

**Supplemental material for:**

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Kaylyn Swankoski,<sup>1</sup> M.A.; Deborah Peikes,<sup>1</sup> M.P.A., Ph.D.; Maya Palakal,<sup>1</sup> M.S.; Nancy Duda,<sup>1</sup> Ph.D.; Timothy J. Day,<sup>2</sup> M.S.P.H.

1 = Mathematica Policy Research

2 = Centers for Medicare & Medicaid Services

## **Supplemental Appendix. Description of survey weights**

We applied practice-level weights to the comparison practice data, where weights were equal to the product of a matching weight and a nonresponse weight. The matching weight ensured that the comparison practices matched to a given CPC practice had the same combined weight as that CPC practice. The nonresponse weight adjusts for potential bias that can arise if survey nonresponse is not random.

**Matching weight.** For the evaluation, we used propensity-score matching to select one or more comparison practices that were similar to CPC practices in terms of:

- Key practice characteristics (whether the practice had a clinician [primary and specialty care physicians, nurse practitioners, and physician assistants] who was a Medicare Meaningful EHR user, whether it had patient-centered medical home recognition, the number of clinicians, the percentage of practice clinicians with a primary care specialty, practice ownership, and whether the practice was a critical access hospital)
- Geographic characteristics (household income in the county, penetration rate of Medicare Advantage, and whether the practice is in a medically underserved area)
- Characteristics of the practice's attributed Medicare beneficiaries (number of attributed Medicare beneficiaries, percentage who are dual eligible, demographic characteristics, chronic conditions, HCC scores, and original reasons for Medicare entitlement)
- Service use by the practice's attributed beneficiaries who are in Medicare fee-for-service (number of inpatient hospital visits, emergency department visits, and physician visits) and expenditures for these beneficiaries<sup>7</sup>

The matching weights adjusted for the number of comparison practices matched to each CPC practice. For example, if one CPC practice was matched to five comparison practices, each comparison practice would have a matching weight of 0.2.

**Survey nonresponse weight.** Because all CPC practices were required to complete the survey as a condition of participating in the initiative, we did not need to account for survey nonresponse among CPC practices. To account for nonresponse among the comparison practices, we calculated nonresponse weights for each comparison practice, using a decision tree plus stepwise regression to select the variables that best predicted survey responses. The nonresponse weights accounted for ownership, number of clinicians, whether the practice was in the same region as the CPC practices to which it was matched, median household income of the practice's county, the distribution of ages for the attributed Medicare beneficiaries, percentage Hispanic, and percentage Native American.<sup>7</sup>

**Supplemental Table 1. Variables and data sources**

Variable	Data
<b>CPC subgroup variables</b>	
CPC practice size in October 2012 (number of primary care physicians, nurse practitioners, and physician assistants)	CPC roster files submitted to CMS November 2012
Whether practice was affiliated with a health care system	SK&A, 2016 <sup>a</sup>
Hierarchical Condition Category (HCC) score	Medicare FFS claims, May 2010-April 2012
Percentage of practice's county that is urban	HRSA's Area Resource File, 2009
<b>Regression Covariates</b>	
<b>Practice Characteristics</b>	
Number of primary care clinicians (physicians, nurse practitioners, physician assistants)	SK&A, 2012
NCQA or state medical home recognition status	National Committee for Quality Assurance (NCQA), CPC application data, and Oklahoma Sooner Care data, 2012
Number of Medicare or Medicaid meaningful users of EHRs in the practice	Centers for Medicare & Medicaid Services, 2012
Whether practice was affiliated with a health care system	SK&A, 2016
Whether practice is multispecialty	SK&A, 2012
<b>Characteristics of Practices' County or Census Tract</b>	
Whether in medically underserved area	HRSA data, 2009
Medicare Advantage penetration rate of county	HRSA's Area Resource File, 2009
Percentage of practice's county that is urban	HRSA's Area Resource File, 2009
Median household income of county	HRSA's Area Resource File, 2009

CMS = Centers for Medicare & Medicaid Services; HRSA = Health Resources & Services Administration

<sup>a</sup> We did not have baseline data on practices' affiliation with a health care system and therefore use 2016 data, the earliest measure.

**Supplemental Table 2. Percentage of CPC Practices with Different Staff Types, by System Affiliation and Mean HCC Score of Beneficiaries**

Staff Type	Practices' Affiliation with a System								Mean 2012 HCC Score Among Practices' Attributed Medicare FFS Beneficiaries							
	Is in a system				Is not in a system				Less than or equal to the sample median				Greater than the sample median			
	2012	2014	2016	Change over time	2012	2014	2016	Change over time	2012	2014	2016	Change over time	2012	2014	2016	Change over time
Number of practices	172	171	171		289	283	289		231	226	231		230	228	229	
Primary care clinicians reported on roster files to CMS <sup>b</sup>	100	100	100	0	100	100	100	0	100	100	100	0	100	100	100	0
Physicians	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.
Primary care physicians (MDs or DOs) (2014)	n.a.	100	99	-1	n.a.	99	99	0	n.a.	100	99	-1	n.a.	100	99	0
Specialty physicians (2014)	n.a.	13	12	-1	n.a.	12	12	0	n.a.	11	10	-1	n.a.	14	14	1
Nurse practitioners and physician assistants (NPs and PAs)	51	n.a.	n.a.	n.a.	54	n.a.	n.a.	n.a.	56	n.a.	n.a.	n.a.	50	n.a.	n.a.	n.a.
NPs/PAs who can bill under own NPI (2014)	n.a.	53	57	4	n.a.	39	45	6	n.a.	46	49	4	n.a.	43	50	7
NPs/PAs who do not bill under own NPI (2014)	n.a.	12	16	4	n.a.	26	21	-5	n.a.	24	23	-2	n.a.	18	16	-1
RNs, excluding RN care managers	31	39	43	12**	38	49	43	5	30	42	42	12***	40	48	44	4
Nutritionists	6	8	11	5*	3	12	15	12***	4	12	15	11***	4	10	12	7***
Behavioral health, clinical psychologist, or social workers (2014)	n.a.	25	40	15***	n.a.	15	23	8**	n.a.	19	33	14***	n.a.	19	26	7*
Health educators	6	8	6	1	3	10	11	8***	3	8	8	6***	6	11	10	4*
Care managers/care coordinators who coordinate care for patients in the practice with other providers	23	94	90	67***	24	79	80	56***	23	86	84	61***	25	83	83	59***
Community services coordinators who link patients in the practice with available services and resources in the community	3	9	8	5*	5	2	2	-2	3	2	4	0	5	7	5	0
Medical assistants	90	91	92	2	89	87	88	-1	92	93	93	0	87	84	86	0
LPNs/LVNs	46	51	57	11**	48	49	49	1	41	45	46	5	53	55	58	5
Pharmacists	16	23	25	8*	2	9	14	11***	3	12	14	11***	12	17	21	10***
Practice supervisors or practice managers (2014)	n.a.	95	97	2	n.a.	89	90	2	n.a.	92	94	3	n.a.	91	91	0
Quality improvement specialists (2014)	n.a.	10	19	9**	n.a.	12	17	5*	n.a.	12	17	4	n.a.	10	19	9***
Physical or respiratory therapists (2014)	n.a.	4	2	-1	n.a.	3	3	0	n.a.	2	2	0	n.a.	4	4	0
Lab or radiology technicians (2014)	n.a.	30	30	-1	n.a.	32	35	3	n.a.	38	40	1	n.a.	24	27	3

Health information technologists or EHR specialists (2014)	n.a.	14	15	1	n.a.	17	19	2	n.a.	17	15	-2	n.a.	15	20	5
Administrative (reception, medical records, appointment, finance, etc.)	99	n.a.	n.a.	n.a.	98	n.a.	n.a.	n.a.	99	n.a.	n.a.	n.a.	99	n.a.	n.a.	n.a.
Receptionists (2014)	n.a.	98	98	0	n.a.	94	95	1	n.a.	96	97	1	n.a.	94	95	0
Accountants or financial manager (2014)	n.a.	11	15	4	n.a.	14	19	5	n.a.	15	17	2	n.a.	11	18	7**
Staff who work in billing, coding, administrative assistance, medical records, payroll, data entry or analysis, or network administrator (2014)	n.a.	42	51	9*	n.a.	57	54	-3	n.a.	52	58	6	n.a.	51	48	-2
Other (2014)	n.a.	26	29	3	n.a.	18	18	0	n.a.	19	21	2	n.a.	22	23	1

Source: CPC practice surveys administered October through December 2012, April through July 2014, and April through August 2016.

Notes: Practices' affiliation with a system is from 2016 SK&A data. A practice's mean HCC score is based on the 2012 HCC scores of the practice's Medicare FFS beneficiaries. Mean HCC scores ranged from 0.68 to 1.61; the median score was 1.02. By design, system affiliation and HCC score are held constant.

<sup>a</sup> Between the 2012 and 2014 survey, we changed some of the staff categories. In this column we provide the percentage of practices that reporting having the staff type in 2012 if the staff type was asked about in 2012, otherwise we report the data for 2014 as noted in the first column.

<sup>b</sup> The number of primary care clinicians at the practice site includes primary care physicians, nurse practitioners, and physician assistants who can bill under their own NPI. Practices reported this information to CMS each month; the numbers for this analysis come from the roster files reported November of the corresponding year.

n.a. = not applicable because that staff type was not asked about in that survey; HCC = hierarchical condition category; FFS = fee-for-service; MD = Doctor of Medicine; DO = Doctor of Osteopathic Medicine; NPI = National Provider Identifier; RN = Registered Nurse; LPN = Licensed Practical Nurse; LVN = Licensed Vocational Nurse.

\*/\*\*/\*\*\* Change over time was statistically different from zero at the 0.10/0.05/0.01 level, two-tailed t-test.

**Supplemental Table 3. Percentage of CPC Practices with Different Staff Types by Year and Change Over Time, by Baseline Practice Size<sup>a</sup>**

Staff Type	Number of Clinicians at Baseline (2012)																			
	1				2-3				4-5				6-10				More than 10			
	2012	2014	2016	Change over time	2012	2014	2016	Change over time)	2012	2014	2016	Change over time	2012	2014	2016	Change over time	2012	2014	2016	Change over time
Number of practices	71	67	71		156	154	155		109	108	109		93	93	93		32	32	32	
Primary care clinicians reported on annual roster files <sup>b</sup>	100	100	100	0	100	100	100	0	100	100	100	0	100	100	100	0	100	100	100	0
Physicians	99	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.
Primary care physicians (MDs or DOs)	n.a.	97	99	2	n.a.	100	99	-1	n.a.	100	99	-1	n.a.	100	99	-1	n.a.	100	97	-3
Specialty physicians	n.a.	3	3	0	n.a.	6	8	2	n.a.	7	8	1	n.a.	19	19	0	n.a.	53	41	-13
Nurse practitioners and physician assistants (NPs and PAs)	30	n.a.	n.a.	n.a.	48	n.a.	n.a.	n.a.	52	n.a.	n.a.	n.a.	68	n.a.	n.a.	n.a.	91	n.a.	n.a.	n.a.
NPs/PAs who can bill under own NPI	n.a.	24	21	-3	n.a.	38	45	6	n.a.	44	54	11	n.a.	62	66	3	n.a.	66	75	9
NPs/PAs who do not bill under own NPI	n.a.	22	20	-3	n.a.	20	21	1	n.a.	19	15	-5	n.a.	19	22	2	n.a.	31	22	-9
RNs, excluding RN care managers	20	33	30	10	26	34	29	3	31	44	42	11*	55	59	63	9	69	88	84	16
Nutritionists	0	9	4	4*	3	6	11	8***	3	7	12	9***	9	18	24	15***	13	22	22	9
Behavioral health, clinical psychologist, or social workers	n.a.	6	13	7	n.a.	8	19	11***	n.a.	15	25	10**	n.a.	37	49	13*	n.a.	59	72	13
Health educators	4	0	4	0	1	8	9	8***	4	12	7	4	8	11	16	9*	13	22	9	-3
Care managers/care coordinators who coordinate care for patients in the practice with other providers	17	73	75	58***	17	82	79	62***	21	92	86	65***	34	86	94	59***	53	91	94	41***
Community services coordinators who link patients in the practice with available services and resources in the community	4	0	1	-3	1	4	1	-1	4	2	6	2	6	11	6	0	13	9	19	6

Medical assistants	89	84	77	-11*	85	84	92	8**	92	94	92	0	95	90	91	-3	94	94	91	-3
LPNs/LVNs	32	36	39	7	46	47	47	2	40	48	50	10	62	60	65	2	69	69	75	6
Pharmacists	1	4	6	4	2	8	12	10***	4	9	13	9**	17	27	30	13**	34	47	53	19
Practice supervisors or practice managers	n.a.	73	77	4	n.a.	88	93	5	n.a.	99	98	-1	n.a.	98	97	-1	n.a.	97	97	0
Quality improvement specialists	n.a.	4	7	3	n.a.	10	18	8**	n.a.	11	16	4	n.a.	17	20	3	n.a.	16	41	25**
Physical or respiratory therapists	n.a.	1	1	0	n.a.	0	1	0	n.a.	2	1	-1	n.a.	6	6	0	n.a.	19	13	-6
Lab or radiology technicians	n.a.	12	18	6	n.a.	23	24	1	n.a.	32	36	3	n.a.	48	48	0	n.a.	59	59	0
Health information technologist or EHR specialists	n.a.	9	21	12**	n.a.	9	14	5	n.a.	15	12	-3	n.a.	29	24	-5	n.a.	28	28	0
Administrative (reception, medical records, appointment, finance, etc.)	97	n.a.	n.a.	n.a.	98	n.a.	n.a.	n.a.	99	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.	100	n.a.	n.a.	n.a.
Receptionists	n.a.	84	89	5	n.a.	96	95	-1	n.a.	97	98	1	n.a.	99	99	0	n.a.	100	97	-3
Accountants or financial managers	n.a.	3	14	11**	n.a.	9	17	8**	n.a.	10	12	2	n.a.	23	18	-4	n.a.	34	41	6
Staff who work in billing, coding, administrative assistance, medical records, payroll, data entry or analysis, or network administrator	n.a.	43	37	-7	n.a.	38	45	6	n.a.	49	50	1	n.a.	73	78	5	n.a.	75	66	-9
Other	n.a.	7	8	1	n.a.	13	19	6	n.a.	19	28	10*	n.a.	34	29	-5	n.a.	53	25	-28**

Source: CPC practice surveys administered October through December 2012, April through July 2014, and April through August 2016.

Notes: The sample is restricted to the 461 CPC practices that responded to the 2012, 2014, and 2016 surveys.

<sup>a</sup> Practice size was determined using practice-provided rosters of the primary care physicians and NPs and PAs who bill under their own NPI. The roster files were collected in November 2012 and report the number of these clinicians at the practice site in October 2012, the first month of CPC.

<sup>b</sup> The number of primary care clinicians includes primary care physicians, nurse practitioners, and physician assistants who can bill under their own NPI. Practices reported this information to CMS each month; the numbers for this analysis come from the roster files reported November of the corresponding year.

pp = percentage point; n.a. = not applicable because that staff type was not asked about in that survey; MD = Doctor of Medicine; DO = Doctor of Osteopathic Medicine; NPI = National Provider Identifier; RN = Registered Nurse; LPN = Licensed Practical Nurse; LVN = Licensed Vocational Nurse.

\*/\*\*/\*\*\*\* Change over time was statistically different from zero at the 0.10/0.05/0.01 level, two-tailed t-test.

**Supplemental Table 4. Mean Number of FTE Staff per Primary Care Clinician in CPC Practices with Staff Type in 2016, by Baseline Practice Size<sup>a</sup>, Part-Time Staff Calculated as 0.75 FTE**

Staff Type	All CPC Practices	Number of Clinicians at Baseline (2012)				
		1	2-3	4-5	6-10	More than 10
Staff per primary care clinician FTE	3.4	5.4	3.2	3.0	2.9	3.3
Non-administration staff per primary care clinician FTE	2.1	3.1	2.0	1.8	1.8	2.2
Administration staff per primary care clinician FTE	1.3	2.3	1.2	1.0	1.0	1.0

Source: CPC practice surveys administered April through August 2016.

Notes: In the survey, we asked for the number of full-time and part-time staff. We estimated that a part-time staff member was equivalent to 0.75 FTE. For the denominator of each ratio, we used the number of FTE physicians reported in the November 2016 clinician roster files to CMS; the numerator is the FTE staff reported by practices in the survey.

<sup>a</sup> Practice size was determined using practice-provided rosters of the primary care physicians and nurse practitioners and physician assistants who bill under their own NPI. The roster files were collected in November 2012 and report the number of these clinicians at the practice site in October 2012, the first month of CPC.

FTE = full-time equivalent.



**Supplemental Table 5. Mean number of FTE staff to FTE primary care clinicians (reported in the survey) among practices with each staff type, 2016**

	CPC	Comparison	Difference
Physicians			
Primary care physicians (MDs or DOs)	0.8	0.8	0.0
Specialty physicians	0.4	0.6	-0.1
Nurse practitioners and physician assistants (NPs and PAs)			
NPs/PAs who can bill under own NPI	0.4	0.3	0.0
NPs/PAs who do not bill under own NPI	0.8	0.7	0.1
RNs, excluding RN care managers	0.4	0.4	0.0
Nutritionists	0.2	0.1	0.1
Behavioral health, clinical psychologist, or social workers	0.2	0.3	0.0
Health educators	0.2	0.3	-0.1
Care managers/care coordinators, who coordinate care for patients in the practice with other providers	0.4	0.4	0.0
Community services coordinators, who link patients in the practice with available services and resources in the community	0.3	0.3	0.0
Medical assistants	1.3	1.3	0.1
LPNs/LVNs	0.8	0.8	-0.1
Pharmacists	0.3	0.2	0.0
Practice supervisors or practice managers	0.4	0.4	-0.1
Quality improvement specialists	0.2	0.2	0.0
Physical or respiratory therapists	0.3	0.2	0.1
Lab or radiology technicians	0.5	0.5	0.0
Health information technologists or EHR specialists	0.3	0.2	0.1
Administrative (reception, medical records, appointments, finance, etc.)			
Receptionists	1.0	1.0	0.0
Accountants or financial managers	0.3	0.3	0.0
Staff who work in billing, coding, administrative assistance, medical	0.7	0.6	0.1
Other	0.5	1.2	-0.7

Source: CPC practice survey administered April through August 2016.

Notes: In the survey, we asked for the number of full-time and part-time staff at each practice site. We estimated that a part-time staff member was equivalent to 0.50 FTE. For the denominator of each ratio, we used the number of FTE primary care physicians, nurse practitioners, and physician assistants who bill under their own NPI, as reported by practices in the survey. The denominator used for the ratios in this table is from the survey, which is different from the denominators used in Table 3 and Appendix Table 4 that use staff counts that practices reported to CMS in monthly roster files. We needed to use the survey data here because CMS did not collect roster files from comparison practices.

DO = Doctor of Osteopathic Medicine; FTE = full-time equivalent; LPN = Licensed Practical Nurse; LVN = Licensed Vocational Nurse; MD = Doctor of Medicine; NPI = National Provider Identifier; RN = Registered Nurse.

