

eAppendix

Table 1. Characteristics of Office-Based Physicians and EHR Adopters

	All Physicians (n = 2567)	EHR Adopters (n = 1678)
Health IT and delivery system characteristics		
Has any EHR	62%	100%
Participating in PCMH or ACO	22%	29%
Has EHR that meets Meaningful Use criteria	48%	79%
Year current EHR installed		
2011-2012	19%	31%
2009-2010	13%	22%
2008 or earlier	26%	41%
Unknown	4%	6%
No EHR	38%	0%
EHR support		
Received assistance implementing EHR	47%	66%
Received assistance training staff to use EHR	52%	74%
Physician characteristics		
Age		
Less than 50 years	33%	39%
50 years or older	67%	61%
Specialty		
Primary care	48%	54%
Other specialty	52%	46%
Practice characteristics		
Size (number of physicians)		
Solo	23%	13%
2	14%	10%
3-5	27%	31%
6-10	16%	19%
11+	21%	26%
Ownership		
Physician/physician group	64%	59%
Hospital/academic medical center	16%	19%
HMO/insurance plan/other healthcare corporation	8%	10%
Community health center	4%	5%
Other/unknown	8%	7%
Multispecialty practice		
Single specialty	52%	47%
Multispecialty	46%	50%
Unknown	2%	3%

Geographic characteristics

Rural/urban location		
Non-metropolitan	12%	13%
Metropolitan	88%	87%
Region		
Northeast	21%	20%
Midwest	20%	22%
South	36%	35%
West	22%	23%

ACO indicates accountable care organization; EHR, electronic health record; HMO, health maintenance organization; IT, information technology; PCMH, patient-centered medical home.

Source: CDC/NCHS Physician Workflow Survey, 2012

Table 2. Logistic Regression of Health IT and Payment/Delivery Model on Probability That Physician Performs Care Processes Routinely (percentage point incremental effects) (n = 2567)

	Population Management						
	Create a list of patients by lab result	Create a list of patients by vital signs	Create a list of patients by diagnosis	Create a list of patients who are due for tests or preventive care	Provide patient reminders for preventive or follow-up care	Any population management process	
Health IT and Payment/Delivery Model							
Any EHR (vs no EHR)	10.2 **	15.2 **	17.6 **	13.8 **	12.9 **	15.1 **	
Participating in PCMH or ACO (vs not)	10.7 **	9.7 **	13.3 **	10.4 **	10.1 **	12.0 **	
Other Factors							
Aged <50 years (vs 50 or older)	0.1	-2.4	-1.7	-4.6	-1.6	-3.5	
Primary care specialty (vs other specialty)	3.8 *	6.6 **	3.8	11.0 **	6.4 *	5.2	
Practice size (vs 1 physician)							
2	4.3	6.9	11.8 *	12.2 *	11.5 *	10.5 *	
3-5	7.3 **	2.0	5.7	5.6	1.8	0.3	
6-10	6.1	-2.2	5.0	8.7	2.7	-0.7	
≥11	8.2 **	-0.2	6.1	2.4	-0.2	-1.0	
Ownership (vs physician or physician group)							
Hospital/academic medical center	-2.7	-3.0	-6.0 *	-11.7 **	-18.4 **	-14.4 **	
HMO/insurance plan/other healthcare corporation	9.6 *	11.9 **	13.5 **	10.2	5.8	3.8	
Community health center	-1.6	-2.2	5.3	-14.9 *	-13.8	-14.2	
Other/unknown	4.0	-1.1	-3.4	-15.1 **	-11.6	-13.6 *	
Multispecialty group (vs single specialty)							
Multispecialty	-7.5 **	-8.5 **	-5.9 *	-7.6 *	-9.0 *	-5.4	
Unknown	-7.2	12.5	12.9	3.0	-12.4	-7.3	
Non-MSA (vs MSA)	1.2	-2.2	4.9	3.8	-4.4	-1.1	
Region (vs NE)							
MW	2.6	0.7	-5.3	0.9	-2.2	-4.2	
SO	4.2	2.1	-1.5	-2.5	1.3	-1.4	
WE	5.4	5.3	3.0	6.4	0.1	-2.0	

	Quality measurement				
	Create reports on clinical care measures for patients with specific chronic conditions (eg, HA1c for diabetic patients)	Create reports on clinical care measures by patient demographic characteristics (eg, age, sex, race)	Submit clinical care measures to public and private insurers (eg, blood pressure control, HA1c, smoking status)	Any quality measurement process	
Health IT and Payment/Delivery Model					
Any EHR (v. no EHR)	21.1 **	20.4 **	18.3 **	26.1 **	
Participating in PCMH or ACO (v. not)	8.6 **	17.7 **	17.4 **	22.6 **	
Other factors					
Age less than 50 years (v. 50 or older)	-0.3	-2.7	-0.8	1.3	
Primary care specialty (v. other specialty)	2.8	12.8 **	11.7 **	13.3 **	
Practice size (v. 1 physician)					
2	10.3 *	5.1	12.2 *	6.7	
3-5	3.9	-1.0	6.4	0.0	
6-10	5.4	-3.1	8.5	-2.9	
11+	4.4	0.2	12.6 **	5.0	
Ownership (v. physician or physician group)					
Hospital/academic medical center	-2.3	-4.3	-3.6	-5.2	
HMO/insurance plan/other healthcare corporation	12.4 *	10.0	16.3 **	13.2 **	
Community health center	19.8 **	11.2	24.3 **	23.3 **	
Other/unknown	-9.8 **	-7.5	-0.3	-8.9	
Multispecialty group (v. single specialty)					
Multispecialty	-4.8	-7.9 *	10.6 **	-8.1 *	
Unknown	5.7	5.8	-1.9	5.1	
Non-MSA (v. MSA)	-1.1	-1.9	1.1	1.8	
Region (v. Northeast)					
Midwest	-2.7	0.9	0.2	-1.6	
South	5.1	2.2	-4.9	1.0	
West	3.9	0.4	-0.7	-0.3	

	Patient communication							
	Provide patients with a clinical summary for each visit		Provide patients with a copy of their health information		Record a patient advanced directive		Any patient communication process	
Health IT and Payment/Delivery Model								
Any EHR (v. no EHR)	17.7	**	39.4	**	25.9	**	25.3	**
Participating in PCMH or ACO (v. not)	12.4	**	14.0	**	8.7	*	14.8	**
Other factors								
Age less than 50 years (v. 50 or older)	-0.4		1.9		9.9	**	3.9	
Primary care specialty (v. other specialty)	6.6	*	3.7		5.1		8.2	**
Practice size (v. 1 physician)								
2	3.4		9.7		4.9		4.9	
3-5	-1.4		-2.4		-3.0		-3.4	
6-10	0.4		-6.0		-8.2		-3.4	
11+	-0.1		-3.2		3.0		1.9	
Ownership (v. physician or physician group)								
Hospital/academic medical center	12.6	**	-2.6		-0.4		5.8	
HMO/insurance plan/other healthcare corporation	20.9	**	11.2	*	9.1		15.3	**
Community health center	-13.6	*	-32.7	**	-27.8	**	-31.2	**
Other/unknown	2.4		-10.4		-4.3		-4.6	
Multispecialty group (v. single specialty)								
Multispecialty	-5.8		-3.2		-3.1		-1.5	
Unknown	13.9		6.8		17.7	*	8.5	
Non-MSA (v. MSA)	3.4		1.3		-6.5		-1.1	
Region (v. Northeast)								
Midwest	4.4		-4.1		2.1		-3.2	
South	1.3		0.2		5.5		-1.4	
West	3.2		1.0		3.6		-1.5	

	Care coordination			
	Receive patient clinical information from other physicians treating your patient (eg, referral summaries)	Receive information needed to continue managing a patient posthospital discharge	Share patient clinical information with other providers treating your patient	Any care coordination process
Health IT and Payment/Delivery Model				
Any EHR (v. no EHR)	7.0 *	5.4	8.0 **	5.3 *
Participating in PCMH or ACO (v. not)	4.8	9.6 **	5.6	5.8 *
Other factors				
Age less than 50 years (v. 50 or older)	0.1	1.2	2.4	-0.4
Primary care specialty (v. other specialty)	11.1 **	3.5	0.0	1.3
Practice size (v. 1 physician)				
2	4.6	5.9	-0.7	3.1
3-5	4.2	0.5	-2.3	-0.4
6-10	3.6	-5.1	0.3	0.9
11+	5.5	-3.0	-2.5	-2.1
Ownership (v. physician or physician group)				
Hospital/academic medical center	6.9 *	-0.4	-1.4	2.1
HMO/insurance plan/other healthcare corporation	4.2	6.7 *	3.0	6.9 **
Community health center	-3.3	-7.0	1.5	4.2
Other/unknown	-4.0	-12.4 *	-16.5 **	-11.8 *
Multispecialty group (v. single specialty)				
Multispecialty	-0.6	1.5	2.1	0.2
Unknown	6.2	7.3	-5.1	7.0 *
Non-MSA (v. MSA)	-3.3	-3.1	-4.3	-2.3
Region (v. Northeast)				
Midwest	8.0 *	2.3	4.2	4.1
South	6.8	1.4	2.6	3.3
West	10.0 *	1.5	4.5	2.8

*(**) Significantly different from reference category at $P < .01$ ($P < .05$).

Source: CDC/NCHS Physician Workflow Survey, 2012

Table 3. Predicted Probabilities (percent) That Physicians Routinely Perform Care Processes by health IT and Delivery/Payment System Characteristics (n = 2567)

	Population management					
	Create a list of patients by lab result	Create a list of patients by vital signs	Create a list of patients by diagnosis	Create a list of patients who are due for tests or preventive care	Provide patient reminders for preventive or follow-up care	Any population management process
No EHR, No PCMH/ACO (34%)	3.8 **	3.0 **	13.8 **	28.8 **	48.5 **	55.1 **
EHR, no PCMH/ACO (44%)	12.9	15.2	27.7	41.1	59.5	68.8
EHR, PCMH/ACO (18%)	25.5 **	30.2 **	47.4 **	54.2 **	72.9 **	83.0 **

	Quality measurement			
	Create reports on clinical care measures for patients with specific chronic conditions (eg, A1C for diabetic patients)	Create reports on clinical care measures by patient demographic characteristics (eg, age, sex, race)	Submit clinical care measures to public and private insurers (eg, blood pressure control, A1C, smoking status)	Any quality measurement process
No EHR, No PCMH/ACO (34%)	5.8 **	12.4 **	15.7 **	21.9 **
EHR, no PCMH/ACO (44%)	26.6	31.9	34.6	49.2
EHR, PCMH/ACO (18%)	36.2 *	51.6 **	52.0 **	70.8 **

	Patient communication			
	Provide patients with a clinical summary for each visit	Provide patients with a copy of their health information	Record a patient advanced directive	Any patient communication process
No EHR, No PCMH/ACO (34%)	27.7 **	16.6 **	33.7 **	49.8 **
EHR, no PCMH/ACO (44%)	42.5	55.9	57.2	76.7
EHR, PCMH/ACO (18%)	60.2 **	70.0 **	70.2 **	88.7 **

	Care coordination			
	Receive patient clinical information from other physicians treating your patient (eg, referral summaries)	Receive information needed to continue managing a patient posthospital discharge	Share patient clinical information with other providers treating your patient	Any care coordination process
No EHR, No PCMH/ACO (34%)	69.8	76.2	76.1 **	85.1
EHR, no PCMH/ACO (44%)	75.3	81.5	84.5	90.2
EHR, PCMH/ACO (18%)	83.2 *	91.4 **	89.5	96.4 **

*(**) Significantly different from EHR, no PCMH/ACO at $P < .01$ ($P < .05$).

Estimates adjusted for physician and office characteristics in Appendix Table 1. Results exclude 5% of physicians who reported participating in PCMH/ACO but did not have any EHR system.

Table 4. Logistic Regression of Health IT Factors on Probability That EHR Adopters Perform Care Processes Routinely in computerized manner (percentage point incremental effects) (n = 1678)

	Population management											
	Create a list of patients by lab result		Create a list of patients by vital signs		Create a list of patients by diagnosis		Create a list of patients who are due for tests or preventive care		Provide patient reminders for preventive or follow-up care		Any population management process	
Health IT factors												
MU-certified EHR (v. other EHR)	9.0	**	12.5	**	14.7	**	18.0	**	16.1	**	14.7	**
Year current system installed (v. 2011-2012)												
2009-2010	-5.2		1.3		-1.6		0.8		10.9	*	9.8	*
2008 or earlier	3.5		2.3		10.7	**	6.7		12.2	**	10.3	*
Unknown	5.9		5.1		-1.7		-0.5		2.2		-3.5	
Received assistance with training staff to use EHR (v. not)	-0.9		-6.2		3.8		-5.2		5.0		3.6	
Received assistance with EHR implementation (v. not)	1.0		0.7		-8.4		0.6		-8.1		-6.5	
Other factors												
Age less than 50 years (v. 50 or older)	-1.2		-3.1		-3.7		-6.2		2.8		-0.5	
Primary care specialty (v. other specialty)	4.7		7.8	**	5.4		14.1	**	5.0		6.1	
Practice size (v. 1 physician)												
2	7.8		8.5		5.7		11.7		16.9	*	11.7	
3-5	10.2	*	4.8		4.7		10.1		11.1		5.3	
6-10	8.1		-2.2		5.8		14.6	*	16.9	*	8.8	
11+	12.3	**	1.4		4.6		6.3		13.0	*	4.6	
Ownership (v. physician or physician group)												
Hospital/academic medical center	-1.3		-2.1		-2.3		12.7	**	-13.1	**	-9.6	*
HMO/insurance plan/other healthcare corporation	10.7	*	15.9	**	16.3	**	11.7		6.5		5.5	
Community health center	1.0		1.5		6.1		13.8		-15.5		-16.3	
Other/unknown	2.8		-2.2		2.3		-7.8		-7.5		-9.3	
Participating in PCMH or ACO (v. not)	10.2	**	12.6	**	13.8	**	7.8	*	6.8		7.9	*
Multispecialty group (v. single specialty)												
Multispecialty	-9.8	**	-11.1	**	-9.2	*	12.5	**	-13.2	**	-11.4	**
Unknown	-5.3		25.0	*	20.4		6.6		-3.1		-0.1	
Non-metropolitan (v. metro)	-0.9		-4.2		4.8		6.5		-1.6		1.0	
Region (v. Northeast)												
Midwest	6.3		0.3		-2.0		1.5		0.7		-0.2	
South	6.8		0.0		-0.7		-5.8		3.1		0.7	
West	8.8		4.8		8.9		3.7		5.4		-0.7	

	Quality measurement							
	Create reports on clinical care measures for patients with specific chronic conditions (eg, A1C for diabetic patients)		Create reports on clinical care measures by patient demographic characteristics (eg, age, sex, race)		Submit clinical care measures to public and private insurers (eg, blood pressure control, A1C, smoking status)		Any quality measurement process	
Health IT factors								
MU-certified EHR (v. other EHR)	13.9	**	14.2	**	15.3	**	17.6	**
Year current system installed (v. 2011-2012)								
2009-2010	-1.0		1.7		-2.2		-1.2	
2008 or earlier	7.2		8.3	*	8.1	*	8.7	*
Unknown	-0.2		11.4		-1.3		0.6	
Received assistance with training staff to use EHR (v. not)	-4.8		-6.3		1.8		-4.4	
Received assistance with EHR implementation (v. not)	6.2		2.8		-0.4		3.1	
Other factors								
Age less than 50 years (v. 50 or older)	0.9		0.2		1.0		5.8	
Primary care specialty (v. other specialty)	3.3		11.2	**	14.8	**	11.6	**
Practice size (v. 1 physician)								
2	6.1		5.4		10.9		5.9	
3-5	2.3		6.5		12.2	*	7.9	
6-10	5.5		-0.4		14.2	*	3.5	
11+	4.8		5.9		19.3	**	12.4	
Ownership (v. physician or physician group)								
Hospital/academic medical center	0.5		-4.5		-0.2		-1.8	
HMO/insurance plan/other healthcare corporation	13.9	*	9.6		20.7	**	16.4	**
Community health center	25.7	**	7.0		20.9	*	15.4	
Other/unknown	-11.0	*	-8.7		1.0		-9.0	
Participating in PCMH or ACO (v. not)	3.9		14.4	**	11.4	**	14.5	**
Multispecialty group (v. single specialty)								
Multispecialty	-4.7		-9.1	*	-9.9	*	-7.3	
Unknown	17.7		16.2		5.1		11.7	
Non-metropolitan (v. metro)	-0.7		-1.1		3.5		4.9	
Region (v. Northeast)								
Midwest	0.0		1.7		2.0		-3.2	
South	8.1		1.2		-3.7		1.9	
West	11.4	*	3.3		4.6		2.7	

	Patient communication			
	Provide patients with a clinical summary for each visit	Provide patients with a copy of their health information	Record a patient advanced directive	Any patient communication process
Health IT factors				
MU-certified EHR (v. other EHR)	13.0 **	32.0 **	17.9 **	21.6 **
Year current system installed (v. 2011-2012)				
2009-2010	6.0	7.3	8.4	14.0 **
2008 or earlier	16.7 **	5.0	10.8 *	10.8 **
Unknown	18.8 *	-5.0	5.6	5.1
Received assistance with training staff to use EHR (v. not)	12.1 **	0.8	2.0	3.3
Received assistance with EHR implementation (v. not)	-16.2 **	-2.8	-2.3	-1.9
Other factors				
Age less than 50 years (v. 50 or older)	1.1	5.4	9.2 *	6.2 *
Primary care specialty (v. other specialty)	0.7	2.2	1.9	2.4
Practice size (v. 1 physician)				
2	-3.3	7.4	5.4	4.6
3-5	1.3	6.6	-3.0	2.9
6-10	0.2	1.8	-8.2	3.6
11+	-2.1	3.9	1.6	5.3
Ownership (v. physician or physician group)				
Hospital/academic medical center	14.0 **	-1.8	-2.3	5.9
HMO/insurance plan/other healthcare corporation	20.2 **	13.7 *	8.6	16.4 **
Community health center	-17.2 **	42.3 **	-26.6 **	-32.4 **
Other/unknown	0.7	-6.2	-8.2	-3.5
Participating in PCMH or ACO (v. not)	10.0 *	7.4	10.0 *	8.0 *
Multispecialty group (v. single specialty)				
Multispecialty	-12.1 **	-4.5	-5.1	-4.6
Unknown	15.9	16.6	27.8 **	11.6 *
Non-metropolitan (v. metro)	-0.5	3.3	-4.5	2.6
Region (v. Northeast)				
Midwest	4.2	-3.7	-1.3	-5.7
South	1.8	-5.9	0.4	-2.6
West	4.5	-4.8	-4.2	-5.9

	Care coordination			
	Receive patient clinical information from other physicians treating your patient (eg, referral summaries)	Receive information needed to continue managing a patient posthospital discharge	Share patient clinical information with other providers treating your patient	Any care coordination process
Health IT factors				
MU-certified EHR (v. other EHR)	15.0 **	13.6 **	17.9 **	12.2 **
Year current system installed (v. 2011-2012)				
2009-2010	9.4	10.4 *	3.1	8.9 *
2008 or earlier	14.0 **	9.2 *	6.6	7.4 *
Unknown	18.2 *	13.1	14.3	8.1
Received assistance with training staff to use EHR (v. not)	0.3	-4.1	-2.9	0.7
Received assistance with EHR implementation (v. not)	-1.8	8.1	8.2	4.5
Other factors				
Age less than 50 years (v. 50 or older)	0.8	4.8	-0.6	1.4
Primary care specialty (v. other specialty)	4.3	-1.8	-7.0 *	-1.0
Practice size (v. 1 physician)				
2	16.2 *	25.5 **	15.2 *	16.3 *
3-5	23.8 **	26.2 **	18.6 **	18.2 **
6-10	17.4 *	19.5 **	15.4 *	16.5 *
11+	18.6 **	22.6 **	16.3 *	15.9 **
Ownership (v. physician or physician group)				
Hospital/academic medical center	14.8 **	7.6	8.3 *	10.2 **
HMO/insurance plan/other healthcare corporation	13.5 *	14.6 *	13.9 **	12.4 **
Community health center	-16.8	-14.2	-10.3	-5.6
Other/unknown	5.8	3.0	2.6	-3.1
Participating in PCMH or ACO (v. not)	1.1	3.5	-2.2	3.7
Multispecialty group (v. single specialty)				
Multispecialty	-10.8 *	-10.6 *	-6.3	-10.7 **
Unknown	3.2	-0.5	-12.3	7.2
Non-metropolitan (v. metro)	-6.9	-5.1	-1.8	-2.1
Region (v. Northeast)				
Midwest	8.7	1.0	1.5	-4.1
South	1.1	-6.9	-6.2	-9.7 **
West	9.3	0.0	1.4	-4.5

*(**) Significantly different from reference category at $P < .01$ ($P < .05$).

Source: CDC/NCHS Physician Workflow Survey, 2012