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Methods for Estimating the Medicare Costs of Resources Used in Detection and Care of Prostate Cancer

This appendix presents microlevel Medicare cost information on the components of screening, diagnosis, and treatment for prostate cancer.¹ As described in chapter 5, these data are incorporated into a mathematical Markov model to estimate the total costs and the cost-effectiveness of an illustrative hypothetical Medicare benefit for prostate cancer screening. All cost data are in 1992 dollars.²

The analysis collected and sorted Physicians' *Current Procedural Terminology*, Fourth Edition (CPT-4) codes for procedures (e.g., diagnostic tests, hospitalizations) by urological and radiation oncology billing departments at the Massachusetts General Hospital and the Mayo Clinic. A clinical advisory panel from these institutions and outside reviewers then reviewed these codes for completeness and accuracy.

Tables G-1, G-2, G-3, and G-5 present cost information for components of treatment for prostate cancer grouped by general treatment category: screening and staging, radical prostatectomy, transurethral resection of prostate, and hormone therapy. Table G-4 differs from the others in that it presents an episode of care for exter-

nal beam radiation therapy for localized prostate cancer. Table G-6 includes information on the cost of procedures/treatments related to complications associated with prostate cancer (impotence, incontinence, etc.). Table G-7 organizes the cost data by CPT-4 code or Diagnosis-related Group (DRG), allowing easy development of cost estimates based on complete treatment protocols.

SPECIFIC ISSUES

Cost Information

We present cost information in terms of both Medicare average allowable charge data for 1992 and the 1992 Medicare fee schedule (tables G-1 through G-7). Average allowable charges are percentages of regionally determined "usual, customary, and reasonable" (UCR) physician fees determined on a service-by-service basis. The physician fee schedule is based on a resource-based relative-value scale (RBRVS) point system to which a monetary conversion factor is applied.

Cost-effectiveness research has historically used allowable charges for physician services. However,

¹Information in this appendix is based on an OTA contract paper by Fahs and colleagues. (121).

²Continuing changes in Medicare reimbursements for procedures associated with prostate cancer screening and treatment may make these 1992 costs inaccurate predictors of costs in 1995 or in subsequent years (13a).

TABLE G-1: ESTIMATED COSTS OF SERVICES RELATED TO SCREENING AND STAGING OF PROSTATE CANCER

Description	CPT-4 code	Medicare average allowable charge, 1992 ^a (\$)	Medicare fee schedule (\$)
PSA	86316	\$29.56	not included
DRE			
■ Office visit with primary care physician/urologist ^b	99213	3.79	4.12
TRUS	76872	76.14	84.94
■ Office consult with urologist	99214	45.71	47.12
TRNB			
■ TRUS guidance for biopsy	76942	67.95	84.07
■ Prostatic needle biopsy (single/multiple)	55700	120.54	105.09
Osseus survey for metastases	76061	32.00	54.87
Radionuclide bone scan	78306	81.02	184.14
Pelvic CT scan	72170	15.67	25.11
■ with contrast	72193	93.77	283.66
Pelvic MRI	72196	247.60	450.13
Limited lymphadenectomy for staging	38562	639.55	672.11
■ anesthesia	00860	203.63	194.04

^a The majority of the surgical allowable charges have two components: one for the surgeon and one for surgical assistance. Composite charges are reported.

^b DRE is estimated to take 13.3% of a 99213 office visit. The entire office visit average allowable charge is \$28.52 and under the fee schedule is \$31.

SOURCE: Office of Technology Assessment, 1995. Data are HCFA's unpublished Medicare Average Allowable Charge data from NCH/Best system. Other categories are unpublished data from the HCFA Office of Research provided by W.J. Sobaski, HCFA, Baltimore, MD, personal communication, 1993.

TABLE G-2: ESTIMATED COSTS FOR RADICAL PROSTATECTOMY SERVICES

Description	CPT-4 code/DRG	Medicare average allowable charge, 1992 ^a (\$)	Medicare fee schedule ^b (\$)
Retropubic radical prostatectomy	55840	\$1,450.34	1,493.82
■ with lymph node biopsies	55862	1,041.51	1,135.37
■ with bilateral pelvic lymphadenectomy	55845	2,097.83	2,056.62
■ anesthesia	00860	203.63	194.04
Hospitalization for radical prostatectomy and pelvic node excision			
■ with complications	334	NA	7,483.00
■ without complications	335	NA	5,867.00

^a The majority of the surgical allowable charges have two components: one for the surgeon and one for the surgical assistance. Composite charges are reported.

^b For DRGs, the figures represent average expenditures per beneficiary, including Medicare reimbursement and beneficiary deductible.

KEY: NA = not applicable.

SOURCE: Office of Technology Assessment, 1995. Data are HCFA's unpublished Medicare Average Allowable Charge data from NCH/Best system. Other categories are unpublished data from HCFA Office of Research provided by W.J. Sobaski, Health Care Financing Administration, Baltimore, MD, personal communication, 1993.

TABLE G-3: ESTIMATED COSTS FOR TRANSURETHRAL RESECTION OF THE PROSTATE

Description	CPT-4 code/DRG	Medicare average allowable charge, 1992 ^a (\$)	Medicare fee schedule ^b (\$)
Transurethral resection of prostate (TURP)	52601	\$948.10 ^b	897.96
■ anesthesia	00914	139.69	146.51
Hospitalization for TURP			
■ with complications	336	NA	3,943.00
■ without complications	337	NA	2,778.00

^a The majority of the surgical allowable charges have two components: one for the surgeon and one for surgical assistance. Composite charges are reported.

^b For DRGs, the figures represent average expenditures per beneficiary, including Medicare reimbursement and beneficiary deductible.

KEY: NA = not applicable.

Source: Office of Technology Assessment, 1995. 1992 HCFA data from Part B Medicare Annual Data System and Part A Medicare Annual Data System for short-stay hospitals provided by W.J. Sobaski, Office of Research, HCFA, Baltimore, MD, personal communication, 1993.

starting in 1992, Medicare began paying physicians using a fee schedule based on RBRVS. The fee schedule attempts to measure the costs of providing services based on resources consumed. In this way, it may be a more accurate input for cost-effectiveness analysis if that analysis attempts to relate resource use (monetary and otherwise) to benefits.

However, there has been much debate over two components of the fee schedule: the monetary conversion factor that is applied to the RBRVS and the allocation of true practice costs. In a recent study, Hsiao and colleagues (170) concluded that the practice-expense component of the Medicare fee schedule was incorrectly legislated. It is based on historical charges instead of resource costs and, thus, the Medicare fee schedule “continues to provide an overly generous rate of payment for invasive services” (170). The authors also conclude that the conversion factor is too low to yield sufficient net income to most physicians and warn that in the short run this may cause access problems for Medicare beneficiaries and in the long run may discourage an adequate supply of qualified medical personnel.

One other caution on the fee schedule is in order. The fee schedule is in transition and will not be fully implemented until 1996. This means that fees actually paid to providers are a weighted blend of allowable charges and the fee schedule rate (in each of 230 payment localities) (e.g., 56 FR 59502). Despite these anomalies, the 1992 fee schedule is preferable to average allowable fees for cost-effectiveness research both because of its more explicit relationship to resource use and because it will be how providers are reimbursed for Medicare patients in 1996.

One must use caution in interpreting and applying any “cost” information for medical care (122). The “cost” of a procedure may bear little resemblance to the charge submitted, which will probably only be paid on a percentage basis anyway. In attempting to provide inputs for a cost-effectiveness analysis for the addition of a screening benefit for prostate cancer to the Medicare program, we present the reimbursement amounts that Medicare pays out, not the submitted charge or an estimated “cost” of the procedure.

TABLE G-4: ESTIMATED COSTS OF SERVICES FOR TREATING LOCALIZED^a PROSTATE CANCER BY RADIATION THERAPY (based on Medicare fee schedule)

Description	Calculation of total cost (\$)
Radiation treatment	\$3,604.41
Hospital	
Simple (77406) 19 @ \$58.59 = \$1,113.21	
Complex (77416) 19 @ \$76.88 = \$1,460.72	
Radiation oncologist	
Simple (77420) 4 @ \$79.67 = \$318.68	
Complex (77430) 4 @ \$177.95 = \$711.80	
Complex treatment planning (77263)	154.69
Complex treatment simulation (77263)	154.69
Dosimetry calculation (77300)	75.02
Weekly evaluation of dosage (77336)	861.63
7 evaluations @ \$123.09	
Isodose plan for teletherapy (77315)	185.89
Radiation oncologist Consult (99244)	113.46

^a Stage A and B cancers.

SOURCE: Office of Technology Assessment, 1995. Data are HCFA's unpublished Medicare Average Allowable Charge data from NCH/Best system. Other categories are unpublished data from HCFA Office of Research provided by W.J. Sobaski, HCFA, Baltimore, MD, personal communication, 1993.

This caution in using “cost” information may be particularly relevant for services provided to elderly men, regardless of the source of the “cost” information. The disease processes, as well as the psychosocial, environmental and financial attributes of geriatric patients have been suggested to be out of sync with payment structures derived from acute care services for younger populations (120). In other words, payment structures may not adequately reflect the additional resources required by geriatric patients as compared with younger patients, including longer time spent dressing and undressing, or in communication with the physician on the risks and benefits of clinical choices.

Digital Rectal Examination

One of the standard screening procedures for prostate cancer examined in this analysis is the digital rectal examination (DRE). This procedure is considered to be part of a routine physical exam (349). It is estimated that this procedure requires two minutes to perform (265). This analysis assumes the cost of this procedure is 13.3 percent of a standard 15-minute (CPT-4 code 99213) office visit. It is worth noting that if this DRE were found abnormal, it would likely be repeated by a urologist.

Treatment Costs

We present the cost of drugs for hormone therapy at specified dosages. The total will depend on the combination of drugs and the length of treatment/research that is ongoing (107, 319). Some drugs for hormone therapy require implantation. Cost data for this procedure are not available. An estimate for the cost of implantation can perhaps be imputed using implantation fees for related procedures. This estimate will be added to the drug costs, pending physician consultation.

Surgical Procedures

Costs for surgical procedures include both surgeon and surgical assistance fees.

Diagnostic Radiology

Diagnostic radiology is composed of two components: technical and professional. Oftentimes the two components are billed by the same provider, who receives a composite payment. Sometimes different providers are involved and each is paid according to the component provided. However, the composite payment for each CPT-4 code is not necessarily the sum of the components for a variety of reasons (i.e., different localities, different modifiers, etc.). We advise using the com-

TABLE G-5: ESTIMATED COSTS OF HORMONE THERAPY SERVICES FOR PROSTATE CANCER

Description	CPT-4 code/DRG	Medicare average allowable charge, 1992 ^a (\$)	Medicare fee schedule ^b (\$)
GnRH agonist (does not include fees for monthly implantation)			
■ Zoladex @ 3.6 mg/month	NA	\$318.75/month	NA
■ Lupron @ 7.5 mg/month	NA	437.50/month	NA
Flutamide (Eulexin) @ 250 mg	NA	135.42/100	NA
Diethylstilbesterol (DES) tablets @ 1 mg/day	NA	9.14/100	NA
Orchiectomy	54520	516.16	408.16
■ anesthesia	00920	97.93	105.25
Hospitalization for bilateral orchiectomy	338	NA	3,893.00

^a The majority of the surgical allowable charges have two components: one for the surgeon and one for surgical assistance. Composite charges are reported.

^b For DRGs, the figures represent average expenditures per beneficiary, including Medicare reimbursement and beneficiary deductible.

Key: NA = not applicable.

Source: Office of Technology Assessment, 1995. Data are HCFA's unpublished Medicare Average Allowable Charge data from NCH/Best system. Other categories are unpublished data from HCFA Office of Research provided by W.J. Sobaski, HCFA, Baltimore, MD, personal communication, 1993. Pharmaceutical costs are wholesale prices as reported in the 1993 *Red Book* published by Medical Economics Data, Montvale, NJ.

posite payment, rather than adding the two components together for two reasons: predominantly, one provider performs both components and, thus, it is the composite rate that is most commonly paid; and because Medicare is moving toward a fee structure where the components add to the composite rate (320).

Anesthesia Services

Costs for anesthesia services are provided for the P1, P2, and P3 severity of illness categories as well as both with and without CPT-4 code 99100 (an adjustment for patients over age 70). However, there are many other modifiers that could be applied, and they may or may not affect reimbursement. For some time, the Health Care Financing Administration (HCFA) has not incorporated many of these modifiers into their reimbursement amounts (231). The cost figures presented are calculated based on the average time associated with each CPT-4 code. Time is the most significant component of the cost

of anesthesia, overshadowing the application of modifiers (320).

Courses of Treatment

The analysis uses the total costs for a six-week episode of external beam radiotherapy treatment for localized (T1/T2) cancer (26). The costs associated with complications (proctitis, incontinence, etc.) are presented separately (313, 363), as well as average allowable charges and Medicare fee schedule amounts for the entire range of related radiotherapy procedures (that are to be organized into treatment protocols relevant to T3 cancer).

The course of medical treatment for advanced, hormone-sensitive prostate cancer is difficult to specify. There are numerous clinical trials incorporating a significant number of drugs both singly and in combination (107, 319). This analysis estimates costs for related drugs (271) using the *Red Book* of wholesale drug prices for 1993.

TABLE G-6: ESTIMATED COSTS OF LOCAL SYMPTOMS/TREATMENTS/COMPLICATIONS FOR PROSTATE CANCER

Description	CPT-4 code/DRG	Medicare average allowable charge, 1992 ^a (\$)	Medicare fee schedule ^b (\$)
Dilation of urethral stricture	53600	\$31.86	\$51.15
■ under anesthesia	53605	33.62	58.59
■ anesthesia	00910	85.20	97.16
Hospitalization for urethral stricture dilation			
■ with complications	312	NA	3,800.00
■ without complications	323	NA	2,281.00
Urethroplasty (stricture repair)	53415	1,084.57	1,077.76
■ anesthesia	00910	85.20	97.16
Hospitalization for major stricture repair			
■ with complications	312	NA	3,800.00
■ without complications	313	NA	2,281.00
Artificial sphincter placement	53445	1,780.34	1,352.14
■ anesthesia	00860	203.63	194.04
Hospitalization for artificial urinary sphincter			
■ with complications	308	NA	6,534.00
■ without complications	309	NA	3,439.00
Penile prosthesis			
■ non-inflatable	54400	1,173.30	868.81
■ inflatable, self-contained	54401	1,494.56	1,107.60
■ inflatable, multi-component	54405	1,812.29	1,375.52
■ anesthesia	00938	162.46	170.34
Hospitalization for penile prosthesis insertion	315	NA	10,072.00

^a The majority of the surgical allowable charges have two components: one for the surgeon and one for the surgical assistance. Composite charges are reported.

^b For DRGs, the figures represent average expenditures per beneficiary, including Medicare reimbursement and beneficiary deductible.

KEY: NA = not applicable.

Source: Office of Technology Assessment, 1995. Data are HCFA's unpublished Medicare Average Allowable Charge data from NCH/Best system. Other categories are unpublished data from HCFA Office of Research provided by W.J. Sobaski, HCFA, Baltimore, MD, personal communication, 1993.

TABLE G-7: ESTIMATED COST OF SERVICES RELATED TO PROSTATE CANCER

CPT-4 or DRG	Description	Charge ^a (\$)	Fee schedule or DRG ^b (\$)
Medical			
99213	Office visit with primary care physician or urologist	28.52	31.00
Surgical			
38562	Limited lymphadenectomy for staging (anesthesia code 00914)	639.55	672.11
52601	Transurethral resection of prostate (anesthesia code 00914)	948.10	897.96
53415	Urethroplasty (stricture repair) (anesthesia code 00910)	1084.57	1077.76
53445	Artificial sphincter placement for incontinence (anesthesia 00860)	1780.34	1352.14
53600	Dilation of urethral stricture	31.86	51.15
53605	Dilation of urethral stricture under anesthesia (anesthesia code 00910)	33.62	58.59
54400	Insertion of penile prosthesis for impotence (anesthesia code 00938) non-inflatable	1173.36	868.81
54401	inflatable, self-contained	1494.56	1107.60
54405	inflatable, multi-component	1812.29	1375.52
54520	Orchiectomy (anesthesia code 00920)	516.22	408.16
55700	Prostatic needle biopsy (single or multiple)	120.54	105.09
55840	Retropubic radical prostatectomy (anesthesia code 00860)	1450.34	1493.82
55845	with lymph node biopsies	1041.51	1136.37
55862	with bilateral pelvic lymphadenectomy	2097.83	2056.62
Consults			
99214	Office consultation with urologist	28.52	31.00
99244	Office consultation with radiation oncologist	106.42	113.46
Diagnostic radiology			
76061	Osseous survey for metastases	32.00	54.87
76872	Transrectal ultrasound	76.14	84.94
78306	Radionuclide bone scan	81.02	184.14
72170	Pelvic CT scan	15.67	25.11
72193	with contrast	93.77	283.66
72196	Pelvic MRI	247.60	450.13
76942	Transrectal ultrasound guidance for prostatic biopsy	67.95	84.07
Diagnostic laboratory			
84060	Phosphatase, acid; total	10.61	NA
84075	Prostates, alkaline	7.64	NA
84403	Testosterone, total	37.86	NA
86316	Prostate-specific antigen	29.56	NA
Radiation therapy			
77261	External beam radiation clinical treatment planning simple	78.32	68.02
77262	intermediate	119.60	103.85
77263	complex	177.78	154.69
77300	Dosimetry calculation	72.67	75.02
77315	Isodose plan for teletherapy	160.48	145.89

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TABLE G-7: ESTIMATED COST OF SERVICES RELATED TO PROSTATE CANCER CONTINUED

CPT-4 or DRG	Description	Charge ^a (\$)	Fee schedule or DRG ^b (\$)
77336	Weekly evaluation of delivered dose	87.04	123.09
77401	External beam radiation treatment delivery	49.13	58.59
88402	single, ≤ 5 MeV	57.62	58.59
77403	single area, 6–10 MeV	58.08	58.59
77404	single area, 11–19 MeV	71.60	58.59
77406	single area, ≥ 20 MeV	55.44	58.59
77407	2 areas, ≤ 5 MeV	66.99	69.13
77408	2 areas, 6–10 MeV	70.10	69.13
77409	2 areas, 11–19 MeV	77.59	69.13
77411	2 areas, ≥ 20 MeV	65.67	69.13
77412	3 or more areas, ≤ 5 MeV	74.87	76.88
77413	3 or more areas, 6–10 MeV	78.22	76.88
77414	3 or more areas, 11–19 MeV	82.85	76.88
77416	3 or more areas, ≥ 20 MeV	75.64	76.88
Diagnostic radiology			
76061	Osseous survey for metastases	32.00	54.87
76872	Transrectal ultrasound	76.14	84.94
78306	Radionuclide bone scan	81.02	184.14
72170	Pelvic CT scan	15.67	25.11
72193	with contrast	93.77	283.66
72196	Pelvic MRI	247.60	450.13
76942	Transrectal ultrasound guidance for prostatic biopsy	67.95	84.07
Diagnostic laboratory			
84060	Phosphatase, acid; total	10.61	NA
84075	Phosphatase, alkaline	7.64	NA
84403	Testosterone, total	37.86	NA
86316	Prostate specific antigen (PSA)	29.56	NA
Anesthesia^c			
00914	P1	201.00	
	P2	222.50	
	P3	157.00	
	All	139.69	146.51
00860	P1	271.00	
	P2	NA	
	P3	181.00	
	All	203.63	194.04
00910	P1	28.52	
	P2	103.80	
	P3	NA	
	All	85.20	97.16

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TABLE G-7: ESTIMATED COST OF SERVICES RELATED TO PROSTATE CANCER CONTINUED

CPT-4 or DRG	Description	Charge ^a (\$)	Fee schedule or DRG ^b (\$)
00938	P1	NA	
	P2	NA	
	P3	NA	
	All	162.46	170.34
00920	P1	NA	
	P2	158.00	
	P3	17.00	
	All	97.93	105.25
Hospitalizations			
308	Implantation, artificial urinary sphincter (58.93)		
	with complications		6,534
309	without complications		3,439
	Release, urethral stricture (58.5) or		
312	Repair, urethra (58.4)		
	with complications		3,800
313	without complications		2,281
315	Penile prosthesis insertion		10,072
	non-inflatable (64.95)		
	inflatable (64.97)		
	Pelvic lymph node excision (59.00) or		
334	Prostatectomy, radical (60.5)		7,483
	with complications		
335	without complications		5,867
336	Prostatectomy, transurethral (60.2)		
	with complications		3,943
337	without complications		2,778
338	Orchiectomy, bilateral (62.4)		3,893
Pharmaceuticals^d			
	GnRH agonist		
	■ Goserelin acetate implant (Zoladex) @ 3.6 mg monthly	318.75	
	■ Leuprolide acetate depot (Lupron) @ 7.5 mg monthly	437.50	
	Flutamide (Eulexin) @ 250 mg	135.42/100	
	Diethylstilbesterol (DES) @ 1 mg	9.14/100	
	Macroductin @ 50 mg (cystitis)	66.13/100	
	Prednisone @ 10 mg	3.30/100	
	Methylprednisolone acetate @ 10 ml	6.00	

NOTES:

^a Medicare Average Allowable Charge, 1992.^b Medicare Fee Schedule, 1992 and Average Expenditure per Beneficiary (DRG), 1992.^c Medicare fee schedule anesthesia costs are not adjusted for supervision of more than one patient.^d Pharmaceutical prices are wholesale costs as found in the 1993 *Red Book*, Montvale, NJ.

KEY: NA = not included in fee schedule.

SOURCE: Office of Technology Assessment, 1995. Data are HCFA's unpublished Medicare Average Allowable Charge data from NCH/Best system. Other categories are unpublished data from HCFA Office of Research provided by W.J. Sobaski, HCFA, Baltimore, MD, personal communication, 1993.