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Professional charges not reimbursed to dentists in the US: evidence from Medical Expenditure Panel Survey, 1996.

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Objectives: This cross-sectional study examined professional charges not paid to dentists. ***Methods:*** This analysis used logistic regression in SUDAAN examining the 1996 MEPS data from 12,931 adults. ***Results:*** Among people incurring dental care charges, 13.6% had more than $50 of unpaid charge (UC). The percapita UC was $53.30. Total UC was higher for highest income group [45.4% of total] compared to lowest income group [26.0%]. The percapita UC of $76.70 for low income group was significantly greater than for high income group ($47.80, P<0.01). More Medicaid recipients (52% vs. non-recipients: 12%) incurred at least $50 in UC (P<0.01). Adjusted odds of incurring UC were greater for those employed (OR=1.3, 95%CI: 1.0-1.7), and for those with private insurance (OR: 1.5, CI: 1.3-1.9). Number of dental procedure types modified the association between Medicaid recipient and UC (OR=13.6 for Medicaid recipients undergoing multiple procedure types; OR: 2.3 for Medicaid non-recipients with multiple procedure types; OR: 1.9 for Medicaid recipients receiving single dental procedure. ***Conclusions:*** Having private insurance, being unemployed and being Medicaid insured undergoing multiple procedure were strongest predictors of UC.

Key words: Dental charges, expenditure, MEPS, socio-demographic, unreimbursed charges, Medicaid, dental procedures.

Introduction

Medicaid is a needs-based health programme for low income families and individuals in the United States (US) funded jointly by the Federal and the State government, but managed by the States. Those eligible for Medicaid include: low-income parents, children, seniors, and persons with disabilities. Medicaid reimburses the physician and dentist according to reimbursement rates which are published in the State's Medicaid reimbursement schedule. Historically, reimbursements for dental care have been very low, as a result very few dentists participate in the programme to treat Medicaid enrolled persons. Medicare, on the other hand is an entitlement health programme run fully by the Federal government and provides coverage for the elderly and those with certain disabilities including those with end stage renal disease.

In 1991 it was suggested (Fraser *et al*, 1991) that in general medical care, most of the recent growth in unpaid hospital costs incurred in care for the poor in the US was caused by rising Medicaid shortfalls. While Medicaid shortfalls accounted for 20% of unpaid care for the poor in 1980, they accounted for a third in 1989 (Fraser *et al*, 1991). A 1999 report (Manski *et al*, 1999) suggested that professional charges for the amount of care provided by dentists that were not paid (unpaid charge – UC defined as difference between amount billed and amount paid to the dentist) were greater than that for their office-based physician counterparts.

Little evidence exists about unpaid care undertaken by dentists to adults although some studies have evaluated UC among children. For most children, the greater the need for care, the lower is the likelihood of getting it (Azogui-Levy *et al*, 2003). Much of the increase from 1987-96 in dental expenditures among economically disadvantaged children who had had a dental visit was due to an increase in dental care that was not reimbursed (Wall *et al*, 2002). It is known that dental procedure types covered under Medicare and Medicaid are not easily reimbursed (Reagan *et al*, 1993) and it was suggested that dental care utilization rates may be modified by the way in which dental providers are reimbursed (Marcus *et al*, 1996).

Evaluating UC may provide insights into possible areas to target for its recovery. UC could arise for any procedure for which a bill would be generated, and payment would fall short of that amount, such as uncollected payments, bad debts, and third-party restrictions. With increasing participation of safety net providers in service to the poor, proper understanding of UC carries importance. Whereas the dental school based safety net providers are looking toward a model for improving access to care through faculty practices, UC looms as a hazard for teaching hospitals in low socio-economic areas (Retchin, 1997). Although changes in expenditures across decades have been studied, existence, and real constitution and dynamics of UC have not been effectively examined adequately, nor has a national estimate of UC been reported.

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The purpose of this study was to estimate the UC to dentists for care provided to the US adult population during 1996. The specific aims of this study were: 1) to describe the average UC per capita, and proportion of persons incurring UC for the US adult population aged 19-64 years and for subgroups defined by age, gender, race/ethnicity, income, rural/urban place of living, census track area, employment status, and number of procedure types performed; and 2) to determine factors that predicted the probability of incurring UC.

Methods

This study used data from 12,931 people aged 19-64 years who completed the 1996 Medical Expenditure Panel Survey (MEPS) which was the third in a series of national probability surveys conducted by the Agency for Healthcare Research and Quality (AHRQ) on the financing and utilization of medical care in the US (AHRQ, 2001) to provide nationally representative estimates of health care utilization, charges, payments, sources of payment, and insurance coverage for the US civilian non-institutionalized population. The overall response rate for the 1996 MEPS household survey was 77.7 percent (AHRQ, 2001). Charges and expenditure data were collected through a preliminary contact followed by a series of six rounds of interviews over a two-and-a-half year period using computer-assisted personal interviewing technology.

At the initial visit to a household, respondents were given a calendar and asked to record details of forthcoming health care encounters. At each subsequent interview round, subjects were asked if they had used various forms of health care including dental care. Additional questions were asked about the charges for health care, payments made by respondents, other family members, insurance, or any other third parties. (AHRQ, 2001) Charges for Medicaid non-recipients were calculated based on the dentists billed charges. Corresponding insurance statements and personal financial records were examined, and the difference between the charged amount and the paid amount was called the "unpaid amount". Because persons on Medicaid rarely know the provider's charge for services or the amount paid by the state Medicaid programme, the total charge for Medicaid-covered services was imputed and discounted to reflect the amount that a state programme would pay for the care. (AHRQ, 2001) Where possible, respondents' reports of charges and expenditures were verified with documentation, such as receipts, bills or explanations of benefits provided by third parties. (AHRQ, 2001)

We defined UC as the difference between total charges incurred and total payments made irrespective of the sources of payment; "expenditures" reflect reimbursed charges. UC were evaluated in two different ways: First, as any dollar amount un-reimbursed; and second, classified as UC only if the amount exceeded $50.00 (latter definition used for multivariable analyses).

To be consistent with our previous report (Chattopadhyay *et al*, 2003) and other reports (Vargas and Manski, 1999), we restricted the analysis to people between 19 and 64 years of age and used MEPS defined categories for income level {low income group [<= 200% of the Federal Poverty Level (FPL)], middle income group (>200-400% of FPL), and high income group (>400% of FPL)}, employment status, race/ethnicity groups census tracts and urban/rural (MSA/ non-MSA) characteristics of respondents (AHRQ, 2001). We categorized participant age using ten-year age groups from 19 years, while the highest age group was restricted to 60-64 year olds and created binary variables for each insurance payer type (Medicaid; private/ indemnity insurance; any third party insurance). We categorized number of dental procedure types into two groups: any single procedure type, and more than one procedure type per visit.

After assessing univariate distributions we evaluated bivariate associations using t-tests, ANOVA and chi-square tests. We examined correlations between the covariates to help prevent co-linearity errors in the multivariable models. All analyses were done in SAS (V8.2, SAS Institute Inc., Cary, NC) and SUDAAN (11) using appropriate weights and variance adjustments that accounted for the complex sampling design (significance inferred at 0.05 level; two sided p-values) so that results are generalizable to the US adult population.

Multivariable analyses: Indicator variables with reference cell coding were used for all variables. Unconditional logistic regression analyses were performed using the RLOGIST procedure, modeling the probability of UC (>$50.00) as the outcome. The goal of these analyses was to control for potential confounders, and to find the best fitting, most parsimonious and reasonable model to describe the relationship between the outcome variable and a set of independent explanatory variables.

We assessed an initial 'full" model (including all variables mentioned above) that was significantly better than an intercept-only model. Using the likelihood ratio test, we assessed hierarchically well-formulated models to arrive at a final model. We tested for the interaction of variables in the final model, performed regression diagnostics and assessed utility of the models by outputting predicted scores.

Results

In 1996, some 25.4% of the adult US population incurred UC (27.8% among insured and 20.2% among uninsured). In total, the US adult population incurred $28.8 billion total charges for dental treatment (Table 1). Of this amount, $3.7 billion (12.8%) was not reimbursed to dentists. Percent of UC was inversely related to increasing income, being 20.3% for lower income group, 12.3% for middle income group, and 10.8% for higher income group. UC dollars increased with increasing income, being $0.9 billion for lower income group, $ 1.06 billion for middle income group, and $1.7 billion for higher income group. Among those incurring some dental charges, only 1.56% persons were uninsured, and among the uninsured, some 1.2% had dental charges. Henceforth we shall leave this latter group out of our discussion.

Together, 74.1% of the total expenditure was among middle income group and higher income group. Total charges and total expenditures exhibited a similar trend (Table 1, Fig. 1). For lower income group, the proportion of UC was lower for private-insurance payment source (32.8%) compared to out-of-pocket payment source

Table 1. Total and unreimbursed charges for dental treatment among those with charges by poverty levels, MEPS 1996. FPL = Federal Poverty Level.

Total Actual Charges	*All persons*	*Low income < 200% FPL*	*Middle income 200-400% FPL*	*High income => 400% FPL*
	Estimate	*Estimate*	*Estimate*	*Estimate*
% of sample size (weighted)	*100*	*18.0*	*31.4*	*50.6*
A: Total charges (Billion $)	28.83	4.73	8.61	15.49
B: Unpaid charges (Billion $)	3.69	1.0	1.06	1.68
B2: % of Total Unpaid charges within income groups (B/A)	12.8	20.3	12.3	10.8
B3: % Unpaid charges of Total unre imbursed charges (Column/Total B)	100.0	26.0*	28.7*	45.4*
C: Total expenditures(Billion $) (**A-B**)	25.13	3.77	7.55	13.81
D: Percapita Unpaid charges ($)	53.3	76.7	48.7	47.8
E: Percapita Total expenditures($) **	415. 9 ± 11.3	378.5 ± 21.52	395.9 ± 16.8	441.6 ± 18.3
F: % of expenditure paid:				
Out of pocket	47.9	49.8	45.6	48.8
Private insurance	47.3	32.8	51.1	49.1
Medicaid	2.3	13.5	0.6	0.1
Other insurance	2.5	3.9	2.8	1.9
Total	100%	100%	100%	100%

* Significantly different (row mean scores differ and general association p=0.0071)
** Mean + SE

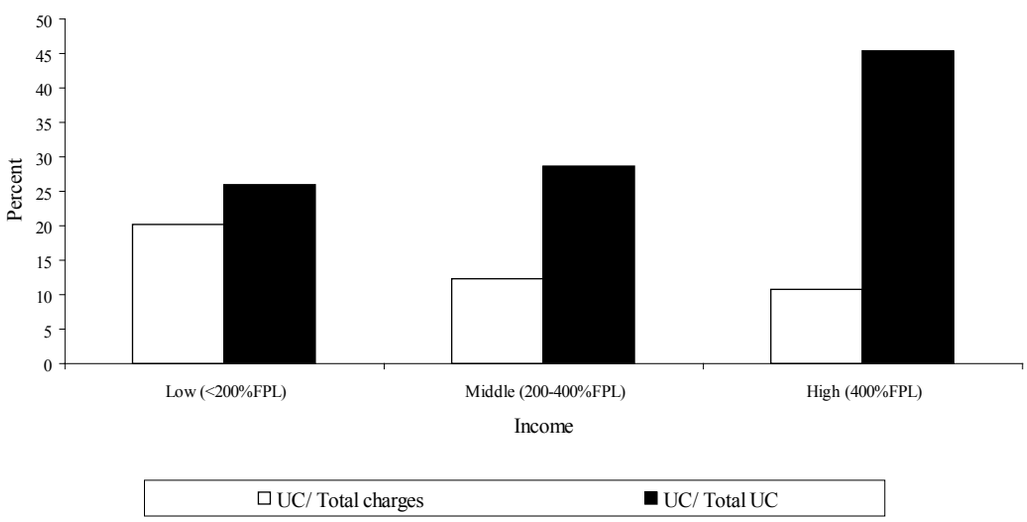

Figure 1. *Distribution of unreimbursed charges across income groups: MEPS 1996. Unreimbursed charges as a proportion of total charges (row B2 of table 1) is greater for lower income group, whereas unreimbursed of specific income group as a proportion of the total unreimbursed charge (row B3 of table 1) shows a reverse trend and is greater for higher income group.*

(49.75%) (Table 1). The direction of this difference was reverse for middle income group and high income group though the differences were much smaller. Among the low income group, 13.5% of dental expenditures were covered by Medicaid. Distribution of per capita charges was similar across census tracts.

Table 2 presents total and UC by insurance payer group. Per-capita total charges for those with private insurance and the Medicaid group were similar. UC was higher for the Medicaid group. Among those with a private insurance, UC was lower than those without private insurance. Out of pocket payment was higher among those without private insurance and the non-Medicaid group.

Overall, the proportion of persons with UC varied according to the definition of UC by dollar amount cut-off

Table 2. Per-capita total and unreimbursed charges for dental treatment among those with charges by source of payment, MEPS 1996.*

Per-capita actual charges and payment	*Third Party Payment Source*					
	Private Insurance		*Medicaid*		*Other Insurance*	
	Yes	No	Yes	No	Yes	No
Total Charges ($)	461.7	337.1	456.9	414.4	657.3	405.8
Unreimbursed charges ($)	39.5	77.0	189.7	48.3	74.2	52.4
Out of pocket payment ($)	147.0	220.3	22.9	179.5	206.1	172.6

* Proportion of persons in different insurance and UC categories can be seen in tables 1 and 3.

(Table 3). About a quarter of the population had some UC; however, at the $50.00 dollar definition, 13.6% of the population had UC. At still higher dollar definition ($100.00), about 9% of the population had UC. Overall, proportion of persons with UC was higher for oldest age groups, women, low income, unemployed, Hispanics, those living in northeast and in west census tract zones, those with Medicaid, and those undergoing more than one dental procedure types (Table 3) regardless of whatever dollar figure was used for defining UC threshold. The trends across socio-demographic groups were similar for both dollar amount definition of UC.

Table 4 shows the significant independent predictors for UC from the logistic regression model. Those with private insurance (OR=1.5), those with non-private/indemnity type insurance (OR=1.4), and those unemployed (OR=1.3), were more likely to have UC after adjusting for covariates in the model, whereas compared to those living in the west census tract, those in mid-west (OR=0.7) and south (OR=0.8) had significantly lesser adjusted odds for UC. Table 4 also shows that there was a significant interaction (p=0.03) between Medicaid insured and number of procedure types. Compared to non-Medicaid insured undergoing one procedure, all others had greater odds of UC. These odds were about doubled for those without Medicaid and more than one procedure (OR=2.3), and for Medicaid insured with one procedure (OR=1.9). However, the odds of UC were 13.6 times greater for the Medicaid insured undergoing more than one procedure.

Discussion

The US dental healthcare system is being challenged by substantial UC that may occur as charity/free care or bad debt. Although there is a growing recognition that all unpaid care should not be viewed as charity work, dental literature tends to consider most unpaid dental care as charity care (Fraser *et al*, 1991; Manski *et al*, 1999; American Dental Association, 2001). Charity implies a clear and declared intent to provide services without expectation of reimbursement. Most unpaid work probably is bad debt where the intent to be compensated for the clinical work is implied when treatment is initiated and billed for. For this analysis, we calculated the "unpaid amount" using $50.00 as a cut-off criterion because it reasonably represented a typical fee for the least costly dental service. We used these data from 1996 because that year represents a time of economic boom in the U.S. and allows examination of potential effect of economic high tide compared to data from later date. We have not been able to explain the difference in geographical distribution of UC. Because the general distribution of different charges is similar across different census tracks (Table 2) and the upper confidence bounds of odds ratios are close to unity, we attribute these differences to some survey methodological issues.

Analysis of UC should evaluate the issue from two different perspectives. First: the proportion of persons with UC is much greater for the low income group. Second: overall, to recover UC, it would probably be inefficient to organize recovery efforts over a larger group although the high income group that shares a larger proportion of the total UC (45% compared to 26% of lower income group) (Fig 2). Therefore, recovery efforts aimed at high income group should turn out to be more efficient and effective.

The greater proportional share of total UC dollars in high income group can probably be attributed to a greater number of procedure types and more complicated (expensive) procedure types performed because the adjusted odds for UC was 2.6 times higher for those with multiple procedure types (full model, table 4). Assessing the interaction suggested that the odds of UC more than doubled for more than one procedure even among the non-Medicaid persons.

It may be argued that if dentists agreed to accept payments from Medicaid insured patients as payment in full, then the difference between what they were paid by Medicaid and what they would be normally paid by non-Medicaid patients should not be counted as UC. We discounted this argument because in MEPS 1996, the charges for non-Medicaid persons were calculated based on the dentists billed charges but the payments by Medicaid were calculated based on the State's Medicaid programme reimbursement schedule, i.e., UC from Medicaid insurance was calculated from what was billed to Medicaid. Therefore, UC for Medicaid recipient was not based on fees charged to non-Medicaid patients. Also, while it may be true that dentists may "consent" to forego some part of payment by billing Medicaid, we believe that it is equally likely that dentists similarly "consent" to forego payments for non-Medicaid patients. This equality does not alter the nature of the outcome

Table 3. Distribution of persons with total charges and unreimbursed charges MEPS 1996.

Characteristic	*Levels*	*% of persons*	*% of people with unpaid charges>$0*	*% of people with unpaid charges > $50*
All persons	All	100.0	43.7	13.6
Age (years)	19-29	25.6	35.9	13.9
	30-39	36.7	44.1	13.4
	40-49	25.4	47.1	13.5
	50-59	16.1	48.7	12.3
	>=60	6.2	47.2	17.6
Sex	Men	48.8	38.6	11.9
	Women	51.2	48.5	14.9
Income*	Low	28.0	28.1	21.1
	Middle	32.4	42.3	12.8
	High	39.6	55.8	11.5
Employment†	Yes	81.0	45.0	12.1
	No	18.9	38.4	20.5
Race/Ethnicity**	NHW	72.8	48.9	12.9
	NHB	11.9	27.5	16.1
	Hispanic	10.7	28.3	19.4
	Others	4.5	38.9	14.2
Census Track***	NE(1)	19.4	45.8	16.0
	MidW(2)	22.9	49.4	11.2
	S(3)	35.1	38.7	12.2
	W(4)	22.6	43.7	16.2
Urban/Rural****	MSA	81.3	44.8	13.7
	Non-MSA	18.8	38.6	13.3
Medicaid	Yes	1.5	3.5	51.9
	No	98.5	96.5	12.2
Pvt/ Indem insurance	Yes	27.6	63.2	10.8
	No	72.4	36.8	18.4
Other Insurance	Yes	1.8	4.0	19.5
	No	98.3	95.9	13.4
Any 3rd party insurance	Yes	42.9	24.3	12.5
	No	57.0	100.0	82.4
Number of Procedure types	One	43.8	12.3	7.4
	More than 1	56.2	87.7	14.5

* Income: Low = < 200% Federal Poverty Level (FPL); Middle = 200-400% FPL; High = > 400% FPL.
** NHW: Non-Hispanic Whites; NHB: Non-Hispanic Blacks.
*** NE: North-East; MidW: mid-West; S: South; W: West.
**** MSA: Metropolitan Statistical Area.
† Employment: Employed in 1996 or part thereof.

Table 4: Factors associated with unreimbursed dental charges (logistic regression- SUDAAN), MEPS 1996.

Variable	*Full Model*			*Final Model*	
	Levels	*Odds Ratio*	*95% CI*	*Odds Ratio*	*95% CI*
Employment†	No	1.2	0.9, 1.5	1.3	1.0, 1.7
	Yes	1		1	
Census Track	North-East	0.9	0.7, 1.2	0.9	0.7, 1.2
	Mid-West	0.7	0.5, 0.9	0.7	0.5, 0.9
	South	0.8	0.6, 0.9	0.8	0.6, 0.9
	West	1		1	
Private Insurance	No	1.5	1.2, 1.9	1.5	1.3, 1. 9
	Yes	1		1	
Other Insurance	Yes	1.5	1.0, 2.2	1.4	0.9, 2.1
	No	1		1	

				*Estimate (SE)***	*p-value***
No. of Procedure types	More than 1 vs. one	2.6	1.9, 3.7	-0.81 (0.17)	0.0
Medicaid	Yes vs. No	4.9	3.4, 7.1	1.8 (0.19)	0.0
Medicaid * No. of Procedure types		---	---	-1.18 (0.54)	0.0307

	*Odds ratios for interaction between Number of procedure types and Medicaid***	
	More than one procedure type	*One procedure type*
Medicaid	13.6	1.9
No Medicaid	2.3	1.0

* Income: Low = < 200% Federal Poverty Level (FPL); Middle = 200-400% FPL; High = > 400% FPL

† Employment: Employed in 1996 or part thereof.

** Estimates presented because of the statistically significant interaction term. The odds ratios were calculated from the final model above after adjusting for all other variables in the model. The full model was also adjusted for age, sex, urban/rural residence, poverty level and race/ ethnicity.

variable, which is a discrepancy between the amount billed, and the amount paid.

Medicaid is an important payer for the poor although the coverage is minimal. Because the proportion of care paid for out of pocket by the low income group is similar to that of higher income groups (Table 1), it is possible that the greater unpaid revenue stems from non-recovery from Medicaid sources rather than out of Medicaid recipient's out of pocket non-payment. The mean out of pocket payment by Medicaid insured was similar to others. Therefore, the substantially greater odds of UC for Medicaid insured persons undergoing multiple procedure types, raises the possibility that the key issue may lie with non- reimbursement by Medicaid office – a view that overturns the previously held notion that it is the Medicaid insured persons who default on payment. Contrarily, if recovery from Medicaid office is inadequate, then improving claims reimbursement system in Medicaid office can lead to increased reimbursed dollars for the dentist.

Dentists have often complained about cumbersome billing and payment protocol when dealing with Medicaid (HRSA., 2000). It is therefore possible that dentists forego a certain proportion of potentially recoverable revenue from Medicaid, and write it off as a bad-debt towards Medicaid and do not pursue Medicaid reimbursement actively (HRSA., 2000). A recent report evaluating reimbursement procedure for emergency care (Young *et al*, 2002) found that preauthorization gate keeping is not predictive of whether managed care third party payers will initially reimburse the emergency department (ED) visits. Overall, almost two thirds of all ED claims were initially denied, and reimbursed claims were uniformly down-coded. On appeal, reimbursement was often reinstated or increased, although billing services only appealed about half of the ED visits. A similar outcome may occur by pursuing Medicaid reimbursement mechanisms more actively. Therefore, if there are claims given up for procedural complexities, then such a source of loss of revenue can be addressed with modifying relevant procedures.

If dentists provide a certain amount worth of charity care, and do not-even bill the patient, then it would never get counted into MEPS. Alternatively, it may be argued that dentists providing charity care are more likely to generate a bill that itemizes each service, but then list a "discount" or equivalent to cover the complete amount, so that the amount to pay would be zero. If this is true, the issue of "consented" unpaid care probably exists both for Medicaid and non-Medicaid persons. Therefore the differences in UC between Medicaid and non-Medicaid persons cannot be accounted for by such discounted write-offs.

Conclusion

Our study evaluated the data from 1996 representing a boom time in the US economy. There are contrasting ways to interpret our findings. One economic perspective would argue that the greater odds of UC among groups such as the unemployed, Medicaid recipients and those without private insurance, is indicative of an optimally working and socially responsive dental care delivery system with substantial welfare work through charitable service contributions to the economically poorer section of the society. This idea may be reinforced by the observation that the greater proportion of persons with UC exist among lower income group, and the proportion of UC of the total charges for care received is highest among low income group.

In contrast, another economic perspective would argue the opposite by suggesting that the greatest share of the total UC come from the high income group (45% of the total), and that middle income group and high income group together contribute to three-quarters of the total UC, thereby suggesting a system that provides more subsidized work to those whose dental health care unmet needs are minimal, and ability to buy insurance and healthcare is greatest. This perspective would also point out that the proportion of the total charges paid through out of pocket resources is similar across all income groups. This observation may also form the basis to argue that in a free-market economic system, the demand side is fueled by the subsidized higher income consumers, who sustain higher prices for dental health care system, leading to a classical vicious cycle of poverty for the lower income group, who fall out of the care-seeking system, and access it only as a last resort. This argument would also explain the greater odds of UC for Medicaid persons as their lack of monetary surplus forces them to use the system maximally by using available resources to seek minimal health care and forcing bad-debt as a coping strategy.

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