Medicare & Medicaid Research Review
2012: Volume 2, Number 1

A publication of the Centers for Medicare & Medicaid Services, Center for Strategic Planning

Effect of Cost-Sharing Reductions on Preventive Service Use Among Medicare Fee-for-Service Beneficiaries

Suzanne M. Goodwin[1] *& Gerard F. Anderson*[2]

[1]Johns Hopkins Bloomberg School of Public Health
[2]Johns Hopkins Bloomberg School of Public Health, Center for Hospital Finance and Management

Background: Section 4104 of the Patient Protection and Affordable Care Act (ACA) waives previous cost-sharing requirements for many Medicare-covered preventive services. In 1997, Congress passed similar legislation waiving the deductible only for mammograms and Pap smears. The purpose of this study is to examine the effect of the deductible waiver on mammogram and Pap smear utilization rates.

Methods: Using 1995–2003 Medicare claims from a sample of female, elderly Medicare fee-for-service beneficiaries, two pre/post analyses were conducted comparing mammogram and Pap smear utilization rates before and after implementation of the deductible waiver. Receipt of screening mammograms and Pap smears served as the outcome measures, and two time measures, representing two post-test observation periods, were used to examine the short- and long-term impacts on utilization.

Results: There was a 20 percent short-term and a 25 percent longer term increase in the probability of having had a mammogram in the four years following the 1997 deductible waiver. Beneficiaries were no more likely to receive a Pap smear following the deductible waiver.

Conclusions: Elimination of cost sharing may be an effective strategy for increasing preventive service use, but the impact could depend on the characteristics of the procedure, its cost, and the disease and populations it targets. These historical findings suggest that, with implementation of Section 4104, the greatest increases in utilization will be seen for preventive services that screen for diseases with high incidence or prevalence rates that increase with age, that are expensive, and that are performed on a frequent basis.

Key Words: Medicare, preventive services, mammograms, Pap smears, cost sharing, deductible, Patient Protection and Affordable Care Act (ACA).

doi: http://dx.doi.org/10.5600/mmrr.002.01.a03

Preventive services allow for early detection of disease in the absence of clinical symptoms. Despite their potential health benefits, evidence supporting their effectiveness, and efforts to encourage their use and enable their availability, not all individuals obtain the recommended services. Numerous studies have been conducted over the years to understand why some individuals do not receive recommended preventive services and to evaluate the effectiveness of interventions aimed at increasing their use. These studies have identified a number of demographic, clinical, educational, behavioral, financial, logistical, and organizational factors associated with their use (Blustein, 1995; Bynum, Braunstein, Sharkey, Haddad, & Wu, 2005; Hsia et al., 2000; Lane, Zapka, Breen, Messina, & Fotheringham, 2000; Pham, Schrag, Hargraves, & Bach, 2005). Cost sharing has been shown to be a contributing factor (Blustein, 1995; Liang, Phillips, Tye, Haas, & Sakowski, 2004; Lurie et al., 1987; Solanki & Schauffler, 1999; Solanki, Schauffler, & Miller, 2000; Trivedi, Rakowski, & Ayanian, 2008).

Many preventive services are recommended for elderly individuals. Medicare currently covers 21 different preventive services, including mammograms and Pap smears (Centers for Medicare & Medicaid Services [CMS], 2010c). Until recently, these preventive services were subject to different degrees of cost sharing. In some instances (e.g., influenza vaccination), beneficiaries were not required to pay the annual deductible before the service was covered, nor did they pay coinsurance. In other instances (e.g., glaucoma eye examination), beneficiaries were required to pay the annual Part B deductible before Medicare would pay and/or they were responsible for 20 percent of the cost. This cost sharing may have deterred some beneficiaries from obtaining recommended preventive services.

Beginning January 2011, cost-sharing requirements were waived for most Medicare-covered preventive services. Specifically, Section 4104 of the Patient Protection and Affordable Care Act (ACA) waives the previous coinsurance requirement for initial preventive physical examinations, ultrasound screenings for abdominal aortic aneurysms, medical nutrition therapy, screening pelvic examinations, bone mass measurements, hepatitis B vaccinations, and some—but not all—colorectal cancer screening procedures (coinsurance will still apply for screening barium enemas). It also waives the previous deductible for medical nutrition therapy, bone mass measurement, and hepatitis B vaccinations. A full list of preventive services currently covered under Medicare, and their cost-sharing requirements before and after implementation of ACA Section 4104, is provided in Appendix Exhibit A1. These waivers are expected to remove financial barriers to obtaining beneficial preventive services.

Although this change is significant, it is not the first time Congress has waived cost-sharing requirements for Medicare-covered preventive services. In the 1990s, Congress became concerned that out-of-pocket costs were deterring women from getting mammograms and Pap smears. To increase utilization rates, Congress eliminated the Part B deductible requirement for these two preventive services in the Balanced Budget Act of 1997 (BBA 1997). More recently, Congress exempted colorectal cancer screening from the Part B deductible in the Deficit

Reduction Act of 2005, and waived the Part B deductible for initial preventive physical examinations in the Medicare Improvements for Patients and Providers Act of 2008.

The purpose of this study was to use claims data to assess whether the BBA 1997's elimination of the Part B deductible was effective in increasing mammogram and Pap smear utilization rates among female elderly Medicare beneficiaries. The results provide historical evidence on the effectiveness of this strategy, and may forecast whether ACA's elimination of cost sharing for other Medicare-covered preventive services will induce certain types of Medicare beneficiaries to seek these services.

Methods

We analyzed Medicare claims and enrollment data for a randomly-selected five percent sample of Medicare beneficiaries to assess whether elimination of the Part B deductible was effective in increasing mammogram and Pap smear utilization rates. These data were linked to county-level income and education data from the 2001 Area Resource File. We obtained permission to use these data from the Privacy Board of the Centers for Medicare & Medicaid Services (CMS) and the Institutional Review Board of the Johns Hopkins Bloomberg School of Public Health (JHBSPH). Also, this study complied with all data privacy and security laws and regulations to ensure that sensitive health information was protected.

The mammogram analysis spans a six-year time period (three 2-year observation periods covering 1996–2001) and the Pap smear analysis spans a nine-year time period (three 3-year observation periods covering 1995–2003). The comparison periods differ because the recommended frequency of the two procedures differs: Mammograms were covered at least once every two years and Pap smears were covered at least once every three years.

The Pap smear sample consisted of female Medicare beneficiaries who were age 65 or older in 1995 and the mammogram sample consisted of female Medicare beneficiaries who were age 65 or older in 1996. To be included in either sample, beneficiaries also had to reside in the United States, be alive, and be continuously enrolled in the Medicare fee-for-service (FFS) program with Part B eligibility for the full study period. Women diagnosed and treated for breast cancer during the study period were excluded from the mammogram sample and women diagnosed and treated for cervical cancer were excluded from the Pap smear sample. Women with these diagnoses were excluded because any mammograms or Pap smears they received would be considered diagnostic and not screening. Women who had a hysterectomy claim also were excluded from the Pap smear sample since women who had their cervix removed would have no need for a Pap smear. Some women may have had these procedures before they entered the Medicare program; this cannot be determined from the data, however.

For both analyses, a single-group time-series study design with three observation periods was used, with the first observation period being the pre-waiver period (1995–1997 for the Pap smear analysis and 1996–1997 for the mammogram analysis) and the second and third

observation periods (post one and post two, respectively) serving as the two post-waiver periods (1998–2000 and 2001–2003 for the Pap smear analysis and 1998–1999 and 2000–2001 for the mammogram analysis). To determine if the waiver had a short-term effect on utilization rates, mammogram and Pap smear use in 1998–1999 and 1998–2000, respectively, were compared with mammogram and Pap smear use in 1996–1997 and 1995–1997, respectively (post one vs. pre-waiver). To determine if the waiver had a longer term effect on utilization rates, mammogram and Pap smear use in 2000–2001 and 2001–2003, respectively, were compared to mammogram and Pap smear use in 1996–1997 and 1995–1997, respectively (post two vs. pre-waiver). These two sets of pre-post results were compared with changes in mammogram and Pap smear use between the two post-waiver periods (post two vs. post one), when there were no major interventions aimed at increasing their use.

Women were classified as having either received a mammogram or a Pap smear during each observation period if a screening mammogram or Pap smear procedure code appeared at least once in the beneficiary's inpatient, outpatient, or carrier claims during that observation period. A list of the procedure codes used is provided in Appendix Exhibit A2. Two time variables representing the first and second post-waiver periods served as the main independent variables, with the pre-waiver time period serving as the reference.

Both analyses controlled for age, race, income, education, Medicaid enrollment status, health status, number of office visits, and receipt of flu shot. All variables except race were allowed to vary by time period and all variables except income and education were measured at the beneficiary-level. Several interaction terms also were included to account for the possibility that one covariate moderated the association between the dependent variable and one of the covariates (e.g., the association between health status and mammogram use may have differed depending on how many health care visits beneficiaries had).

Age, race, and Medicaid enrollment status were measured using data from the Medicare enrollment files. Age was measured as a categorical variable (age 65–69, 70–74, 75–79, 80–84, and 85+), with age 70–74 serving as the reference group. Race was measured as a categorical variable (White, Black, Hispanic, Asian, other), with White serving as the reference group. A beneficiary was considered to be a Medicare-Medicaid dual enrollee if she was enrolled in Medicaid for at least one month of the observation period, as noted by the state buy-in indicator included in the administrative data.

Income and education data were not available in the enrollment data; instead, they were measured using county-level data obtained from the 2001 Area Resource File, which was linked to the enrollment data using the state-county geographic code contained in both files. Income status was based on the median household income for the county in which the beneficiary resided; beneficiaries were assigned to an income quartile based on their county-level income status, with the lowest income quartile serving as the reference group. Education was based on whether the median education level of the county in which the beneficiary resided was above or

below 12.0 (equivalent of a high school diploma), with a below 12.0 education level serving as the reference group.

Health status, number of office visits, and receipt of flu shot were derived from Medicare claims data. The number of chronic conditions served as a proxy for health status and was calculated using a multi-step process. First, the diagnosis fields of each year's inpatient, outpatient, and carrier files were scanned to count the frequency of each International Classification of Diseases, Ninth Revision, Clinical Modification diagnosis code. For a diagnosis code to move on to the next step, it had to appear more than once in a given year in any of the three files combined, so as not to erroneously count any diagnoses that appeared on a claim to rule out a condition rather than to report the presence of a confirmed diagnosis. Second, the diagnosis code had to be for a chronic condition, which was determined using a chronic condition classification system developed by a team at JHBSPH (Hwang, Weller, Ireys, & Anderson, 2001). If the diagnosis code was for a chronic condition, it was assigned to one of the disease categories of the Clinical Classifications Software (CCS) developed by the Agency for Healthcare Research and Quality (Agency for Healthcare Research and Quality, 2009). The final number of chronic conditions for a given year represented the sum of the different chronic condition categories a beneficiary had for that year. The number of chronic conditions reported for each observation period represented the highest count for the years represented in that observation period.

Number of office visits served as a measure of the number of opportunities for a mammogram or Pap smear to be recommended or performed by a health provider. Each evaluation and management procedure code present in the carrier files was counted as an office visit. A list of the procedure codes used is provided in the Appendix. The number of unique office visits was counted for each year and summed for all years within an observation period.

Receipt of an influenza vaccination served as a proxy for beneficiaries' propensity to seek preventive services. Flu shots were selected as the proxy measure, because it was the only preventive service covered during the entire study period whose cost-sharing requirements did not change (the deductible had been waived and coinsurance had not applied since it was first covered). Beneficiaries were counted as having a flu shot during an observation period if an influenza virus vaccination procedure code was listed in their inpatient, outpatient, or carrier claims at least once during the observation period. A list of the procedure codes used is provided in Appendix Exhibit A2.

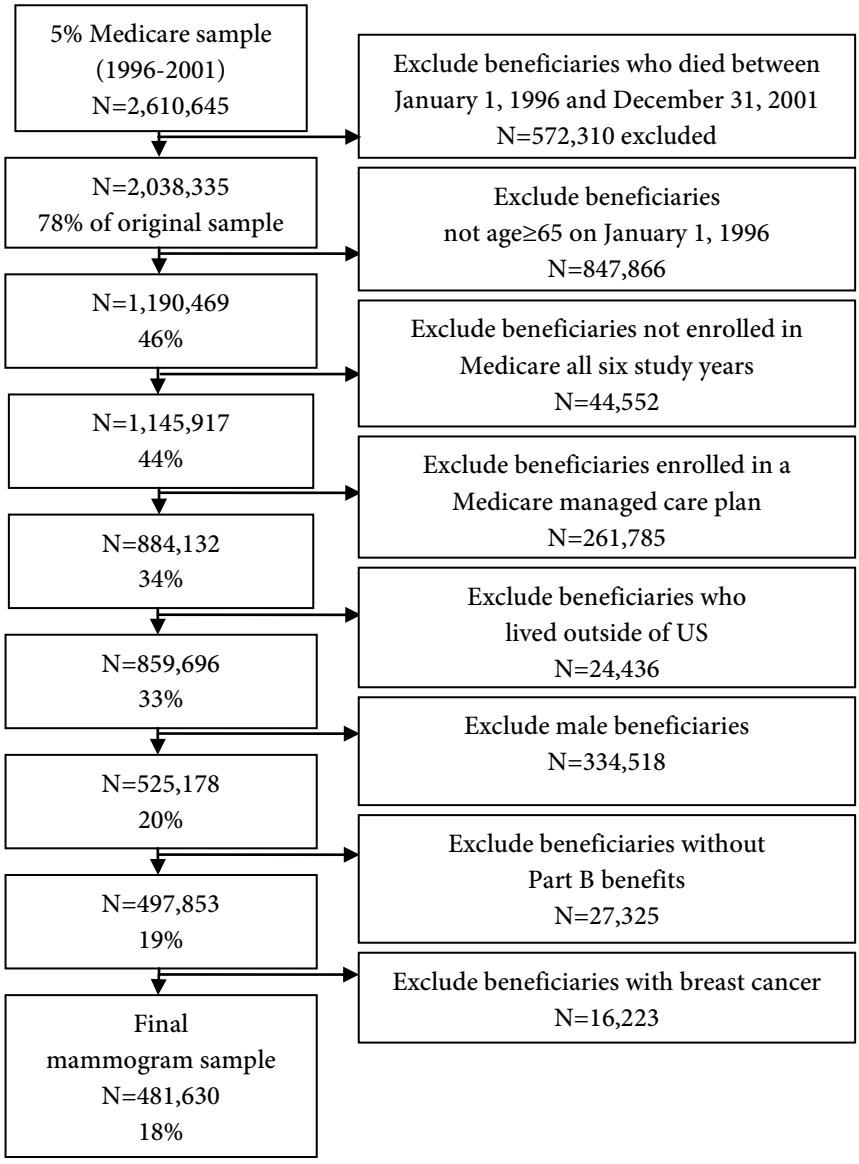
The analyses were performed using multivariate logistic regression. Because the study design involved repeated observations of the same beneficiaries over time, regression models were estimated using generalized estimating equations with exchangeable covariance to account for the correlations between observations of the same subject. Also, the Huber/White sandwich estimator of variance was used to ensure that accurate standard errors were produced in case the model was misspecified. Because of the large sample sizes, a 99% confidence interval was used to determine statistical significance instead of the 95% confidence interval traditionally used.

The analytic files were created with SAS software, version 9.1 (SAS Institute Inc., 2002) and the analyses were conducted with Stata Release 9.0 (StataCorp, 2007).

Results

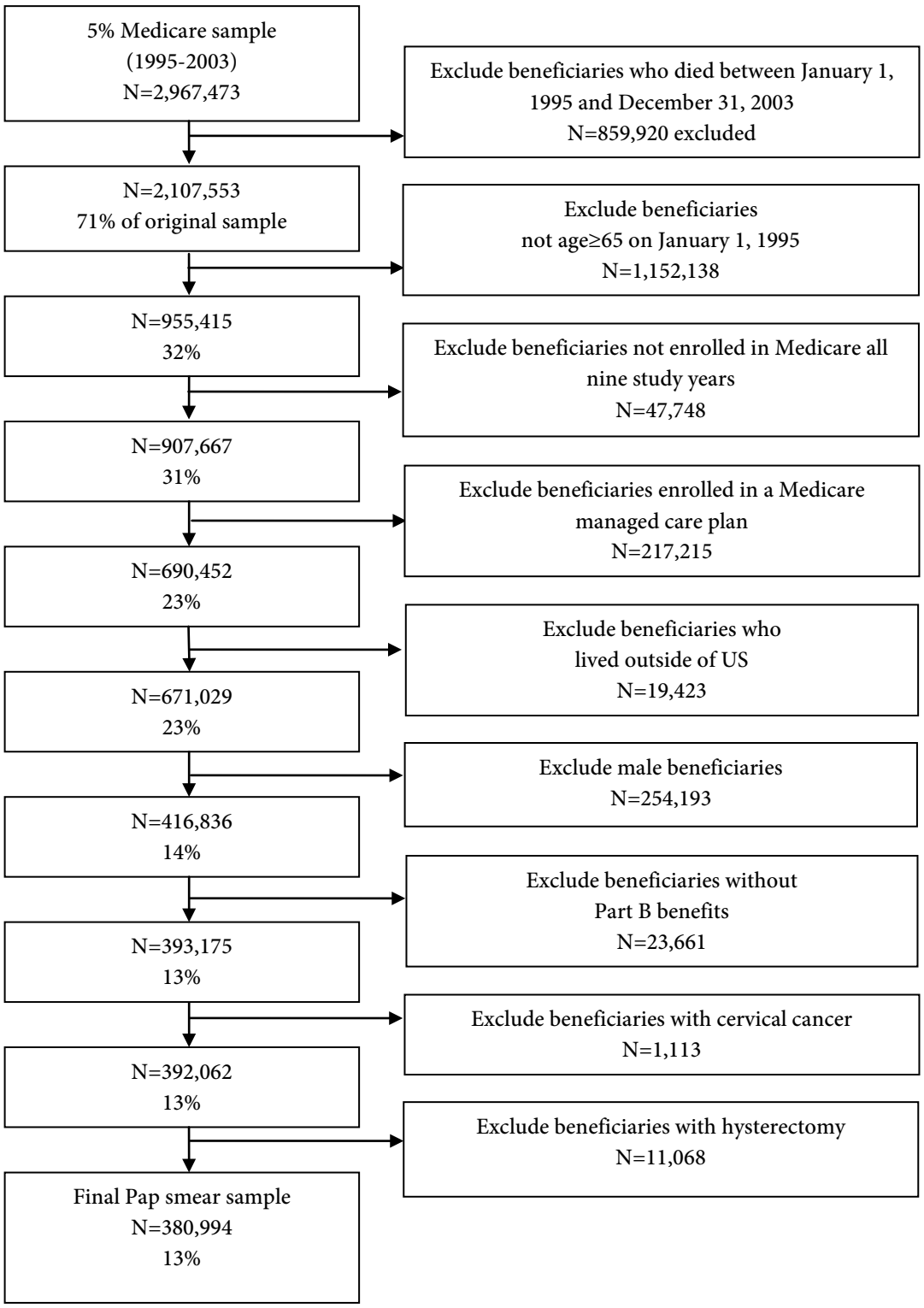
In Exhibits 1 and 2, the impact of the exclusion criteria and final sample sizes are presented. The final mammogram sample contained 481,630 beneficiaries and the final Pap smear sample contained 380,994 beneficiaries.

Exhibit 1. Application of Exclusion Criteria: Mammogram Sample



Source: 1996-2002 Medicare Standard Analytic Files, 5% Sample

Exhibit 2. Application of Exclusion Criteria: Pap Smear Sample



Source: 1995-2003 Medicare Standard Analytic Files, 5% Sample

Exhibit 3 shows the distribution of characteristics of the two samples. With the exception of race, the statistic for each characteristic is different for each time period, because of the longitudinal nature of the study design and time-varying nature of the attributes. Also, because the samples were aging over time, the number of beneficiaries in the younger age categories decreased over time and the number in the older age categories increased. By the second post-waiver period, no one was in the age 65–69 group. Several of the other variables (number of chronic conditions, number of office visits) also increased over time, as would be expected in an aging cohort.

Exhibit 3. Mammogram and Pap Smear Sample Characteristics

	Mammogram Sample (N=481,630)						Pap smear Sample (N=380,994)					
	Pre-waiver (1996–1997)		Post 1 (1998–1999)		Post 2 (2000–2001)		Pre-waiver (1995–1997)		Post 1 (1998–2000)		Post 2 (2001–2003)	
Age												
Age 65–69	117,413	(24.4%)	57,001	(11.8%)	0	(0%)	93,767	(24.6%)	13,092	(3.4%)	0	(0%)
Age 70–74	143,396	(29.8%)	149,171	(31.0%)	147,225	(30.6%)	126,712	(33.3%)	133,984	(35.2%)	66,372	(17.4%)
Age 75–79	111,314	(23.1%)	127,167	(26.4%)	140,353	(29.1%)	89,956	(23.6%)	115,659	(30.4%)	130,376	(34.2%)
Age 80–84	68,868	(14.3%)	85,203	(17.7%)	101,499	(21.1%)	48,811	(12.8%)	72,030	(18.9%)	99,517	(26.1%)
Age 85+	40,639	(8.4%)	63,088	(13.1%)	92,553	(19.2%)	21,748	(5.7%)	46,229	(12.1%)	84,729	(22.2%)
Mean (±SD*)	74.8	(±6.4)	76.8	(±6.4)	78.8	(±6.4)	74.2	(±5.8)	77.2	(±5.8)	80.2	(±5.8)
Race												
White	426,267	(88.8%)	426,267	(88.8%)	426,267	(88.8%)	338,413	(88.8%)	338,413	(88.8%)	338,413	(88.8%)
Black	35,843	(7.5%)	35,843	(7.5%)	35,843	(7.5%)	27,750	(7.3%)	27,750	(7.3%)	27,750	(7.3%)
Hispanic	7,759	(1.6%)	7,759	(1.6%)	7,759	(1.6%)	6,017	(1.6%)	6,017	(1.6%)	6,017	(1.6%)
Asian	5,610	(1.2%)	5,610	(1.2%)	5,610	(1.2%)	4,405	(1.2%)	4,405	(1.2%)	4,405	(1.2%)
Other	4,717	(1.0%)	4,717	(1.0%)	4,717	(1.0%)	3,384	(0.9%)	3,384	(0.9%)	3,384	(0.9%)
Missing	1,434	(0.3%)	1,434	(0.3%)	1,434	(0.3%)	1,025	(0.3%)	1,025	(0.3%)	1,025	(0.3%)
Income (county-level)												
Mean (±SD*)	$37,710	(±8,970)	$37,762	(±8,988)	$37,842	(±9,007)	$37,762	(±8,962)	$37,836	(±8,983)	$37,960	(±9,002)
Education (county-level)												
HS** or equiv.	427,687	(88.8%)	427,804	(88.8%)	427,987	(88.9%)	338,851	(88.9%)	338,967	(89.0%)	339,122	(89.0%)
No HS** or equiv.	52,943	(11.2%)	53,826	(11.2%)	53,643	(11.1%)	42,143	(11.1%)	42,027	(11.0%)	41,872	(11.0%)
Medicare-Medicaid dual enrollment												
Yes	62,371	(10.3%)	69,512	(11.2%)	77,458	(12.2%)	45,399	(11.9%)	52,466	(13.8%)	63,425	(16.7%)
No	419,259	(89.7%)	412,118	(88.8%)	404,172	(87.8%)	335,595	(88.1%)	328,528	(86.2%)	317,569	(83.4%)

Exhibit 3 (cont.)	Mammogram Sample (N=481,630)						Pap smear Sample (N=380,994)					
	Pre-waiver (1996–1997)		Post 1 (1998–1999)		Post 2 (2000–2001)		Pre-waiver (1995–1997)		Post 1 (1998–2000)		Post 2 (2001–2003)	
Number of chronic conditions												
0	50,067	(10.4%)	47,487	(9.9%)	36,461	(7.6%)	28,037	(7.4%)	24,390	(6.4%)	16,225	(4.3%)
1	52,519	(10.9%)	51,150	(10.6%)	39,673	(8.2%)	33,243	(8.7%)	28,937	(7.6%)	18,140	(4.8%)
2	64,843	(13.7%)	65,728	(13.7%)	56,084	(11.6%)	46,757	(12.3%)	43,548	(11.4%)	30,720	(8.1%)
3	66,043	(13.7%)	67,382	(14.0%)	61,781	(12.8%)	51,751	(13.6%)	50,540	(13.3%)	39,949	(10.5%)
4	58,474	(12.1%)	59,652	(12.4%)	58,522	(12.2%)	48,681	(12.8%)	49,142	(12.9%)	43,823	(11.5%)
5+	189,684	(39.4%)	190,231	(39.5%)	229,109	(47.6%)	172,525	(45.3%)	184,437	(48.4%)	232,137	(61.0%)
Mean (±SD*)	4.3	(±3.6)	4.3	(±3.5)	5.0	(±3.9)	4.8	(±3.6)	5.0	(±3.6)	6.2	(±3.6)
Number of provider visits												
Mean (±SD*)	13.6	(±12.0)	14.8	(±12.6)	15.3	(±13.3)	19.8	(±16.6)	22.7	(±18.1)	24.5	(±20.0)
Receipt of influenza vaccination												
Yes	282,678	(58.7%)	294,962	(61.2%)	290,054	(60.2%)	240,922	(63.2%)	256,126	(67.2%)	267,487	(70.2%)
No	198,952	(41.3%)	186,668	(38.8%)	191,576	(39.8%)	140,072	(36.8%)	124,868	(32.8%)	113,507	(29.8%)
Receipt of screening mammogram												
Yes	193,382	(40.2%)	220,484	(45.8%)	215,233	(44.7%)	--	--	--	--	--	--
No	288,248	(59.9%)	261,146	(54.2%)	266,397	(55.3%)	--	--	--	--	--	--
Receipt of Pap smear												
Yes	--	--	--	--	--	--	144,841	(38.0%)	138,219	(36.3%)	108,209	(28.4%)
No	--	--	--	--	--	--	236,153	(62.0%)	242,775	(63.7%)	272,785	(71.6%)

*SD: standard deviation

** HS: high school diploma

Source: 1996-2001 Medicare Standard Analytic Files, 5% Sample for the mammogram sample

Source: 1995-2003 Medicare Standard Analytic Files, 5% Sample for the pap smear sample

As Exhibit 3 shows, the number of beneficiaries who received a screening mammogram increased from 40 percent in 1996–1997 to 46 percent in 1998–1999 and then declined slightly to 45 percent in 2000–2001. The number of beneficiaries who received a Pap smear decreased from 38 percent in 1995–1997 to 36 percent in 1998–2000 and to 28 percent in 2001–2003.

Exhibit 4 shows the results of the longitudinal logistic regression analyses performed on the mammogram sample. The first reported odds ratio of 1.38 translates into a relative risk of 1.20, or a 20 percent increase in the probability of having had a mammogram in the 2 years after the deductible waiver compared to the 2 years immediately before the deductible waiver was introduced. The second odds ratio of 1.49 translates into a relative risk of 1.25, or a 25 percent increase in the probability of having had one in the in the 3 to 4 years after the waiver. There was only a five percent increase in the probability of getting a mammogram between the two post-waiver periods (odds ratio [OR]=1.07, relative risk [RR]=1.05), when there were no changes to the cost-sharing requirements.

Exhibit 4. Longitudinal Logistic Regression Results for Mammogram Analysis

Measure	Odds Ratio	p-value	99% Confidence Interval
Time			
Post 1 vs. pre-waiver	1.38	<.001	1.37–1.40
Post 2 vs. pre-waiver	1.49	<.001	1.47–1.50
Post 2 vs. post 1	1.07	<.001	1.06–1.08
Age			
REF: age 70–74			
age 75–79	0.74	<.001	0.73–0.75
age 80–84	0.46	<.001	0.45–0.47
age 85+	0.22	<.001	0.22–0.23
Race			
REF: White			
Black	0.91	<.001	0.88–0.94
Hispanic	0.76	<.001	0.71–0.81
Asian	0.57	<.001	0.52–0.62
Other	0.68	<.001	0.63–0.73
Income			
REF: 1st quartile (Q1)			
Q2	1.02	.009	1.00–1.04
Q3	0.96	<.001	0.93–0.98
Q4	0.89	<.001	0.86–0.93
Education			
REF: no HS diploma			
HS diploma	1.13	<.001	1.10–1.17
Dual enrollment			
REF: no			
yes	0.56	<.001	0.54–0.58

Exhibit 4 (cont.) Measure	Odds Ratio	p-value	99% Confidence Interval
# chronic conditions (health)			
REF: no chronic conditions			
1	1.45	<.001	1.42–1.48
2	1.58	<.001	1.54–1.61
3	1.59	<.001	1.55–1.64
4	1.56	<.001	1.51–1.62
5+	1.41	<.001	1.35–1.48
Number of provider visits			
REF: no visits			
1–4	3.05	<.001	2.96–3.14
5–8	4.51	<.001	4.36–4.67
9–12	5.28	<.001	5.08–5.49
13–16	5.75	<.001	5.49–6.03
17+	6.48	<.001	6.12–6.86
Flu shot			
REF: no			
yes	1.79	<.001	1.72–1.87
Interaction terms			
flu*age	0.99	0.04	0.99–1.00
flu*race	0.99	.004	0.97–1.00
flu*income	1.01	0.01	1.00–1.02
flu*education	1.01	0.46	0.97–1.05
flu*dual	0.88	<.001	0.85–0.90
flu*health	0.97	<.001	0.97–0.98
flu*visits	0.97	<.001	0.96–0.98
age*health	1.00	0.19	1.00–1.00
visits*health	1.01	<.001	1.01–1.01
visits*income	1.01	<.001	1.01–1.01
dual*income	1.00	0.67	0.99–1.02
race*income	1.01	.002	1.00–1.01

Source: 1996-2002 Medicare Standard Analytic Files, 5% Sample

Exhibit 5 shows the results of the longitudinal logistic regression analyses performed on the Pap smear sample. Beneficiaries were almost as likely to have had a Pap smear in the 3 years immediately after the deductible waiver was introduced as before (OR=0.99, RR=1.00). In the 4 to 6 years after the deductible waiver, the probability of having had a Pap smear actually decreased by 16 percent (OR=0.78, RR=0.84).

Exhibit 5. Longitudinal Logistic Regression Results for Pap Smear Analysis

Measure	Odds Ratio	p-value	99% Confidence Interval
Time/deductible waiver			
Post 1 vs. pre-waiver	0.99	0.02	0.98–1.00
Post 2 vs. pre-waiver	0.79	<.001	0.78–0.80
Post 2 vs. post 1	0.80	<.001	0.79–0.80
Age			
REF**: age 70–74			
age 75–79	0.78	<.001	0.76–0.79
age 80–84	0.52	<.001	0.51–0.54
age 85+	0.30	<.001	0.29–0.31
Race			
REF: White			
Black	0.78	<.001	0.75–0.81
Hispanic	0.85	<.001	0.78–0.93
Asian	0.87	.001	0.79–0.97
Other	0.81	<.001	0.74–0.89
Income			
REF: 1st quartile (Q1)			
Q2	1.02	0.12	0.99–1.04
Q3	0.99	0.33	0.95–1.02
Q4	0.94	<.001	0.89–0.98
Education			
REF: no HS* diploma			
HS* diploma	1.08	<.001	1.04–1.13
Dual enrollment			
REF: no			
yes	0.65	<.001	0.62–0.67
# of chronic conditions (health)			
REF: no chronic conditions			
1	1.52	<.001	1.47–1.58
2	1.63	<.001	1.57–1.69
3	1.67	<.001	1.61–1.75
4	1.68	<.001	1.60–1.77
5+	1.58	<.001	1.49–1.68
Provider visits			
REF: no visits			
1–6	4.25	<.001	4.02–4.49
7–12	6.68	<.001	6.29–7.09
13–18	8.07	<.001	7.55–8.61
19–24	9.25	<.001	8.58–9.98
25+	11.64	<.001	10.65–12.73

Exhibit 5 (cont.) Measure	Odds Ratio	p-value	99% Confidence Interval
Flu shot			
REF: no			
yes	1.54	<.001	1.45–1.62
Interaction terms			
flu*age	0.98	<.001	0.97–0.99
flu*race	1.01	0.08	1.00–1.03
flu*income	1.00	0.43	0.99–1.02
flu*education	1.06	.002	1.01–1.11
flu*dual	0.89	<.001	0.85–0.93
flu*health	0.98	<.001	0.97–0.99
flu*visits	0.97	<.001	0.96–0.98
age*health	1.00	.002	0.99–1.00
visits*health	1.00	0.87	1.00–1.00
visits*income	1.01	<.001	1.01–1.02
dual*income	0.94	<.001	0.93–0.96
race*income	1.00	0.97	0.99–1.01

* HS=High School

** REF=Reference Group

Source: 1995-2003 Medicare Standard Analytic Files, 5% Sample

Discussion

The results indicate that reducing out-of-pocket costs for preventive services can be an effective strategy for increasing utilization for certain types of preventive services, but not necessarily all services. What then determines which preventive services are likely to have increased use when cost sharing is eliminated?

Differences between mammograms and Pap smears and the diseases they target may partially explain the contrasting response to the deductible waiver. Elderly women are significantly more likely to develop breast cancer than cervical cancer (National Cancer Institute, 2010a; National Cancer Institute, 2010b). Also, the risk of developing breast cancer increases with age, whereas the risk of developing cervical cancer decreases with age (National Cancer Institute, 2010a; National Cancer Institute, 2010b). For these reasons, elderly women may perceive that it is more important for them to get mammograms than Pap smears. The differences in risk for these diseases among elderly women are reflected in the clinical practice guidelines for mammograms and Pap smears. Screening mammograms are usually recommended for women age 40 and over who are not in poor health (Nelson et al., 2009), while cervical cancer screening can be discontinued in elderly women who have had two to three normal test results in a nine- or ten-year period (Hartmann, Hall, Nanda, Boggess, & Zolnoun, 2002). Because mammograms are recommended for older women in good health, elderly beneficiaries previously deterred from getting one due to the out-of-pocket cost may have been

more inclined to do so after the deductible was waived. In contrast, the clinical factors rather than the cost sharing may explain why many older women did not start getting a Pap smear even after the deductible was waived.

Changes in the out-of-pocket costs of mammograms and Pap smears, before and after the waiver was implemented, may be a second reason why beneficiaries may have responded differently to the deductible waiver. During the study period, Pap smears and mammograms cost approximately $20–$60 and $95–$190, respectively, depending on the procedure code used and geographic location of the health care provider. Before the deductible waiver, a beneficiary who had not yet paid her Part B deductible would have paid the full $20–$60 for a Pap smear and $95–$118 for a mammogram (assuming a $100 deductible). After the deductible waiver, these beneficiaries would have paid only $4–$12 for a Pap smear and $19–$38 for a mammogram, resulting in a $16–$48 decrease in the out-pocket cost for a Pap smear and a $76–$80 decrease in the out-of-pocket cost for a mammogram. The larger reduction in the out-of-pocket cost for mammograms than for Pap smears may have made women more inclined to start getting a mammogram after the deductible waiver.

Based on the results of this study, it is hypothesized that preventive services that share characteristics of screening mammograms will be more likely to see increases in utilization following implementation of ACA Section 4104. Specifically, preventive services that screen for diseases with high incidence or prevalence rates and put women at increased risk with age, that target elderly beneficiaries, that are recommended to be performed more frequently, and that are more expensive may be more likely to experience utilization increases. Once data become available, future studies can test whether this hypothesis is upheld.

According to the proposed rule issued by CMS describing changes to the 2011 Physician Fee Schedule, beneficiaries no longer have to meet the deductible or pay coinsurance for certain preventive services as of January 1, 2011, and they no longer have to pay coinsurance (the deductible already is waived) for other preventive services (CMS, 2010a). Appendix Exhibit A1 lists the expected changes to cost sharing for each preventive service. Exhibit 6 provides detailed information on the characteristics of these tests, the diseases they target, and the factors expected to influence their use.

Exhibit 6. Factors influencing use of preventive services with waived cost sharing under ACA

	Medical nutrition therapy	Hepatitis B vaccinations	Bone mass measurement	Init. prev. phys. exam	Electro-cardiogram	Ultrasound screening	Mammo-grams	Pelvic exam	Colonoscopy, sigmoidoscopy, and FOBT*	Pap smears
Disease target	Diabetes and renal disease	Hepatitis B	Osteoporosis	n/a**	Cardiac conditions (e.g., dysrhythmias, murmurs)	Abdominal aortic aneurysm (AAA)	Breast cancer	Cervical and vaginal cancer	Colorectal cancer	Cervical cancer
Incidence rate (per 100,000) or prevalence rate (%)	Diabetes: age 60+ 23.1% (Centers for Disease Control and Prevention [CDC], 2007a). Renal disease: age 60+ 39.4% (CDC, 2007b).	1.5 (CDC, 2009).	men 3.8% women age 65+ 26.1% (Office of the Surgeon General, 2004).	n/a	n/a	elder men 4–8% elder women 0.5–1.5% (Fleming, Whitlock, Beil, & Lederle, 2005).	females age 65+ 415 (National Cancer Institute [NCI], 2010a).	Cervical cancer: 10.7 (NCI, 2010b). Vaginal cancer: women age 60+ 1.3–2.8 (Watson, Saraiya, & Wu, 2009).	men age 65+ 268 women age 65+ 209 (NCI, 2010).	Cervical cancer: 10.7 (NCI, 2010b).
Change in incidence rate with age	Increases	Decreases	Increases	n/a	n/a	Increases	Increases	Cervical cancer: Decreases. Vaginal cancer: Increases.	Increases	Decreases
Recommended screening frequency	2–3 hours of counseling each year	Once	Biennially	Once	Once	Once	Annually	Once every 1–2 years	FOBT: annually Colonoscopy: Every 2 years if high risk, every 10 years if average risk. Sigmoidoscopy: every 4 yrs or every 10 yrs after screening colonoscopy.	Once every 1–2 years

Exhibit 6 (cont.)	Medical nutrition therapy	Hepatitis B vaccinations	Bone mass measurement	Init. prev. phys. exam	Electro-cardiogram	Ultrasound screening	Mammo-grams	Pelvic exam	Colonoscopy, sigmoidoscopy, and FOBT*	Pap smears
High-risk groups/target population	Diabetes Renal disease	Sexually active men and women	Women age 65 and over	New beneficiaries	New beneficiaries	Family history of AAA*** Men age 65–75 with a history of smoking.	Women age 40 and over and not in poor health.	Sexually active women or women with a history of abnormal test results.	Men and women at high risk. Men and women age 50 and over at average risk.	Women who are sexually active or have history of abnormal test results.
2010 Medicare reimbur. (CMS, 2010b)	$12–$46	$24–$120	$9–$217	$126–$183	$7–$27	$94–$148	$70–$179	$32–$46	$12–$23 for FOBT $196–$483 for colonoscopy $55–$171 for sigmoidoscopy	$17-$55
Out-of-pocket cost before waiver	$12–$41	$24–$120	$9–$199	$25–$37	$1–$6	$18–$30	$14–$36	$6–$10	$2–$5 for FOBT $39–$97 for colonoscopy $11–$35 for sigmoidoscopy	$3–$11
Out-of-pocket cost after waiver	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Savings from waiver	$12–$41	$24–$120	$9–$199	$25–$37	$1–$6	$18–$30	$14–$36	$6–$10	$2–$5 for FOBT $39–$97 for colonoscopy $11–$35 for sigmoidoscopy	$3–$11

NOTES: * FOBT: fecal occult blood test; ** n/a: not applicable; *** AAA=Abdominal aortic aneurysm
SOURCE: Author compilation of data.

Based on this information, it is our hypothesis that medical nutrition therapy, bone mass measurement, colorectal cancer screening, and mammograms will see the largest increases in utilization rates. Utilization of medical nutrition therapy is expected to increase because, like mammograms, the service is covered annually, the diseases it targets—diabetes and renal disease—are highly prevalent among Medicare beneficiaries, the prevalence rates increase with age, and the change in out-of-pocket costs is sizable (pre-waiver out-of-pocket costs using 2010 fees are approximately $12–$46 per visit, depending on the procedure code used and geographic location of the health care provider, and post-waiver out-of-pocket costs would be $0). Bone mass measurements also are expected to see a noticeable increase in utilization among female elderly beneficiaries, because of the high and increasing prevalence of osteoporosis among women aged 65 and older, a recommended screening frequency of once every two years, and the sizable reduction in out-of-pocket costs (estimated out-of-pocket cost savings of $24–$120). Colorectal cancer screening is likely to experience an increase in utilization due to the high prevalence of colorectal cancer that increases with age, a recommended screening frequency of once every ten years, and the sizable savings in out-of-pocket costs. Mammogram utilization rates are expected to experience another increase with the elimination of the 20-percent coinsurance requirement, which reduces the out-of-pocket cost from approximately $14–$36 to $0.

In contrast, utilization rates for Pap smears and pelvic exams generally are not expected to see significant increases, because disease risk is low among elderly women and out-of-pocket cost savings are minimal ($3–$11 for Pap smears and $6–$10 for pelvic exams). Hepatitis B vaccination rates, initial preventive physical examination rates, electrocardiograms, and ultrasound screening for abdominal aortic aneurysms also are not expected to see significant increases in utilization, because they are covered only once. Although noticeable increases in utilization are not expected for these six services, some movement may be observed within specific subpopulations. For example, improvements in Pap smear and pelvic examination rates may be seen among non-elderly female Medicare beneficiaries who are more likely to be sexually active.

Other studies have looked at the effect of cost sharing on preventive service use (Blustein, 1995; Liang et al., 2004; Solanki & Schauffler, 1999; Solanki et al., 2000; Trivedi et al., 2008). These studies generally have found that increased cost sharing results in decreased utilization of preventive services; however, they have been limited in several ways. First, most have used cross-sectional study designs (Blustein, 1995; Liang et al., 2004; Solanki & Schauffler, 1999), which do not allow inferences about causation to be made. Second, most samples have been composed of either non-elderly individuals enrolled in private health insurance plans (Lurie et al., 1987; Solanki & Schauffler, 1999) or elderly beneficiaries enrolled in Medicare managed care plans (Trivedi et al., 2008). As a result, the findings of such studies may not be generalizable to elderly Medicare beneficiaries enrolled in the FFS program, because of differences in the ages of the samples and the cost sharing requirements of the plans. This study improves upon these

previous studies in that it used a time-series study design instead of a cross-sectional study design, and a sample of elderly Medicare beneficiaries enrolled in the FFS program instead of nonelderly, privately insured individuals or Medicare managed care enrollees.

No study we identified has examined how preventive service use is affected by an elimination of the deductible. Other studies have compared preventive service use among individuals who did and did not have a copayment (Lurie et al., 1987; Solanki & Schauffler, 1999; Trivedi et al., 2008), who did not have a copayment then did have a copayment, or whose copayment increased (Trivedi et al., 2008). One study compared preventive service use among beneficiaries with and without supplemental insurance [because most supplemental plans cover Medicare's Part B deductible and coinsurance] (Blustein, 1995), which is a proxy for cost sharing. This study examines how utilization is affected when cost sharing is reduced instead of increased and it does not use a proxy to measure cost sharing.

This study has several limitations. First, the study examined the effect of the 1997 deductible waiver on mammograms and Pap smears and used these results to forecast which preventive services are most likely to show increased use following implementation of ACA Section 4104. These findings on only two preventive services may not be adequate to accurately foretell how these other preventive services will respond to the 2011 cost-sharing waiver. Future assessments of the effect of the 2011 cost-sharing waiver on these other preventive services would be useful for determining whether these predictions are upheld or disproven.

Second, the findings are not applicable to elderly male or disabled beneficiaries or to Medicare managed care enrollees. As seen with the two preventive services studied, the same change in cost sharing can affect preventive service use differently. Other studies have shown differences in effect by gender and health insurance status (Rizzo, 2005). As a result, these findings may not be generalizable to non-elderly, male, or non-Medicare FFS populations.

Third, even though Congress waived the Part B deductible for mammograms and Pap smears, beneficiaries were still required to pay 20-percent coinsurance for these services. ACA, on the other hand, eliminates all cost sharing, not just the deductible, for most Medicare-covered preventive services. Therefore, caution should be used when using these findings to predict how the cost-sharing waivers authorized by ACA will affect utilization of the preventive services affected by the law. Based on previous literature, however, it is likely that ACA's elimination of all cost sharing for the affected preventive services will have an even greater impact on utilization rates than the BBA 1997 deductible waivers had on mammogram and Pap smear use. It also may be more effective because all cost sharing is eliminated and, thus, beneficiaries will not have to remember which preventive services require cost sharing and which do not.

Fourth, mammogram and Pap smear use and influenza vaccinations were measured using claims data, which can underestimate preventive service use compared to other data sources (e.g., patient self-reports). This limitation is expected to be minimal for mammograms

and Pap smears (Smith-Bindman, Quale, Chu, Rosenberg, & Kerlikowske, 2006), but could be sizable for the measure of influenza vaccinations, for which a Medicare claim is not always submitted depending where it was obtained.

Fifth, the county-level education and income variables obtained from the Area Resource File are subject to ecologic fallacy; thus, they are likely inadequate proxies for beneficiary-level measures. The county-level median household income measure is based largely on a nonelderly, employed population and likely overestimates the incomes of elderly individuals, who often are retired. Similarly, older individuals tend to be less educated than younger individuals, so the county-level education measure likely overestimates the education level of the elderly Medicare beneficiaries. Although these county-level measures are subject to ecologic fallacy, the importance of including some measures of income and education was considered to be greater than the consequence of excluding these measures, given the impact that these factors have been shown to have on preventive service use in previous studies.

Sixth, the literature has shown a number of additional factors could influence preventive service use, some of which were not included in the analyses due to our reliance on Medicare claims data. Omission of relevant factors can cause estimates to be biased; however, the likelihood that this occurred is reduced significantly, because of the longitudinal nature of the study design (any factors affecting preventive service use that persist over time are essentially controlled for, even though they are not included in the model).

Lastly, because the sample was aging over time, and age was a significant factor influencing utilization of mammograms and Pap smears in this study, there was concern that the odds ratios for the time variables were measuring changes in utilization over time due to the aging of the sample rather than because of the deductible waiver, even though the analyses controlled for age and a time-varying age measure was used. Sensitivity analyses were performed on each of the five age subsamples to examine the validity of this concern. The results indicated that the deductible waiver had a greater effect on mammogram and Pap smear use among the younger age groups than the older age groups. Therefore, it is unlikely that the study findings were due to the aging of the sample.

In summary, elimination of cost sharing can be an effective strategy for increasing preventive service use, but the degree and duration of effectiveness depend on characteristics of the procedure, its cost, and the disease and populations it targets. The historical findings presented in this study suggest that, with implementation of Section 4104 of ACA, utilization rates are expected to increase for many of the Medicare-covered preventive services with newly waived cost sharing, but larger increases are expected among those that screen for diseases with high incidence or prevalence rates that increase with age, that are expensive, and that experts recommend be performed on elderly patients on a frequent basis. As data become available, future research will be able to assess whether these predictions come true.

Correspondence

Suzanne M. Goodwin, Ph.D. Johns Hopkins Bloomberg School of Public Health, sgoodwin@jhsph.edu.

Acknowledgements

The authors are grateful to CMS and the Dartmouth Institute for Health Care Policy and Clinical Practice for providing Medicare data used for this study. Dr. Goodwin's thesis committee, which included Dr. Anderson, Jonathan Weiner, Elizabeth Stuart, Kelly Gebo, Kevin Frick, Sydney Dy, Thomas Louis, and Hugh Waters of Johns Hopkins University, provided valuable advice throughout the research process. The Agency for Healthcare Research and Quality and the Health Resources and Services Administration supported Dr. Goodwin with training funding while she worked on her dissertation.

References

Agency for Healthcare Research and Quality (2009). *Clinical Classifications Software for ICD-9-CM.* Retrieved February 22, 2009, from http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp#overview

Blustein, J. (1995). Medicare coverage, supplemental insurance, and the use of mammography by older women. *The New England Journal of Medicine*, *332*(17), 1138–1143. PubMed http://dx.doi.org/10.1056/NEJM199504273321706

Bynum, J. P., Braunstein, J. B., Sharkey, P., Haddad, K., & Wu, A. W. (2005). The influence of health status, age, and race on screening mammography in elderly women. *Archives of Internal Medicine*, *165*(18), 2083–2088. PubMed http://dx.doi.org/10.1001/archinte.165.18.2083

Centers for Disease Control and Prevention [CDC] (2007a). *2007 National Diabetes Fact Sheet*. Retrieved September 14, 2010, from http://www.cdc.gov/diabetes/pubs/factsheet07.htm

Centers for Disease Control and Prevention [CDC] (2007b). Prevalence of chronic kidney disease and associated risk factors - United States, 1999-2004. *MMWR Morbidity and Mortality Weekly Report, 56*(8), 161–165.

Centers for Disease Control and Prevention [CDC] (2009). *Hepatitis B FAQs for Health Professionals: Overview and Statistics*. Retrieved September 14, 2010, from http://www.cdc.gov/hepatitis/HBV/HBVfaq.htm#overview

Centers for Medicare & Medicaid Services [CMS] (2010a). Medicare program; Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2011. *Federal Register, 75*(228), 73170–73860.

Centers for Medicare & Medicaid Services [CMS] (2010b). *Physician Fee Schedule Search*. Retrieved September 17, 2010, from http://www.cms.gov/apps/physician-fee-schedule/search/search-criteria.aspx

Centers for Medicare & Medicaid Services [CMS] (2010c). *Preventive Services*. Retrieved December 19, 2011, from http://www.Medicare.gov/navigation/manage-your-health/preventive-services/preventive-service-overview.aspx

Fleming, C., Whitlock, E. P., Beil, T. L., & Lederle, F. A. (2005). Screening for abdominal aortic aneurysm: A best-evidence systematic review for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, *142*(3), 203–211. PubMed

Hartmann, K. E., Hall, S. A., Nanda, K., Boggess, J. F., & Zolnoun, D. (2002). *Screening for Cervical Cancer*. Rockville (MD): Agency for Healthcare Research and Quality. Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK42831/

Hsia, J., Kemper, E., Kiefe, C., Zapka, J., Sofaer, S., Pettinger, M., . . . Mason, E. (2000). The importance of health insurance as a determinant of cancer screening: Evidence from the Women's Health Initiative. *Preventive Medicine*, *31*(3), 261–270. PubMed http://dx.doi.org/10.1006/pmed.2000.0697

Hwang, W., Weller, W., Ireys, H., & Anderson, G. (2001). Out-of-pocket medical spending for care of chronic conditions. *Health Affairs*, *20*(6), 267–278. PubMed http://dx.doi.org/10.1377/hlthaff.20.6.267

Lane, D. S., Zapka, J., Breen, N., Messina, C. R., & Fotheringham, D. J. (2000). A systems model of clinical preventive care: The case of breast cancer screening among older women. For the NCI Breast Cancer Screening Consortium. *Preventive Medicine*, *31*(5), 481–493. PubMed http://dx.doi.org/10.1006/pmed.2000.0747

Liang, S. Y., Phillips, K. A., Tye, S., Haas, J. S., & Sakowski, J. (2004). Does patient cost sharing matter? Its impact on recommended versus controversial cancer screening services. *The American Journal of Managed Care*, *10*(2 Pt 1), 99–107. PubMed

Lurie, N., Manning, W. G., Peterson, C., Goldberg, G. A., Phelps, C. A., & Lillard, L. (1987). Preventive care: Do we practice what we preach? *American Journal of Public Health*, *77*(7), 801–804. PubMed http://dx.doi.org/10.2105/AJPH.77.7.801

National Cancer Institute [NCI] (2010). *Surveillance Epidemiology and End Results Stat Fact Sheets: Cancer of the Colon and Rectum*. Retrieved September 14, 2010, from http://seer.cancer.gov/statfacts/html/colorect.html

National Cancer Institute [NCI] (2010a). *Surveillance Epidemiology and End Results Stat Fact Sheet: Breast Cancer*. Retrieved September 14, 2010, from http://seer.cancer.gov/statfacts/html/breast.html

National Cancer Institute [NCI] (2010b). *Surveillance Epidemiology and End Results Stat Fact Sheet: Cervical Cancer*. Retrieved September 14, 2010, from http://seer.cancer.gov/statfacts/html/cervix.html

Nelson, H. D., Tyne, K., Naik, A., Bougatsos, C., Chan, B., Nygren, P., et al. (2009). Screening for breast cancer: an update for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, 151(10), 727-37.

Office of the Surgeon General. (2004). *Bone Health and Osteoporosis: A Report of the Surgeon General.* Retrieved March 16, 2009, from http://www.surgeongeneral.gov/library/bonehealth/content.html.

Pham, H. H., Schrag, D., Hargraves, J. L., & Bach, P. B. (2005). Delivery of preventive services to older adults by primary care physicians. *Journal of the American Medical Association*, *294*(4), 473–481. PubMed http://dx.doi.org/10.1001/jama.294.4.473

Rizzo, J. A. (2005). Are HMOs bad for health maintenance*? Health Economics*, *14*(11), 1117–1131. PubMed http://dx.doi.org/10.1002/hec.993

SAS Institute Inc (2002). *SAS*. Cary, NC.

Smith-Bindman, R., Quale, C., Chu, P. W., Rosenberg, R., & Kerlikowske, K. (2006). Can Medicare billing claims data be used to assess mammography utilization among women ages 65 and older? *Medical Care*, *44*(5), 463–470. PubMed http://dx.doi.org/10.1097/01.mlr.0000207436.07513.79

Solanki, G., & Schauffler, H. H. (1999). Cost-sharing and the utilization of clinical preventive services. *American Journal of Preventive Medicine*, *17*(2), 127–133. PubMed http://dx.doi.org/10.1016/S0749-3797(99)00057-4

Solanki, G., Schauffler, H. H., & Miller, L. S. (2000). The direct and indirect effects of cost-sharing on the use of preventive services. *Health Services Research*, *34*(6), 1331–1350. PubMed

StataCorp (2007). *Stata statistical software: Release 9.1*. College Station, TX.

Trivedi, A. N., Rakowski, W., & Ayanian, J. Z. (2008). Effect of cost sharing on screening mammography in Medicare health plans. *The New England Journal of Medicine*, *358*(4), 375–383. PubMed http://dx.doi.org/10.1056/NEJMsa070929

Watson, M., Saraiya, M., & Wu, X. (2009). Update of HPV-associated female genital cancers in the United States, 1999-2004. *Journal of Women's Health*, *18*(11), 1731–1738. PubMed http://dx.doi.org/10.1089/jwh.2009.1570

Appendix

Exhibit A1. Preventive services covered by Medicare and changes in cost sharing requirements[1]

Preventive Service by coverage changes	Deductible		Coinsurance	
	Before Jan 1, 2011	Starting Jan 1, 2011	Before Jan 1, 2011	Starting Jan 1, 2011
New Coverage				
Annual wellness visit	N/A[2]	—	N/A[2]	—
Smoking & tobacco cessation counsel.	N/A[2]	—	N/A[2]	—
Cost Sharing Removed				
Medical nutrition therapy services	Applied	—	Applied	—
Hepatitis B vaccination	Applied	—	Applied	—
Bone mass measurement	Applied	—	Applied	—
Coinsurance Removed				
Screening Pap				
—Test	—	—	unless phys. Interpret. req.	—
—Collection, preparation, and conveyance of sample to lab	—	—	Applied	—
Screening pelvic examination	—	—	Applied	—
Screening mammography	—	—	Applied	—
Ultrasound screening for AAA*	—	—	Applied	—
Colorectal cancer screening				
—Colonoscopy	—	—	Applied	—
—Sigmoidoscopy	—	—	Applied	—
—Colonoscopy or sigmoidoscopy w. barium enema	—	—	Applied	Applies
—Fecal occult blood test by immunoassay	—	—	Applied	—
—Blood occult by peroxidase activity	—	—	—	—
Previously Had No Cost Sharing				
Influenza vaccination	—	—	—	—
Pneumococcal vaccination	—	—	—	—
Initial preventive physical examination	—	—	—	—
Cardiovascular disease screening	—	—	—	—
Diabetes screening test	—	—	—	—
HIV screening	—	—	—	—
Cost Sharing Still Applies				
Prostate cancer screening				
—Digital rectal examination	Applied	Applies	Applied	Applies
—Prostate specific antigen test	—	—	—	—
Glaucoma screening	Applied	Applies	Applied	Applies
Electrocardiogram	Applied	Applies	Applied	Applies
Diabetes self-mgt. training svcs.	Applied	Applies	Applied	Applies

[1] Information about coinsurance and deductible waivers starting January 1, 2011 is based on the 2011 Physician Fee Schedule Final Rule (CMS, 2010a). A '—' indicates deductible or coinsurance is waived for that preventive service.

[2] N/A: not applicable because these services were not covered until January 1, 2011.

Source: CMS, 2010a

Exhibit A2. Claims Procedure Codes Used to Measure Mammogram and Pap Smear Use, Influenza Vaccinations, and Number of Provider Visits

The following codes were used to measure mammogram and Pap smear use, influenza vaccinations, and number of provider visits. The codes were identified through a review literature on preventive services and breast and cervical cancer that used 1995-2003 claims data.

Screening mammograms
CPT code 76092
HCPCS codes G0202, G0203
Revenue center code 0403

Pap smears
CPT codes 88142, 88143, 88144, 88145, 88147, 88148, 88150, 88151, 88152, 88153, 88154, 88156, 88157, 88158, 88164, 88165, 88166, 88167, 88174, 88175
HCPCS codes G0101, G0123, G0124, G0141, G0143, G0144, G0145, G0147, G0148, P3000, P3001, Q0091

Influenza vaccinations
CPT codes 90655, 90656, 90657, 90658, 90658, 90659, 90660, 90724
HCPCS code G0008
Revenue center code 0923

Provider visits
CPT codes 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99241, 99242, 99243, 99244, 99245, 99387, 99397, 99401, 99402, 99403, 99404, 99411, 99412
CPT: Current Procedural Terminology; HCPCS: Healthcare Common Procedure Coding System

Medicare & Medicaid Research Review
2012
Volume 2, Number 1

Mission Statement

Medicare & Medicaid Research Review is a peer-reviewed, online journal reporting data and research that informs current and future directions of the Medicare, Medicaid, and Children's Health Insurance programs. The journal seeks to examine and evaluate health care coverage, quality and access to care for beneficiaries, and payment for health services.

http://www.cms.gov/MMRR/

Submission Guidelines: www.cms.gov/MMRR/InformationforAuthors
Contact: mmrr-editors@cms.hhs.gov

Published by the Centers for Medicare & Medicaid Services

ISSN: 2159-0354
doi: http://dx.doi.org/10.5600/mmrr.002.01.a03