribed by one of over 29,000 providers (about 250 of which used the electronic prescribing tool) that were filled between July 2002 and December 2005.
How electronic prescribing was determined	Whether the provider used an electronic prescribing tool.
Outcome(s) measured	Whether the use of an electronic prescribing system has an effect on prescribing low-cost generic and mail-delivered drugs.
Reported findings	Across multiple drug classes, study reported a link between use of electronic prescribing systems and a greater likelihood that generic drugs were prescribed and that they were dispensed through mail order, both of which likely lower overall costs.

The Florida Agency for Health Care Administration

The Florida Agency for Health Care Administration provided Medicaid providers, at no charge, access to a CDS tool called EMPOWERx, which allows for electronic prescribing and includes the following capabilities: provides comprehensive medication histories, alerts providers to drug–drug and drug–allergy interactions, and provides formulary information.

Methodology	A comparison of the costs and savings for 1,000 Medicaid providers in the state in the EMPOWERx personal digital assistant program to the total population of Medicaid providers in the state.[8]
How electronic prescribing was determined	Whether or not the provider was in the EMPOWERx personal digital assistant program.
Outcome(s) measured	(1) The average cost per patient for all prescriptions. (2) The estimated savings for prescriptions written by providers in the EMPOWERx personal digital assistant program, based on the difference between costs for providers in the two groups and the number of patients associated with the EMPOWERx personal digital assistant program providers. (3) The estimated savings for the 1,000 Medicaid providers in the EMPOWERx personal digital assistant program based on information collected about alerts those providers received about drug interactions in response to a medication order, assumptions about avoidable hospitalizations, and assumptions about hospitalization costs.
Reported findings	In the fourth quarter of 2009 (1) average costs per patient for all prescriptions were about $28 to $30 lower for the providers in the EMPOWERx personal digital assistant program; (2) the cost differences between the two groups represents estimated savings of approximately $5.5 million; and (3) by assuming that 5 percent of the 12,480 high- or very-high-severity drug interactions would have led to hospitalizations and that hospitalizations resulting from preventable drug interactions are associated with an average increased cost of $4,685 per incident, the study estimated that the state Medicaid program saved approximately $2.9 million.

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[8]An official with the Florida Agency for Health Care Administration told us that the EMPOWERx program will be phased out. In April 2010, the state began providing CDS capabilities via a secure network access site to Medicaid providers in the state and over 8,000 providers were using this system as of January 2011.

Southeastern Michigan ePrescribing Initiative

The Southeastern Michigan ePrescribing Initiative, a collaborative effort of employers, health plans, pharmacy benefit managers, physician groups, and others, was launched in 2005 to speed the adoption of electronic prescribing. Some of the studies that resulted from this collaboration are summarized below.

Study #1: An official with Medco described a study it conducted. Medco is a pharmacy benefit manager and member of the collaborative.

Methodology	A comparison study of a group of 1,165 physicians who electronically prescribed to Medco's mail-order drug program and 1,000 physicians that did not. Data were collected in the second quarter of 2008.
How electronic prescribing was determined	Providers were included in the electronic prescribing group if they had sent at least 20 prescriptions electronically to Medco's mail-order drug program during the study time period. Providers were included in the nonelectronic prescribing group if they had not met this criterion and provided services in the same zip codes as the providers in the electronic prescribing group.
Outcome(s) measured	The average cost per prescription per group for retail and mail order prescriptions, which was calculated by dividing total costs (identified through claims data) for each category and group by the number of prescriptions for each category and group.
Reported findings	Providers in the electronic prescribing group saved an average of $2.11 per retail prescription and $7.44 per mail-order prescription compared to the group that did not electronically prescribe.
Other issues	The Medco official noted that the findings were not tested for significance or subjected to other more-rigorous validations. It is possible that providers in the group that did not electronically prescribe were electronic prescribing, just not to Medco's mail order service drug program. In addition, while the providers in each group were from the same geographic service areas, Medco did not examine the types of patients served by the providers, so it is possible that the groups were serving different patient populations.

Study #2: An official described a study conducted by HaldyMcIntosh, under the direction of the Southeastern Michigan ePrescribing Initiative project manager, Point-of-Care Partners.

Methodology	A telephone survey of 500 providers participating in the collaborative that responded to the survey, conducted in the fourth quarter of 2007.
How electronic prescribing was determined	Only providers that were electronically prescribing were surveyed.
Outcome(s) measured	Providers' perceptions of the effect of electronic prescribing on quality.
Reported findings	Nearly 70 percent of respondents highly agreed that electronic prescribing improves quality of care; almost 75 percent highly agreed that electronic prescribing improves patient safety; approximately 70 percent were very satisfied with the ease of identifying drug-related interactions; and more than 60 percent reported that they changed a prescription in response to a safety alert at least once.

Study #3: An official with the Health Alliance Plan described a study conducted by Henry Ford Medical Group and the Health Alliance Plan that looked at generic utilization.

Methodology	A comparison study conducted in 2005 of a group of 24 physicians who electronically prescribed from eight practice sites and 26 physicians from eight comparable practice sites that did not.
How electronic prescribing was determined	Whether the practice site had converted to electronic prescribing.
Outcome(s) measured	Rate of generic prescribing using pharmacy claims data and associated savings.

Reported findings	Facilities with access to an electronic prescribing system had a 1.25 percent larger increase in their rate of generic prescribing compared with sites that did not have access to an electronic prescribing system. The study estimated that the health plan can save $800,000 per year for each 1 percentage point improvement in the rate of generic prescribing.

Study #4: An official with the Health Alliance Plan described a study conducted by Henry Ford Medical Group and the Health Alliance Plan that looked at the savings associated with adverse drug events.

Methodology	A cost estimate conducted in 2006 of the savings associated with decreases in ADEs.
How electronic prescribing was determined	Whether a prescription was changed based on an alert from the electronic prescribing system, identified from internal data sources.
Outcome(s) measured	Estimated savings in (1) avoidable hospitalizations and (2) avoidable emergency room admissions, due to the decrease in ADEs.
Reported findings	(1) By assuming that 2 percent of hospitalizations are attributable to ADEs, that 33 percent of those are avoidable due to use of the electronic prescribing system, and that $7,000 is saved per avoidable hospitalization, the study estimated that $441,000 was saved in 2007. (2) By assuming that 1 percent of emergency room visits are attributable to ADEs, that 33 percent of those are avoidable due to use of the electronic prescribing system, and that $500 is saved per avoidable emergency room visit, the study estimated that $99,000 was saved in 2007.

Study #5: An official with the Health Alliance Plan described a study it conducted that identified patients taking contraindicated prescription drug combinations.

Methodology	A file review of pharmacy and medical claims for about 200,000 patients before implementation of electronic prescribing (in 2004) and after implementation of electronic prescribing (in 2007) to identify patients that were prescribed contraindicated drug combinations.[9]
How electronic prescribing was determined	The study identified claims before and after implementation of electronic prescribing.
Outcome(s) measured	The rate of patients taking contraindicated drug combinations.
Reported findings	The study reported a 24 percent decrease in the incidence of patients with generally contraindicated medications and a 48 percent decrease in patients taking medications contraindicated for pregnancy 1 year after the implementation of electronic prescribing.

Study #6: An official with the Health Alliance Plan described a survey conducted by Henry Ford Medical Group and the Health Alliance Plan.

Methodology	A 2006 survey about electronic prescribing attitudes. About 100 physicians in the Henry Ford Medical Group responded to the survey.
How electronic prescribing was determined	Only physicians who were electronically prescribing were included in the survey.
Outcome(s) measured	A variety of questions related to electronic prescribing attitudes, some of which focused on physician attitudes regarding the effect of electronic prescribing on safety.

[9]With respect to drugs, a contraindication is a situation in which a drug should not be used because it may be harmful to the patient.

Reported findings	Various findings reported including the following percentages of respondents who "strongly agreed" or "somewhat agreed": 84.6 percent of respondents reported that electronic prescribing has improved the practice of medicine in their clinics; 77.2 percent and 74.8 percent reported that electronic prescribing improves the safety of the care and the quality of the care, respectively, provided to their patients; 66.7 percent reported that the drug–drug warnings were helpful, 80.5 percent reported that the drug–allergy warnings were helpful, and 68.3 percent reported that the formulary warnings were helpful.

Summaries of Evaluations Obtained from Literature Review

Byrne, C.M., L.M. Mercincavage, E.C. Pan, A.G. Vincent, D.S. Johnston, and B. Middleton. "The Value from Investments in Health Information Technology at the U.S. Department of Veterans Affairs." *Health Affairs*, vol. 29, no. 4 (2010): 629-638.

Methodology	A comparison study of the VA health system and the private-sector health systems on information technology spending, adoption, and quality of care. The study also conducts a cost-benefit analysis to estimate the financial value of key components of the VA's VistA.
How electronic prescribing was determined	Whether or not the health system surveyed had adopted health information technology and whether the health information technology system had certain capabilities as defined by six frameworks in relevant literature and internal VA and publicly available documents.
Outcome(s) measured	(1) The information technology–related quality of care quantified using previously collected quality measures from the VA that could be compared to measures available for the private sector for 2004 to 2007. (2) Cost-benefit analysis that estimates the costs and effects of the core components of the VA VistA system from 2001 to 2007.
Reported findings	(1) The VA was found to have higher performance on preventive care process measures from 2004 to 2007 relative to the private sector. The VA averaged about 15 percentage points higher than the private sector on preventive care for patients with diabetes and 17 percentage points higher for patients with diabetes who have well-controlled cholesterol. (2) The gross value of the investment in VistA applications was projected to be $7.16 billion. Of the gross value, the researchers estimated that cumulative reductions in unnecessary care attributable to VistA in preventing ADE-related hospitalizations and outpatient visits was valued at $4.64 billion, or 65 percent of the total estimated value.
Other issues	The VA system electronically captures and reports allergies and adverse reactions, inpatient and outpatient medications, medication orders, and includes CDS such as clinical reminders and order checking.

Cunningham, T.R., E.S. Geller, and S.W. Clarke. "Impact of Electronic Prescribing in a Hospital Setting: A Process-Focused Evaluation." *International Journal of Medical Informatics*, vol. 77, no. 8 (2008): 546-554.

Methodology	A pre-post study reviewing the medication orders of two different hospitals, a control hospital that did not implement a CPOE system and an intervention hospital that did at each of three different phases of the study—a 4-week baseline phase, a 3-week pilot phase, and 5-week post-CPOE implementation phase. At the control hospital, 247 handwritten orders were reviewed from the baseline phase, 279 handwritten orders from the pilot phase, and 453 handwritten orders from the post-CPOE implementation phase. At the intervention hospital, 201 handwritten orders were reviewed from the baseline period, 283 electronically submitted orders were reviewed from the pilot phase, and 587 orders (276 handwritten and 311 submitted electronically) were reviewed from the post-CPOE implementation phase.

How electronic prescribing was determined	Whether or not the physicians' medication orders were handwritten or submitted electronically in the three different phases of the study, as identified from the files of previously processed medication orders stored in the pharmacy departments of each hospital.
Outcome(s) measured	(1) Rates of compliance with hospital medication protocols (such as recording date, time, drug name, or dosage) by examining behavioral checklists used to collect information on each prescription written; and (2) time it took for a patient to receive antibiotics, as recorded in the hospital medication ordering database.
Reported findings	(1) Medication orders submitted electronically at the intervention hospital were compliant with hospital medication protocols 79.9 percent of the time, compared to a 62.9 percent compliance rate for paper orders written at the same hospital, and a 64.2 percent compliance rate for paper orders written at the control hospital. (2) At the intervention hospital, the average amount of time from the medication order until the first dose of antibiotics was administered was shorter for orders submitted through the CPOE system (185.0 minutes) than paper orders (326.2 minutes).
Other issues	The CPOE had CDS but the specific features of the CDS system are not discussed.

DesRoches, C.M., E.G. Campbell, S.R. Rao, K. Donelan, T.G. Ferris, A. Jha, R. Kaushal, D.E. Levy, S. Rosenbaum, A.E. Shields, and D. Blumenthal. "Electronic Health Records in Ambulatory Care—A National Survey of Physicians." *New England Journal of Medicine*, vol. 359, no. 1 (2008): 50-60.

Methodology	A survey of 2,758 physicians conducted between September 2007 and March 2008.
How electronic prescribing was determined	Whether or not physicians reported on the survey that they adopted an EHR system, including whether the EHR system was a "fully functional" or "basic" EHR. The study defined a "fully functional" EHR as one that allows physicians to record patients' clinical and demographic data, view and manage results of laboratory tests and imaging, manage order entry (including electronic prescriptions), and support clinical decisions (including warnings about drug interactions or contraindications). In the study, the principal differences between "fully functional" and "basic" EHRs were the absence of certain order-entry capabilities and CDS in a basic system.
Outcome(s) measured	The survey asked respondent a variety of questions related to EHR adoption, including questions related to quality of care.
Reported findings	Findings reported by the study included the following: of the respondents with fully functional EHR systems, 80 percent reported averting a potentially dangerous drug allergic reaction and 71 percent of respondents reported averting a potentially dangerous drug interaction compared to 66 percent and 54 percent of respondents with basic EHR systems.

DesRoches, C.M., E.G. Campbell, C. Vogeli, J. Xheng, S.R. Rao, A.E. Shields, K. Donelan, S. Rosenbaum, S.J. Bristol, and A.K. Jha. "Electronic Health Records' Limited Successes Suggest More Targeted Uses." *Health Affairs*, vol. 29, no. 4 (2010): 639-646.

Methodology	The researchers created a survey and surveyed 4,840 acute-care general medical and surgical hospitals from March to September 2008 that were members of the American Hospital Association. The researchers linked the information gathered in their survey to information from three other data sources.
How electronic prescribing was determined	Whether the hospital had a comprehensive EHR, defined as an EHR with 24 clinical functions used across all major clinical units in the hospital, a basic EHR system, defined as a system with 10 key functions in at least one major clinical unit in the hospital, or no EHR system.

Outcome(s) measured	(1) Performance on quality metrics based on data released from the Hospital Quality Alliance for three clinical conditions—acute myocardial infarction, congestive heart failure, and pneumonia—and prevention of surgical complications, and (2) efficiency, as measured by the hospitals' risk-adjusted length of stay, risk-adjusted 30-day readmission rates, and risk-adjusted inpatient costs, which were determined using two sources of data, the Medicare Inpatient Impact File and the Area Resource File.
Reported findings	(1) No relationships were found between EHR adoption and quality process measures for acute myocardial infarction, congestive heart failure, pneumonia, or 30-day risk-standardized mortality of these conditions. Hospitals with EHR had somewhat better performance on the prevention of surgical complications measures than hospitals without EHR (93.7 percent for hospitals with a comprehensive EHR, 93.3 percent for hospitals with a basic EHR, and 92.0 percent for those without EHR). (2) No relationships between the level of EHR adoption and overall risk-adjusted length of stay were found. Hospitals with comprehensive EHRs had similar rates of readmissions within 30 days of hospital discharge compared to hospitals with basic or no EHRs. The researchers found that hospitals with such systems had comparable inpatient costs to hospitals without them. Pneumonia patients in hospitals with a comprehensive EHR had a length of stay that was, on average, 0.5 days shorter than those of patients in hospitals without EHR.
Other issues	In this article, CDS consisted of clinical reminders and clinical practice guidelines and was associated with marginally better performance on each of the Hospital Quality Alliance quality metrics.

Devine, E.B., R.N. Hansen, J.L. Wilson-Norton, N.M. Lawless, A.W. Fisk, D.K. Blough, D.P. Martin, and S.D. Sullivan. "The Impact of Computerized Provider Order Entry on Medication Errors in a Multispecialty Group Practice." *Journal of the American Medical Informatics Association*, vol. 17, no. 1 (2010): 78-84.

Methodology	A pre-post study compared prescriptions written at a multilocation clinic before and after the implementation of a CPOE system. For the pre-CPOE implementation period between March 1, 2002, and July 15, 2002, for one clinic and between January 2, 2004, and March 4, 2004, for other clinics, 5,016 prescriptions were evaluated. For the post-CPOE implementation period between January 14, 2004, and July 13, 2004, for one clinic and between July 1, 2005, and April 26, 2006, for other clinics, 5,153 prescriptions were evaluated.
How electronic prescribing was determined	Whether the prescription was written before or after the implementation of the CPOE system.
Outcome(s) measured	(1) Rates, (2) types, and (3) severity of errors in prescriptions written before CPOE system implementation compared to prescriptions submitted electronically after the implementation of the CPOE system.
Reported findings	(1) Rates of errors in prescriptions declined from 18.2 percent before to 8.2 percent after implementation of the CPOE system, and the adjusted odds of an error occurring postimplementation of CPOE system were 70 percent lower than preimplementation. (2) There were reductions in the adjusted odds of the following error types: illegibility (97 percent), inappropriate abbreviations (94 percent), information missing (85 percent), wrong strength (81 percent), drug–disease interaction (79 percent), and drug–drug errors (76 percent). (3) Electronic prescribing led to a 57 percent decrease in the odds of an error occurring that did not cause harm. There was a 49 percent reduction in the odds of errors occurring that caused harm. The authors note that this reduction was not significant and that the small number of errors in this category could have caused this result to not be significant.
Other issues	The CPOE had limited CDS alerts that included basic dosing guidance and duplicate therapy checks.

Feldstein, A.C., D.H. Smith, N. Perrin, X. Yang, S.R. Simon, M. Krall, D.F. Sittig, D. Ditmer, R. Platt, and S.B. Soumerai. "Reducing Warfarin Medication Interactions: An Interrupted Time Series Evaluation." *Archives of Internal Medicine*, vol. 166, no. 9 (2006): 1009-1015.

Methodology	A pre-post study of 239 primary care providers with 9,910 patients taking Warfarin at 15 primary care clinics that implemented medication interaction alerts for the drug Warfarin into their electronic medical records with computerized order entry and decision support. The baseline period was from January 2000 through November 2002 and the postintervention period was from April 2003 through August 2004.
How electronic prescribing was determined	The presence of electronic medical record alerts for selected coprescriptions of medications that interact with Warfarin. When Warfarin and a targeted interacting medication were coprescribed, an alert would appear, whereupon the clinician had to click "OK" to continue prescribing the interacting medication or prescribe a different drug.
Outcome(s) measured	The interacting prescription rate, defined as the number of coprescriptions of Warfarin-interacting medications per 10,000 Warfarin users per month.
Reported findings	At baseline, about a third of patients had an interacting prescription. Coinciding with the implementation of the alerts, the estimated Warfarin-interacting medication prescription rate decreased from 3,294 interacting prescriptions per 10,000 Warfarin users to 2,804 interacting prescriptions per 10,000 Warfarin users, resulting in a 14.9 percent relative reduction.
Other issues	The electronic medical record had CDS in the form of medication alerts.

Galanter, W.L., R.J. Didomenico, and A. Polikaitis. "A Trial of Automated Decision Support Alerts for Contraindicated Medications Using Computerized Physician Order Entry." *Journal of the American Medical Informatics Association*, vol. 12, no. 3 (2005): 269-274.

Methodology	A comparison, pre-post study of a CPOE alert designed to appear when a clinician attempted to order potentially contraindicated drugs for patients with decreased kidney function through the CPOE. The study was conducted with 233 patients over an 18 month period (4-month pre-CPOE alert period and 14-month post-CPOE alert period).
How electronic prescribing was determined	Whether or not CPOE alerts were generated when contraindicated drugs were ordered electronically.
Outcome(s) measured	(1) The likelihood of a contraindicated drug being administered before and after implementation of the CPOE alerts, as collected from electronic medical records. (2) Alert compliance.
Reported findings	(1) Likelihood of a patient receiving at least one dose of the contraindicated medication decreased from 89 percent in the prealert period to 47 percent in the postalert period. (2) Patient gender was associated with alert compliance rate, with compliance in female patients lower than that in male patients. Alert compliance also decreased as kidney function increased. Housestaff with more than 1 year of residency training had a higher compliance rate than those with less than 1 year of training.

Gandhi, T.K., S.N. Weingart, A.C. Seger, J. Borus, E. Burdick, E.G. Poon, L.L. Leape, and D.W. Bates. "Outpatient Prescribing Errors and the Impact of Computerized Prescribing." *Journal of General Internal Medicine*, vol. 20, no. 9 (2005): 837-841.

Methodology	A comparison study of 1,879 prescriptions reviewed by a pharmacist and submitted at four adult primary care practices, two of which utilized electronic prescribing and two that did not, over a period of 7 months (September 1999 to March 2000).
How electronic prescribing was determined	Whether prescriptions were written at computerized or noncomputerized sites.
Outcome(s) measured	Rates of (1) prescribing errors and (2) potential adverse drug events as determined by the expert reviewers from conducting prescription reviews, chart reviews, and conducting patient surveys.

Reported findings	(1) Sites with electronic prescribing contained errors in 4.3 percent of prescriptions, compared to 11.0 percent of prescriptions written at sites without electronic prescribing. (2) Sites with electronic prescribing contained potential ADEs in 2.6 percent of prescriptions, compared to 4.0 percent of prescriptions at sites without electronic prescribing. The authors note that the differences between the two groups in errors and prevented ADEs were not significant, but that the rates of prescribing errors and prevented ADEs could have been substantially reduced with more advanced CDS.
Other issues	The system provided no automatic checks for correct doses, frequencies, allergies, or drug interactions, and authors found that decision support (such as drug-dose checking and drug-frequency checking) could have prevented 97 percent of prescribing errors and 95 percent of potential ADEs.

Kaushal, R., A.K. Jha, C. Franz, J. Glaser, K.D. Shetty, T. Jaggi, B. Middleton, G.J. Kuperman, R. Khorasani, M. Tanasijevic, and D.W. Bates. "Return on Investment for a Computerized Physician Order Entry System." *Journal of the American Medical Informatics Association*, vol. 13, no. 3 (2006): 261-266.

Methodology	A cost-benefit assessment of the implementation of CPOE with CDS at Brigham and Women's Hospital, a 720-adult bed tertiary care medical center in Boston from 1993 through 2002. Determined the capital and operational costs of implementing a CPOE with CDS and of each CDS intervention through internal documents and interviews with the CPOE developers and reviewing published literature.
How electronic prescribing was determined	Whether or not the CDS intervention was active.
Outcome(s) measured	Identified cost savings associated with specific CDS interventions. GAO grouped the savings into those resulting from: (1) decreased ADEs and (2) decreased drug costs.
Reported findings	Of the estimated $28.5 million in estimated savings from the CPOE, (1) $12.9 million in estimated savings were due to CDS interventions that reduced ADEs, and (2) $6 million in estimated savings were due to CDS interventions that reduced drug costs. The cost to develop, implement, and operate the CPOE was $11.8 million, resulting in cumulative savings of $16.7 million.
Other issues	The CPOE was equipped with CDS.

Kaushal, R., L.M. Kern, Y. Barrón, J. Quaresimo, and E.L. Abramson. "Electronic Prescribing Improves Medication Safety in Community-Based Office Practices." *Journal of General Internal Medicine*, vol. 25, no. 6 (2010): 530-536.

Methodology	A pre-post study of 30 ambulatory care providers (15 electronic prescribers and 15 paper prescribers) in 12 practices in Hudson Valley region of New York (conducted from September 2005 to June 2007). The researchers collected 2 weeks of carbon copies and downloads of prescriptions to identify medication errors at baseline and 1 year follow-up and compared error rates among and between the electronic and paper prescriber groups.
How electronic prescribing was determined	Whether or not the physicians' medication orders were handwritten or submitted electronically through a stand-alone electronic prescribing system as identified through the carbon copies of prescriptions or prescription downloads.
Outcome(s) measured	(1) Medication prescribing errors (including omitting the quantity or incorrect medication dose and duration), (2) illegibility errors, (3) near misses (i.e., potentially harmful errors that were intercepted or reached the patient but caused no harm), (4) ADEs, (5) rule violations (e.g., failing to write "po" for a medication taken orally), and (6) effects of CDS on medication errors.

Reported findings	(1) The medication prescribing error rate among electronic prescribers decreased from 42.5/100 prescriptions at baseline to 6.6/100 prescriptions at 1 year follow-up. Electronic prescribers had a lower medication prescribing error rate than paper prescribers (6.6/100 v. 38.4/100). (2) Electronic prescribing eliminated all illegibility errors. (3) Electronic prescribers had fewer near misses (1.3/100 v. 2.7/100) than paper prescribers. (4) Rates of preventable adverse drug events trended lower among electronic prescribers (0.04 vs. 0.26 per 100 prescriptions). The authors noted that this was not a significant difference between electronic and paper prescribers. (5) Electronic prescribing eliminated nearly all types of rule violation errors. (6) Electronic prescribers had fewer errors judged preventable by advanced/basic CDS than paper prescribers at 1 year than paper prescribers.
Other issues	The stand-alone electronic prescribing system was equipped with CDS.
Kim, G.R., A.R. Chen, R.J. Arceci, S.H. Mitchell, K.M. Kokoszka, D. Daniel, and C.U. Lehmann. "Error Reduction in Pediatric Chemotherapy: Computerized Order Entry and Failure Modes and Effects Analysis." *Archives of Pediatrics and Adolescent Medicine*, vol. 160 (2009): 495-498.	
Methodology	A pre-post study of chemotherapy orders written in a pediatric oncology unit. The study compared 1,259 paper orders written before implementation of the CPOE system (from July 31 to August 1, 2001, and from August 14, 2001, to August 22, 2002) to 1,116 electronic orders written after implementation of the CPOE system (from February 3, 2003, to February 12, 2004).
How electronic prescribing was determined	Whether the orders were submitted before or after the implementation of the CPOE. A paper based survey was used to capture the pre-CPOE data, and the post-CPOE data were captured through the system.
Outcome(s) measured	Data on chemotherapy steps of high morbidity/mortality potential if missed, as determined by attending oncologists.
Reported findings	Findings reported by the study included: after CPOE implementation, daily chemotherapy orders (1) were less likely to have improper dosing, incorrect dosing calculations, missing cumulative dose calculations, and incomplete nursing checklists, and (2) had a higher likelihood of not matching medication orders to treatment plans.
Ko, Y., J. Abarca, D.C. Malone, D.C. Dare, D. Geraets, A. Houranieh, W.N. Jones, W.P. Nichol, G.P. Schepers, M. Wilhardt. "Practitioners' Views on Computerized Drug-Drug Interaction Alerts in the VA System." *Journal of the American Medical Informatics Association*, vol. 14, no. 1 (2007): 56-64.	
Methodology	A survey of 258 prescribers and 84 pharmacists from seven VA Medical Centers across the United States. The time period of the survey was between 2004 and 2005.
How electronic prescribing was determined	Survey participants had prescribing authority in a VA Medical Center and an active outpatient practice. In the VA's computerized patient record system, prescribers enter prescription orders electronically for review and verification by a pharmacist before dispensing.
Outcome(s) measured	The survey asked respondent a variety of questions including those related to (1) respondent satisfaction with the combined inpatient and outpatient CPOE system (the computerized patient record system), (2) attitude towards drug–drug interaction alerts, and (3) suggestions for improving drug–drug interaction alerts.

Reported findings	Findings reported in the study included the following: (1) in general, both prescribers and pharmacists indicated that the computerized patient record system had a positive effect on their jobs. Pharmacists revealed more favorable attitudes toward computerized patient record system than prescribers. (2) Sixty-one percent of prescribers felt that drug–drug interaction alerts had increased their potential to prescribe safely. Thirty percent of prescribers felt that drug–drug interaction alerts provided them with exactly what they needed most of the time. (3) Both prescribers and pharmacists agreed that drug–drug interaction alerts should be accompanied by management alternatives (73 percent and 82 percent, respectively) and more detailed information (65 percent and 89 percent, respectively).

Kocakulah, M.C., and J. Upson. "Cost Analysis of Computerized Physician Order Entry Using Value Stream Analysis: A Case Study." *Research in Healthcare Financial Management*, vol. 10, no. 1 (2005): 13-25.

Methodology	A case study of a 400-bed urban hospital, using value-stream mapping to conduct a cost analysis of a CPOE system. The study determined the potential costs and adverse drug reaction reductions related to CPOE implementation in this hospital, which did not have CPOE installed.
How electronic prescribing was determined	This hospital did not have an electronic prescribing or CPOE system.
Outcome(s) measured	Using published studies or reports and data from the hospital, this study determined (1) the projected decrease in medication errors, (2) the potential net savings, (3) net present value, and (4) project internal rate of return for a CPOE system based on the severity, average cost, and projected reduction of adverse drug reactions.
Reported findings	(1) The percentage of illegible orders is projected to decrease by 78 percent, incomplete orders by 71 percent, incorrect orders by 46 percent, and drug therapy problems by 9 percent. (2) The projected net savings were $155,686 per year. (3) The projected project 5-year net present value was a negative $1,270,112. (4) The projected 5-year internal rate of return was negative 24 percent. Because of these projections, the authors did not recommend the hospital invest in a CPOE system at the current time.

McCullough, J.S., M. Casey, I. Moscovice, and S. Prasad. "The Effect of Health Information Technology on Quality in U.S. Hospitals." *Health Affairs*, vol. 29, no. 4 (2010): 647-654.

Methodology	A comparison study of 3,401 nonfederal acute-care U.S. hospitals from 2004 to 2007.
How electronic prescribing was determined	Whether the hospital had an EHR and a CPOE system, as identified from information from the American Hospital Association's annual survey and the HIMSS analytics database that describes hospitals' health information technology adoption decisions.
Outcome(s) measured	Performance on six process quality measures in the CMS Hospital Compare database.
Reported findings	For nearly all measures, average quality was higher for hospitals with EHR and CPOE (with larger effects for academic hospitals than when compared to all hospitals). However, the difference was only significant for pneumococcal vaccine administration (2.1 percent increase) and use of the most appropriate antibiotic for pneumonia (1.3 percent increase).
Other issues	The study defined an EHR as a set of applications including a computerized patient record with a clinical data repository and some CDS capabilities, such as providing treatment recommendations.

McMullin, S.T., T.P. Lonergan, and C.S. Rynearson. "Twelve-Month Drug Cost Savings Related to Use of an Electronic Prescribing System with Integrated Decision Support in Primary Care." *Journal of Managed Care Pharmacy*, vol. 11, no. 4 (2005): 322-332.

Methodology	A comparison study of 38 primary care clinicians (19 electronic prescribing system users; 19 electronic prescribing system nonusers) conducted from June 2002 through May 2003.
How electronic prescribing was determined	Whether or not the physician was using an electronic prescribing system with CDS capabilities as identified through the study design.
Outcome(s) measured	Using pharmacy claims, determined (1) if the 6-month savings on new prescriptions were sustained during the 12-months of follow-up, (2) the 12-month cost savings associated with CDS on pharmacy claims, and (3) prescribing behavior of clinicians on eight high-cost therapeutic groups targeted by electronic messages to prescribers.
Reported findings	(1) Savings seen in the last 6 months of the 12 month follow-up period were greater than the first 6 months ($748 per-member-per-month at 6 months to $794 at 12 months per-member-per-month). (2) Use of the electronic prescribing system was associated with a sustained decrease in prescription costs. Over the 12 month follow-up period, the average cost per new prescription for the intervention group decreased by $1.00 and increased by $3.75 in the control group. The number of other refilled prescriptions decreased more in the intervention group than in the control group. The number of new prescriptions increased slightly more in the intervention group than the controls. (3) Prescriptions for high-cost target medications overall decreased by 9.1 percent in the intervention group because of CDS and increased in the control group by 8.2 percent. Compared with the control group, the prescription ratio for high-cost drug classes was a relative 17.5 percent lower in the group using the CDS (35.8 percent versus 43.4 percent).
Other issues	The electronic prescribing system had integrated CDS, formulary, payor, and clinical guideline alert messaging capabilities.

Peterson, J.F., G.J. Kuperman, C. Shek, M. Patel, J. Avorn, and D.W. Bates. "Guided Prescription of Psychotropic Medications for Geriatric Inpatients." *Archives of Internal Medicine*, vol. 165, no. 7 (2005): 802-807.

Methodology	A comparison study at a tertiary care hospital, including 3,718 patients 65 years or older that were prescribed a psychotropic medication targeted in the intervention and admitted for medical, surgical, neurology, or gynecology services from October 8, 2001, to May 16, 2002.
How electronic prescribing was determined	Whether the geriatric decision support system, which included medication dosing and selection guidelines for elderly patients, was activated.
Outcome(s) measured	The study measured several outcomes including: (1) The rate at which prescriptions were written in agreement with expert recommendations regarding recommended daily dose for the initial drug order, (2) incidence of dosing at least 10-fold greater than the recommended daily dose, and (3) prescription of nonrecommended drugs.
Reported findings	Findings presented included: (1) The prescriptions for psychotropic medications agreed with the system recommendations for dosing more frequently during the intervention periods when the geriatric decision support application was available. The agreement rate for both control periods was lower than the agreement rate for the intervention periods. (2) During the intervention periods, the incidence of 10-fold dosing decreased from 5.0 percent to 2.8 percent, (3) the prescription of nonrecommended drugs decreased from 10.8 percent to 7.6 percent.

Ross, S.M., D. Papshev, E.L. Murphy, D.J. Sternberg, J. Taylor, and R. Barg. "Effects of Electronic Prescribing on Formulary Compliance and Generic Drug Utilization in the Ambulatory Care Setting: A Retrospective Analysis of Administrative Claims Data." *Journal of Managed Care Pharmacy*, vol. 11, no. 5 (2005): 410-415.

Methodology	A comparison study of 110,975 paid pharmacy claims submitted by two groups—95 providers using predominantly electronic prescribing and a matched sample of 95 providers who did not electronically prescribe—between August 1, 2001, and July 31, 2002.
How electronic prescribing was determined	Whether or not a provider used electronic prescribing during the study period.
Outcome(s) measured	(1) Formulary compliance, which was assessed using the formulary code field in pharmacy data claims, and (2) generic utilization rates, which was assessed using First DataBank National Drug Data File Plus software to determine the brand or generic status of each drug.
Reported findings	(1) Formulary compliance for both groups was similar. The electronic prescribing group was 83.2 percent compliant, compared to 82.8 percent compliance in the group that did not electronically prescribe. (2) Generic utilization rates were also similar, 37.3 percent for those who electronically prescribed and 36.9 percent for those that did not.
Other issues	The electronic prescribing system provided drug and formulary information during the prescribing process.

Spencer, D.C., A. Leininger, R. Daniels, R. Granko, and R.R. Coeytaux. "Effect of a Computerized Prescriber-Order-Entry System on Reported Medication Errors." *American Journal of Health-System Pharmacy*, vol. 62, no. 4 (2005): 416-419.

Methodology	A pre-post study and comparison of two medicine units at an academic hospital before and after implementation of a CPOE with CDS, compared to units in the hospital that did not implement a CPOE system. Data were collected over a period of 16 months.
How electronic prescribing was determined	Whether the medication error was reported before or after the implementation of the CPOE system in two medicine units of the hospital and whether or not the medication error was reported from the two medicine units of the hospital that implemented CPOE.
Outcome(s) measured	Reported medication errors and potential medication errors, as obtained from the hospital's center for medication safety.
Reported findings	Implementation of the CPOE system in the two units was associated with an increase in reported errors, from 0.068 per discharge preimplementation to 0.088 per discharge after implementation. The units in the hospital that did not implement CPOE systems had a decrease in the number of reported errors from 0.133 per discharge to 0.079 per discharge.
Other issues	The authors note that while the error rates increased in the units with CPOE, the error rates in the units in the hospital without CPOE decreased. Therefore, the increase in reported medication errors on units with CPOE systems may have been attributable to the direct or indirect consequences of introduction of the CPOE system.

Steele, A.W., S. Eisert, J. Witter, P. Lyons, M.A. Jones, P. Gabow, and E. Ortiz. "The Effect of Automated Alerts on Provider Ordering Behavior in an Outpatient Setting." *PLoS Medicine*, vol. 2, no. 9 (2005): 864-870.

Methodology	A pre-post study of the implementation and effect of alerts generated during medication ordering in primary care clinics. The baseline data were collected from August 1, 2002, to November 29, 2002, and the postintervention data were collected from December 1, 2002, to April 30, 2003.
How electronic prescribing was determined	All provider staff entered medication orders using CPOE. The study design compared baseline ordering behavior (when no alert was triggered) to ordering behavior after alerts were triggered.
Outcome(s) measured	(1) The number of medication orders not completed in response to an alert, (2) the number of rule-associated laboratory test orders initiated after an alert was displayed, as captured in the electronic prescribing system, and (3) the rates of adverse drug events assessed by completing file reviews on a random sample of medication orders.
Reported findings	(1) Before the alerts were implemented, prescribers did not complete medication orders 5.4 percent of the time, compared to 8.3 percent of the time after the alerts were implemented. The authors noted that this was not a significant difference between the groups. When the alert was for an abnormal laboratory value, the percentage of times where the medication order was not completed increased from 5.6 percent at baseline to 10.9 percent during the intervention. (2) Comparing the pre- and postintervention periods for medication orders when no alert was displayed, prescribers ordered associated laboratory tests 17 percent of the time during the preintervention period, compared to 16.2 percent of the time in the postintervention period. The authors state that this finding was not significant and indicates that there was no trend, in general, to increased laboratory test ordering during the study period. (3) The preintervention group had a potential ADE in 10.3 percent of charts compared to in 4.3 percent of the charts in the postintervention group. The authors state that the difference between the groups was not significant and that the study was too small to show for sure whether there was any true effect on adverse drug reactions.

Stone, W.M., B.E. Smith, J.D. Shaft, R.D. Nelson, and S.R. Money. "Impact of a Computerized Physician Order-Entry System." *Journal of the American College of Surgeons*, vol. 208, no. 5 (2009): 960-969.

Methodology	A pre-post study of patient-safety measures before and after CPOE implementation at the Mayo Clinic Hospital in Phoenix, Arizona. The CPOE system was implemented from May 8, 2007, to April 30, 2008.
How electronic prescribing was determined	Whether or not the physicians' orders were submitted electronically using the CPOE system.
Outcome(s) measured	(1) Medication errors and (2) order-implementation time.
Reported findings	(1) There were no significant differences in the rate of medication errors in any of the study time periods, which were captured through self-reporting. (2) The time from a doctor placing an order, which was recorded or captured electronically, to a nurse receiving that order decreased from 41.2 minutes pre-CPOE to 27 seconds post-CPOE.

Taylor, J.A., L.A. Loan, J. Kamara, S. Blackburn, and D. Whitney. "Medication Administration Variances Before and After Implementation of Computerized Physician Order Entry in a Neonatal Intensive Care Unit." *Pediatrics*, vol. 121, no. 1 (2008): 123-128.

Methodology	A comparison, pre-post study of how the actual medication administration differed from the medication order before and after CPOE implementation. The study was conducted in the 30-bed Neonatal Intensive Care Unit at Madigan Army Medical Center from August 2004 to April 2006 (pre-CPOE: August 2004 to June 2005; post-CPOE: August 2005 to April 2006).

How electronic prescribing was determined	Whether or not the physicians' medication orders were handwritten or submitted electronically using a CPOE system.
Outcome(s) measured	(1) Differences between the medication order and how the medication was actually administered. (2) Reasons for variances between the medication order and administration, as noted by the research nurses.
Reported findings	(1) The variation between the medication order and how the medication was actually administered was lower post-CPOE than pre-CPOE (11.6 percent and 19.8 percent, respectively). (2) Findings related to rates of variance in medication order and administration in the pre- and post-CPOE included the following: similar variances in both periods were found for administration mistakes, pharmacy problems, and prescribing problems; and variances related to administration of drugs by the wrong route and the wrong time were significantly lower after CPOE implementation.
Other issues	The CPOE utilized CDS and display formats and defaults configured specifically for use in the Neonatal Intensive Care Unit for ordering prescriptions.

Upperman, J.S., P. Staley, K. Friend, W. Neches, D. Kazimer, J. Benes, and E.S. Wiener. "The Impact of Hospitalwide Computerized Physician Order Entry on Medical Errors in a Pediatric Hospital." *Journal of Pediatric Surgery*, vol. 40, no.1 (2005): 57-59.

Methodology	A pre-post study comparing orders written before the implementation of a CPOE system in a children's hospital from January 2002 to October 2002 to those written after the implementation of CPOE system in November 2003 (the end point of the study period was not specified).
How electronic prescribing was determined	Whether a prescription was written before or after the implementation of CPOE.
Outcome(s) measured	The rate and types of ADEs determined by analyzing data collected at the hospital.
Reported findings	ADE rates pre-CPOE were 0.3 per 1,000 doses, compared to 0.37 per 1,000 doses post-CPOE. The authors note that the study demonstrates a substantial decrease in harmful ADEs, but no significant difference in all ADEs between the pre- and post-CPOE periods. The rate of harmful ADEs pre-CPOE were 0.05 per 1,000 doses, compared to 0.03 per 1,000 doses post-CPOE.
Other issues	The CPOE had CDS.

Vaidya, V., A.K. Sowan, M.E. Mills, K. Soeken, M. Gaffoor, and E. Hilmas. "Evaluating the Safety and Efficiency of a CPOE System for Continuous Medication Infusions in a Pediatric ICU." *AMIA Symposium Proceedings*, 2006.

Methodology	A comparison study evaluating the safety of a CPOE system compared to a handwritten, hand-calculated method for prescribing continuous drug infusions for pediatric ICU patients. The time period of the study was not specified.
How electronic prescribing was determined	Whether the orders for the drug infusions were generated in the CPOE system or through a handwritten, hand-calculated method.
Outcome(s) measured	The (1) occurrence and (2) risk level of errors, as identified through a review of order sheets for errors.
Reported findings	(1) The drug infusion orders generated using the CPOE system had fewer errors (4.3 percent) than those that were handwritten (73 percent). (2) Twenty-five percent of the errors in the handwritten group were judged to be "high-risk" compared to 0 percent in the CPOE group. All of the errors in the CPOE group were missing signatures.
Other issues	The CPOE included decision support.

Varkey, P., P. Aponte, C. Swanton, D. Fischer, S.F. Johnson, and M.D. Brennan. "The Effect of Computerized Physician-Order Entry on Outpatient Prescription Errors." *Managed Care Interface*, vol. 20, no. 3 (2007): 53-57.

Methodology	A retrospective survey of 4,527 prescriptions ordered from March 1996 through March 2002 at Mayo Clinic ambulatory clinics comparing prescriptions ordered through the clinic's CPOE to handwritten orders.

How electronic prescribing was determined	Whether or not the type of prescription generated was handwritten, computerized, or preprinted.
Outcome(s) measured	The (1) prevalence and (2) type of pharmacist-intercepted prescription errors in computerized and handwritten prescriptions.
Reported findings	(1) The frequency of intercepted prescription errors were highest in handwritten prescriptions (7.4 percent), followed by computerized prescriptions (4.9 percent), and preprinted prescriptions (1.7 percent). (2) The most commonly intercepted prescriptions involved the dosage form, dispense quantity, medication dosage, and drug allergies. CPOE resulted in lower rates in every type of intercepted prescription error, including form, dosage, quantity, allergy, frequency, drug name, patient name, illegibility, route, and drug–drug interaction, compared to handwritten prescriptions.
Other issues	The CDS included required fields and duplicate order checking.

Wang, C.J., M.H. Patel, A. Schueth, M. Bradley, S. Wu, J.C. Crosson, P.A. Glassman, and D.S. Bell. "Perceptions of Standards-based Electronic Prescribing Systems as Implemented in Outpatient Primary Care: A Physician Survey." *Journal of the American Medical Informatics Association*, vol. 16, no. 4 (2009): 493-502.

Methodology	Cross-sectional survey of physicians was fielded from October 2006 to December 2006 among physicians enrolled in a Blue Cross Blue Shield electronic prescribing sponsorship program.
How electronic prescribing was determined	Whether or not the physician had installed an electronic prescribing system.
Outcome(s) measured	(1) Adequacy of available drug formulary and medication history information and (2) perceptions of the electronic prescribing system's enhancement of job performance.
Reported findings	(1) Electronic prescribing users were more likely than nonusers to "agree" or "strongly agree" that the information available about the patient's medication history helps them to identify clinically important drug–drug interactions and prevent callbacks from pharmacies for safety problems. Electronic prescribing users were slightly more favorable toward statements that electronic prescribing system drug coverage helps patients maintain lower drug costs. (2) Sixty-two percent of electronic prescribers "agreed" or "strongly agreed" that electronic prescribing improves the quality of care they can deliver.

Weingart, S.N., B. Simchowitz, L. Shiman, D. Brouillard, A. Cyrulik, R.B. Davis, T. Isaac, M. Massagli, L. Morway, D.Z. Sands, J. Spencer, and J.S. Weissman. "Clinicians' Assessments of Electronic Medication Safety Alerts in Ambulatory Care." *Archives of Internal Medicine*, vol. 169, no. 17 (2009): 1627-1632.

Methodology	A survey mailed to 300 clinicians in December 2007 about the value of electronic prescribing.
How electronic prescribing was determined	Whether clinicians adopted a commercial electronic prescribing system with a drug-allergy and interaction alerts drug reference database and used the electronic prescribing system to write at least 100 prescriptions per month between January 1 and June 30, 2006.
Outcome(s) measured	(1) Clinicians' satisfaction with electronic prescribing and (2) perceptions of the effects of electronic prescribing and alerts on the safety, efficiency, and cost of care.

Reported findings	(1) Forty-seven percent were satisfied or very satisfied with medication safety alerts. Clinicians said electronic prescribing would improve the quality of care delivered (78 percent); prevent medical errors (83 percent); enhance patient satisfaction (71 percent); and improve clinician efficiency (75 percent). (2) Seventy-eight percent said at least one alert had caused them to change their behavior in the past 6 months. Fifty-seven percent said an alert might have prevented at least one error or injury in the average month. Twenty-two percent said an alert had prevented a serious error or injury in their practice. Sixty-three percent of respondents said an alert caused them to take action other than change an alerted prescription (counsel patient, look up information in a drug reference, or change how they monitor a patient). The study also reported participant ratings on potential problems associated with the drug allergy or interaction alerts. For example, 58 percent of respondents reported that alerts were triggered by discontinued medications.

Yu, F.B., N. Menachemi, E.S. Berner, J.J. Allison, N.W. Weissman, and T.K. Houston. "Full Implementation of Computerized Physician Order Entry and Medication Related Quality Outcomes: A Study of 3364 Hospitals." *American Journal of Medical Quality*, vol. 24, no. 4 (2009): 278-286.

Methodology	A comparison study of hospitals—264 that used a CPOE system to enter all orders and 3,100 that did not—over a 1–year period (July 2003 to June 2004).
How electronic prescribing was determined	Whether the hospital reported on the HIMSS analytics survey that it entered all orders through CPOE.
Outcome(s) measured	Performance on hospital quality-of-care measures from CMS.
Reported findings	Of the 11 medication-related measures, the mean performance on 6 cardiovascular-related measures was higher among CPOE hospitals than non-CPOE hospitals, and the mean performance on one measure, antibiotics within 4 hours of arrival, was lower among CPOE hospitals than non-CPOE hospitals.

Yu, F., M. Salas, Y. Kim, and N. Menachemi. "The Relationship Between Computerized Physician Order Entry and Pediatric Adverse Drug Events: A Nested Matched Case-Control Study." *Pharmacoepidemiology and Drug Safety*, vol. 18, no. 8 (2009): 751-755.

Methodology	A comparison study between 54 pediatric hospitals that had CPOE systems and 68 pediatric hospitals that did not. Patient data were retrieved between October 1, 2005, and September 30, 2006.
How electronic prescribing was determined	Whether a CPOE system was fully implemented for all orders and clinical domains, as identified through the HIMSS analytics database.
Outcome(s) measured	The odds of ADEs, using data from the national association of children's hospitals and related institutions case-mix comparative data program and HIMSS.
Reported findings	The odds of experiencing an ADE were 42 percent higher for hospitals without CPOE compared to those with CPOE.

Zhan C., R.W. Hicks, C.M. Blanchette, M.A. Keyes, and D.D. Cousins. "Potential Benefits and Problems with Computerized Prescriber Order Entry: Analysis of a Voluntary Medication Error-Reporting Database." American *Journal of Health-System Pharmacy*, vol. 63, no. 4. (2006): 353-358.

Methodology	Comparison study of 120 facilities that reported having a CPOE in all clinical areas to 339 facilities that did not have a CPOE. Facilities included general community hospitals, specialty hospitals, and outpatient clinics. Data analyzed were from 2003.
How electronic prescribing was determined	Whether the facility had CPOE, as determined by Medmarx, a national voluntary medication-error reporting database.
Outcome(s) measured	(1) The number of errors reported by CPOE versus non-CPOE facilities and (2) the characteristics of errors caused by CPOE, as captured in the Medmarx database.

Reported findings	The authors stated that the different facilities that self-reported data to the Medmarx database appeared to have different levels of underreporting of medication errors, and therefore, these data cannot be used to assess the potential benefits of CPOE or compare rates of medication errors between providers though facilities with CPOE had fewer inpatient errors, more outpatient errors, and smaller numbers of outpatient and inpatient errors that reached or harmed patients compared to facilities without CPOE. The article did not evaluate the sophistication of the CDS employed by the studied CPOE systems.

Appendix III: Scope and Methodology

This appendix provides additional details regarding our scope and methodology for reporting information on the providers who participated in and received incentive payments from the 2009 Electronic Prescribing Program.

To conduct our analyses, we analyzed four Centers for Medicare & Medicaid Services (CMS) files.

- **2009 Electronic Prescribing Program Participation**. We obtained a file from CMS in October 2010 that provided summary information for each provider that participated in the Electronic Prescribing Program in 2009, which CMS also used to make payments to providers for 2009.[1] For each combination of national provider identifier and tax identification number,[2] this file contained the following information: the total number of times each of the three electronic prescribing codes were submitted;[3] the total number of applicable visits; whether CMS determined that the provider would receive an incentive payment; and the amount of the incentive payment.

- **2009 Electronic Prescribing Program Eligible Providers**. We obtained a file from CMS in October 2010 that listed each provider that had at least one applicable visit for the Electronic Prescribing Program in 2009—which we refer to in this appendix as "applicable providers." Over 597,000 providers had at least one applicable visit for the Electronic Prescribing Program in 2009. This number represents a count of all Medicare providers who had at least one applicable visit in 2009. However, not all of these providers have prescribing authority. Consequently, there may be some individuals included in the count of 597,000 providers that were not eligible for an electronic prescribing incentive payment.

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[1]CMS officials told us that the file is subject to change based on provider inquiry or other issues, which might result in a supplemental payment file.

[2]The national provider identifier number is a unique number that identifies each provider, and the tax identification number is a unique number that identifies each entity that bills CMS for Medicare reimbursements on behalf of the provider. Because providers can belong to multiple unrelated health care practices, CMS determined which providers met or exceeded the reporting requirement using each unique combination of providers' national provider identifier numbers and tax identification numbers.

[3]We only obtained a count of the valid electronic prescribing code submissions.

- **National Plan and Provider Enumeration System (NPPES) Downloadable File**. We downloaded this file from CMS's Web site (http://nppes.viva-it.com/NPI_Files.html) in October 2010. We used the variable "Provider Business Practice Location Address State Name" to obtain the state for providers.

- **Provider Enrollment, Chain, and Ownership System (PECOS) Global Extract File**. We obtained this file from CMS in October 2010. In the few cases when we were unable to obtain the state for providers using the NPPES Downloadable File, we attempted to determine the state for providers using either the "Practice Location State" variable or the "Correspondence Address State" variable from the PECOS Global Extract File.

CMS determined which providers met or exceeded the reporting requirement for 2009 using each unique combination of providers' national provider identifiers and tax identification numbers. However, we analyzed and report information at the national provider identifier level only so that we could present results for unduplicated providers. We were unable to match 1,052 applicable providers (less than 0.2 percent of applicable providers) to either the NPPES Downloadable File or the PECOS Global Extract file.[4]

To determine the percent of Medicare providers who received incentive payments by state and the average incentive payment by state using the state for each provider, we obtained state information for over 99 percent of applicable providers using data from the NPPES Downloadable File and for the remaining applicable providers using data from the PECOS Global Extract File. We excluded the about 0.2 percent of applicable providers mentioned above that we could not match to either the NPPES Downloadable File or the PECOS Global Extract File. In addition, we excluded about another 0.2 percent of applicable providers for whom we were unable to obtain state information, the 0.9 percent of applicable

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[4]Of the applicable providers that we were unable to match at the time of our analysis, CMS determined that 974 had national provider identifier numbers that had been deactivated and were therefore not available in the NPPES Downloadable File or the PECOS Global Extract file that we analyzed and another 77 had national provider identifier numbers that were not valid.

providers who were from U.S. insular areas, and six providers whose state information we deemed unreliable.[5]

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[5]CMS determined that five providers from Puerto Rico and one provider from the Virgin Island obtained incentive payments. Providers from American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the Virgin Islands had at least one applicable visit.

Appendix IV: Maximum Electronic Health Record (EHR) Program Incentive Payments, Based on First Year of Payment

First year provider participates in the EHR Program	Maximum EHR incentive payments by year[a]						Maximum total incentive payment
	2011	2012	2013	2014	2015	2016	
2011	$18,000	$12,000	$8,000	$4,000	$2,000		$44,000
2012		18,000	12,000	8,000	4,000	$2,000	44,000
2013			15,000	12,000	8,000	4,000	39,000
2014				12,000	8,000	4,000	24,000

Source: GAO analysis of the Recovery Act.

Notes: The Centers for Medicare & Medicaid Services (CMS) will increase the incentive payments by 10 percent each year for providers that predominantly furnish services in geographic areas designated as health professional shortage areas, such as areas that have a shortage of primary medical care.

[a]Incentive payment amounts are equal to 75 percent of the provider's total allowed charges for services covered by Medicare Part B for the year, but are subject to the annual limits displayed in this table.

Appendix V: Stage-One Reporting Requirements for the Electronic Health Records (EHR) Program

Mandatory requirements	Additional requirements
1. Generate and transmit more than 40 percent of permissible prescriptions electronically.[a]	1. Perform medication reconciliation for more than 50 percent of all transitions of care.[a]
2. Enter medication order into computerized physician order entry (CPOE) system for more than 30 percent of patients with at least one medication in their medication lists.[a]	2. Enable the EHR system's ability to check a prescription against a formulary and maintain access to at least one internal or external drug formulary for the entire EHR reporting period.[a]
3. Enter medication lists or indicate no current prescriptions for more than 80 percent of patients.[a]	3. Incorporate as structured data more than 40 percent of all clinical lab tests results ordered.
4. Enter medication allergy lists or indicate no known medication allergies for more than 80 percent of patients.[a]	4. Generate at least one list of patients by a specific condition.
5. Enable the EHR system's ability to check a prescription for potential drug–drug and drug–allergy interactions.[a]	5. Send reminders during the EHR reporting period for preventative or follow-up care to more than 20 percent of patients aged 65 and over or aged 5 and younger.
6. Record as structured data demographics for more than 50 percent of patients.	6. Provide electronic access to health information within 4 business days of being updated in the EHR system to more than 10 percent of patients.
7. Record as structured data list of current and active diagnoses or indicate no known problems for more than 80 percent of patients.	7. Provide patient-specific education resources to more than 10 percent of all patients.
8. Record as structured data height, weight, and blood pressure for more than 50 percent of patients aged 2 and over.	8. Provide summary of care record to more than 50 percent of transitions of care and referrals.
9. Record as structured data smoking status for more than 50 percent of patients aged 13 and over.	9. Perform at least one test of certified EHR technology's capacity to submit electronic data to immunization registries and follow-up submission if the test is successful.[c]
10. Implement one clinical decision support rule relevant to specialty or high clinical priority.	10. Perform at least one test of certified EHR technology's capacity to provide electronic syndromic surveillance data to public health agencies and follow-up submission if the test is successful.[c]
11. Report ambulatory clinical quality measures to the Centers for Medicare & Medicaid Services (CMS) or the states.[b]	
12. Provide electronic copy of health information within 3 business days to more than 50 percent of all patients who requested that information.	
13. Provide clinical summaries to patients within 3 business days for more than 50 percent of all office visits.	
14. Perform at least one test of certified EHR technology's capacity to electronically exchange key clinical information (i.e., problem list, medication list, medication allergies, or diagnostic test results).	
15. Protect electronic health information created or maintained by the certified EHR technology by conducting or reviewing a security risk analysis, implementing security updates as necessary, and correcting identified security deficiencies.	

Source: GAO analysis of CMS regulation.

Note: Unless a provider has an exception for all of the public health–related reporting requirements, the provider must report at least one of the public health–related reporting requirements among the five additional requirements that the provider reports.

[a]The requirement is electronic prescribing-related.

[b]According to CMS, clinical quality measures help quantify health care processes, outcomes, patient perceptions, and organizational structure. To meet this reporting requirement, providers must report on 6 out of 44 clinical quality measures identified by CMS.

[c]The requirement is public health–related.

DEPARTMENT OF HEALTH & HUMAN SERVICES

OFFICE OF THE SECRETARY

Assistant Secretary for Legislation
Washington, DC 20201

JAN 24 2011

Linda T. Kohn
Director, Health Care
U.S. Government Accountability Office
441 G Street N.W.
Washington, DC 20548

Dear Ms. Kohn:

Attached are comments on the U.S. Government Accountability Office's (GAO) draft report
entitled: "ELECTRONIC PRESCRIBING: CMS Should Address Inconsistencies in Its Two
Incentive Programs That Encourage the Use of Health Information Technology" (GAO-11-159).

The Department appreciates the opportunity to review this report before its publication.

Sincerely,

Jim R. Esquea
Assistant Secretary for Legislation

Attachment

GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO) DRAFT REPORT ENTITLED, "ELECTRONIC PRESCRIBING: CMS SHOULD ADDRESS INCONSISTENCIES IN ITS TWO INCENTIVE PROGRAMS THAT ENCOURAGE THE USE OF HEALTH INFORMATION TECHNOLOGY" (GAO-11-159)

The Department appreciates the opportunity to review and comment on this draft report. GAO was asked to examine the Electronic Prescribing (eRx) Incentive Program that was authorized by the Medicare Improvements for Patients and Providers Act of 2008. GAO examined how the Centers for Medicare & Medicaid Services (CMS) determines which providers receive incentive payments and avoid payment adjustments from the eRx Incentive Program and how many providers received incentive payments in 2009. GAO also examined how the requirements of the eRx Incentive Program compares with the requirements of the Medicare and Medicaid Electronic Health Records (EHR) Incentive Program authorized by the Health Information Technology for Economic and Clinical Health Act of 2009.

Below are the recommendations for executive action made by GAO and CMS' responses to them.

GAO Recommendations
To help improve the effectiveness of the Electronic Prescribing and EHR Programs to encourage the adoption of health information technologies among Medicare providers, the Administrator of CMS should take the following three actions:

- Direct physicians and other health care providers in the Electronic Incentive Program to use electronic prescribing technology that has been certified as an EHR system or an EHR module(s) for use in the EHR Incentive Program.

- Expedite efforts to remove the overlap in reporting requirements for physicians who may be eligible for incentive payments or subject to penalties under both the Electronic Prescribing and EHR Programs by, for example, aligning the reporting requirements so that successfully qualifying for incentive payments or for avoiding penalties under the EHR program would likewise result in meeting the requirements for the Electronic Prescribing Program.

- Identify factors that helped or hindered implementation of the Electronic Prescribing Program to help support the ongoing implementation of the EHR Program. CMS could include consideration of such factors in the integration plan that the agency is required to develop by January 1, 2012.

To help ensure that the Electronic Prescribing Program resources are used appropriately, the Administrator of CMS should develop a risk-based strategy to audit a sample of providers who received incentive payments from the Electronic Prescribing Program to help ensure that providers who receive incentive payments meet that program's requirements. A risk-based strategy could, for example, focus on those providers who received large incentive payments.

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**GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN
SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO)
DRAFT REPORT ENTITLED, "ELECTRONIC PRESCRIBING: CMS SHOULD
ADDRESS INCONSISTENCIES IN ITS TWO INCENTIVE PROGRAMS THAT
ENCOURAGE THE USE OF HEALTH INFORMATION TECHNOLOGY"
(GAO-11-159)**

CMS Response to Recommendation 1

- *Direct physicians and other health care providers in the Electronic Incentive Program to
  use electronic prescribing technology that has been certified as an EHR system or an
  EHR module(s) for use in the EHR Incentive Program.*

We concur with the recommendation in that we agree with the notion that eligible professionals
should be able to use certified EHR systems for the eRx Incentive Program. We do not,
however, agree that CMS should direct eligible professionals to use only prescribing technology
that has been certified as an EHR system.

As pointed out in the report, the eRx Incentive Program began prior to the enactment of the EHR
Incentive Program and, thus, before the availability of a Department of Health and Human
Services (HHS) administered certification process for EHR technology. As a result, the eRx
Incentive Program was based on the use of a "qualified" eRx system with specific defined
functionalities, as defined in the electronic prescribing quality measure currently used for the
eRx Incentive Program. In addition, more health care providers are eligible for the eRx
Incentive Program than for the EHR Incentive Program. Therefore, eligible professionals that
implemented "qualified" eRx systems in accordance with the current eRx Incentive Program
requirements may not have gone through the more recent EHR certification process. We believe
that additional rulemaking would be needed to direct eligible professionals that only certified
EHR technology would meet requirements for the eRx Incentive Program. Such direction may
also add to the cost and burden for existing eRx Incentive Program participants by potentially
requiring professionals to replace existing qualified electronic prescribing systems (for example,
stand-alone electronic prescribing systems that do not meet current Office of the National
Coordinator (ONC) certification requirements for the EHR Incentive Program) merely to
continue to participate in the eRx Incentive Program.

CMS Response to Recommendation 2

- *Expedite efforts to remove the overlap in reporting requirements for physicians who may
  be eligible for incentive payments or subject to penalties under both the Electronic
  Prescribing and EHR Programs by, for example, aligning the reporting requirements so
  that successfully qualifying for incentive payments or for avoiding penalties under the
  EHR program would likewise result in meeting the requirements for the Electronic
  Prescribing Program.*

We agree and are working actively to better align the reporting requirements for the two
programs, where applicable. As required by the Affordable Care Act, CMS is required to
develop a plan to integrate reporting on the EHR Incentive Program with reporting on the
Physician Quality Reporting System by January 1, 2012. We plan to discuss this plan for better
alignment in our rulemaking for the 2012 program year during 2011. Section 1848(m)(3)(B) of
the Social Security Act (the Act) sets forth the requirements for a successful electronic
prescriber, and the standard currently adopted under the eRx Incentive Program requires the
submission of data on an electronic prescribing measure established under the Physician Quality

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GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN
SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO)
DRAFT REPORT ENTITLED, "ELECTRONIC PRESCRIBING: CMS SHOULD
ADDRESS INCONSISTENCIES IN ITS TWO INCENTIVE PROGRAMS THAT
ENCOURAGE THE USE OF HEALTH INFORMATION TECHNOLOGY"
(GAO-11-159)

Reporting System. Currently, the electronic prescribing measure that eligible professionals are
required to report under the eRx Incentive Program is different from the electronic prescribing
requirements of the EHR Incentive Program and from the quality measures required under the
EHR Incentive Program. Given how both programs are currently structured and the statutory
construct of each program, CMS would need to undergo further rulemaking in order to
implement changes to better align the reporting requirements under the 2 programs, where
applicable. In the meantime, we plan to conduct extensive education and outreach activities
regarding the eRx Incentive Program and the need to participate in this program independent of
the EHR Incentive Program despite the prohibition under section 1848(m)(2)(D) of the Act on
duplicate payments under both programs.

CMS Response to Recommendation 3
- *Identify factors that helped or hindered implementation of the Electronic Prescribing
  Program to help support the ongoing implementation of the EHR Program. CMS could
  include consideration of such factors in the integration plan that the agency is required
  to develop by January 1, 2012.*

CMS believes this is a helpful recommendation. We have begun to look into this through
comments received on the calendar year 2011 Medicare Physician Fee Schedule proposed rule.
Some factors that we believe have helped implementation are—

- Revising the reporting requirement for being a successful electronic prescriber from
  reporting on 50 percent of applicable cases to reporting on 25 unique electronic
  prescribing events beginning in 2010;
- Adding registry and EHR reporting mechanisms and the group practice reporting option
  in 2010; and
- Adding codes to the electronic prescribing measure's denominator in 2010 that expanded
  opportunities to report the electronic prescribing measure.

Some commenters expressed challenges that they have encountered in implementing electronic
prescribing technology and/or participating in the eRx Incentive Program. CMS has identified
some potential issues that eligible professionals have expressed (both via comments to our
proposed rule and during educational presentations which have occurred). Some of these issues
include—

a) The cost of purchasing and implementing electronic prescribing systems (provider
   training, potential disruption to workflow, etc.);
b) The pending EHR Incentive Program. Some eligible professionals have stated that they
   want to purchase a comprehensive EHR program and, accordingly, have delayed
   purchasing and implementing their EHR (and, therefore, their eRx component). They
   may be waiting for 2011 and the first year of the EHR Incentive Program;
c) The difficulty of electronically prescribing narcotics and other controlled substances.
   Some eligible professionals only prescribe narcotics or other controlled substances.

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**GENERAL COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN
SERVICES (HHS) ON THE GOVERNMENT ACCOUNTABILITY OFFICE'S (GAO)
DRAFT REPORT ENTITLED, "ELECTRONIC PRESCRIBING: CMS SHOULD
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While the Drug Enforcement Agency recently has allowed controlled substances to be
electronically prescribed, not all States have adopted this policy. Additionally,
electronically prescribing controlled substances requires an electronic prescribing system
that has capabilities beyond what is currently required by the eRx Incentive Program
measure, and these systems are not readily available commercially.

d) The need for an electronic prescribing event to be associated with an eligible encounter in
the office or nursing home. Some eligible professionals have suggested that refills or
electronic prescriptions generated in response to a phone call from the patient should be
counted. This information may be difficult to collect.

Section 1848(m)(3)(B)(iii) of the Act also permits CMS to determine whether an eligible
professional is a successful electronic prescriber based on the electronic submission of a
sufficient number of prescriptions under Part D during the reporting period. We are continuing
to explore the feasibility of using Part D prescription drug event (PDE) data to capture electronic
prescribing events instead of requiring eligible professionals to report an electronic prescribing
measure. There has been some concern about the accuracy and completeness of the PDE data
with respect to whether a prescription was submitted electronically and with respect to the
National Provider Identifier data that is submitted with the PDE.

CMS Response to Recommendation 4
*To help ensure that the Electronic Prescribing Program resources are used appropriately, the
Administrator of CMS should develop a risk-based strategy to audit a sample of providers who
received incentive payments from the Electronic Prescribing Program to help ensure that
providers who receive incentive payments meet that program's requirements. A risk-based
strategy could, for example, focus on those providers who received large incentive payments.*

We agree that an audit of a sample of eligible professionals who received incentive payments
may be needed, but disagree that it should necessarily focus on eligible professionals who
received large incentive payments. As the eRx Incentive Program requires 25 electronic
prescribing instances to be reported for purposes of qualifying for an incentive (regardless of the
amount of the incentive received), we believe that the audit process, if implemented, could be
completely random. In fact, practices who receive smaller incentive payments may have fewer
Medicare encounters (as is evidenced by their smaller incentive) which may make it more
difficult to reach the 25 electronic prescribing events as required by the program. Additionally,
the option of using Part D prescription drug event data in lieu of reporting on the electronic
prescribing measure to determine successful electronic prescribing may alleviate the need for an
audit.

We appreciate the efforts that went into this report and look forward to working with the GAO
on this and other issues.

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Appendix VII: GAO Contact and Staff Acknowledgments

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Staff Acknowledgments	In addition to the contact name above, Robert Copeland, Assistant Director; Nick Bartine; George Bogart; Julianne Flowers; Krister Friday; Toni Harrison; Daniel Lee; Shannon Legeer; and Sarah Marshall made key contributions to this report.