



U.S. Department of Health and Human Services  
Assistant Secretary for Planning and Evaluation  
Office of Disability, Aging and Long-Term Care Policy

# **WHO IS PAYING THE BIG BILLS?**

## **VERY HIGH COST PEDIATRIC HOSPITALIZATIONS IN CALIFORNIA, 1987**

August 1990

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**WHO IS PAYING THE BIG BILLS?  
Very High Cost Pediatric Hospitalizations in  
California, 1987**

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Systemetrics/McGraw-Hill

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Statements contained in this paper are those solely of the author and do not necessarily reflect the views or policies of the Department of Health and Human Services.

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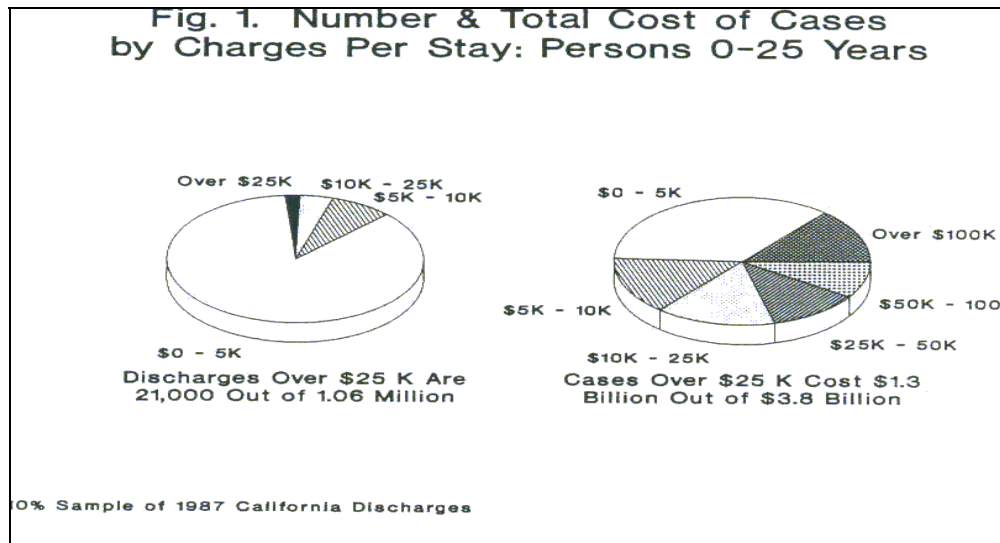
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# SUMMARY

This study examines very expensive hospital stays (those with charges more than \$25,000) for persons under 26 years old in California, based on the 1987 state all-payer discharge data base for acute care, psychiatric and alcohol/drug treatment hospitals.<sup>1</sup> Although cases with hospital charges exceeding \$25,000 were only 2.0% of the 1.06 million discharges for young people, these very high cost cases comprised 34.7% of the total \$3.84 billion in hospital charges (see Figure 1).<sup>2</sup> The risk of such a high cost hospitalization is low: less than one-fifth of 1% of the population under 26 will have such a problem in a year, although the risk is about nine times higher for infants under 1 year of age. With a mean hospital length of stay of 59 days, these are seriously ill children with a variety of medical, surgical and mental health problems.

A particular focus of this paper is who is paying for care, especially who are the people without insurance. In the California data base, hospitals have coded the expected principal payor, which may differ from the eventual payment sources. Nonetheless, since we expect that hospitals will be careful in trying to identify possible payors for expensive cases, this roughly indicates the insurance status of these patients and their families.



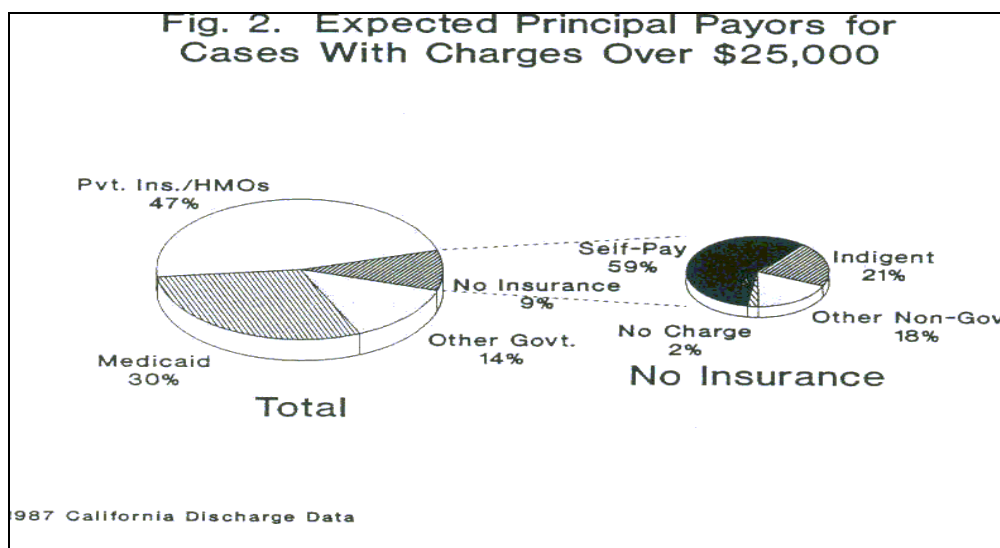
Deciding who is and who is not insured is more complicated than might be expected. For analytical simplicity we grouped the 12 reported expected principal payors into four major categories, as shown in the left half of Figure 2. Private

<sup>1</sup> This analysis includes persons 0 to 25 years old, both children and young adults. Sometimes we will refer to the whole group as children or as pediatric cases.

<sup>2</sup> Cases with missing or miscoded data were excluded from analysis. About 9% of cases had missing charge data, mostly due to HMO patients being cared for at HMO hospitals in which no charges were recorded. Thus, the analyses somewhat underrepresent privately insured patients. However, since HMOs often enroll healthier clients and are aggressive in reducing hospital costs, their representation in the very high cost cases may be lower.

Insurance, including Blue Cross/Blue Shield, commercial insurance and Health Maintenance Organizations (HMOs), and Medicaid represent groups that we would usually call insured. However, some Medicaid patients may arrive at the hospital without insurance and only have Medicaid eligibility determined after entry (e.g., through spending down to the Medically Needy program or becoming qualified for SSI after a long hospital stay). Other Government includes Medicare, Workers' Compensation, Title V (Maternal and Child Health Block Grant) and a subcategory of other government programs, including CHAMPUS (medical coverage for civilian dependents of military personnel), and various other Federal, state and local funding sources, including California's Short-Doyle program for mental health services. A small portion of the Other Government group is clearly insured (those in Medicare or CHAMPUS). Some are partly insured; workers are insured for work-related illness under Workers' Compensation, but not necessarily for other problems. Others may not have regular public or private insurance, but a government program can finance care. The fourth major category is No Insurance, including Self-Payment, No Charge (e.g., charity care, research, etc.), Other Non-Government (foundations, charities, etc.), and Indigent Care, a small State/county program in California. (We refer to these medical indigency cases as uninsured, since being uninsured is one of the eligibility criteria and eligibility is determined only after admission to the hospital.) We presume that the payors in this group were payors of last resort for uninsured people with no alternative funding.

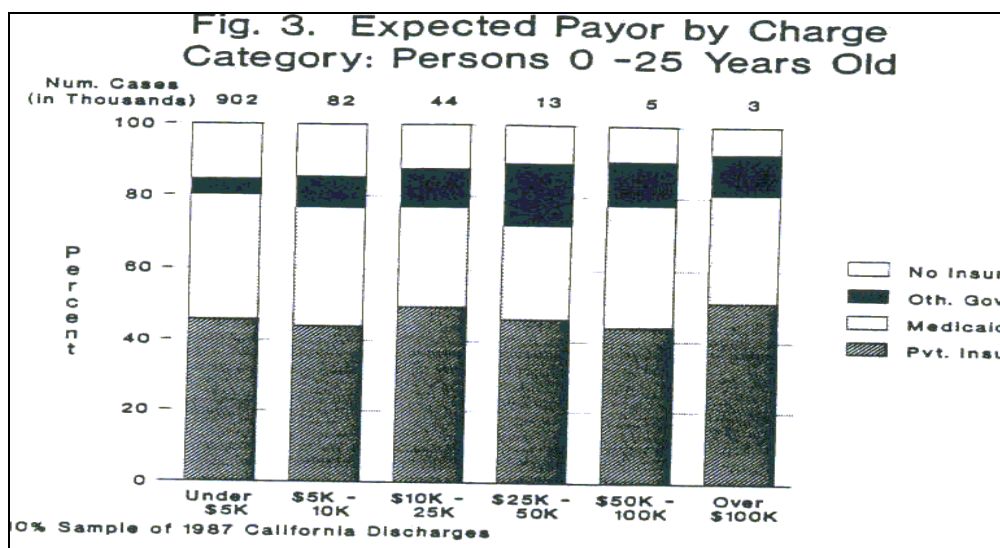
For beneficiaries, insurance should provide assurance of financial support for illnesses. From the perspective of patients and families, members of the No Insurance group and some members of the Other Government group (and even some in the Medicaid group) were uninsured since they had grave illnesses and were uncertain of who (if anyone) would pay for their medical care. From the perspective of hospitals, far fewer of the patients (only those in the Self-Pay and No Charge groups) were uncompensated, since an expected source of payment was identifiable from governmental or non-governmental sources.





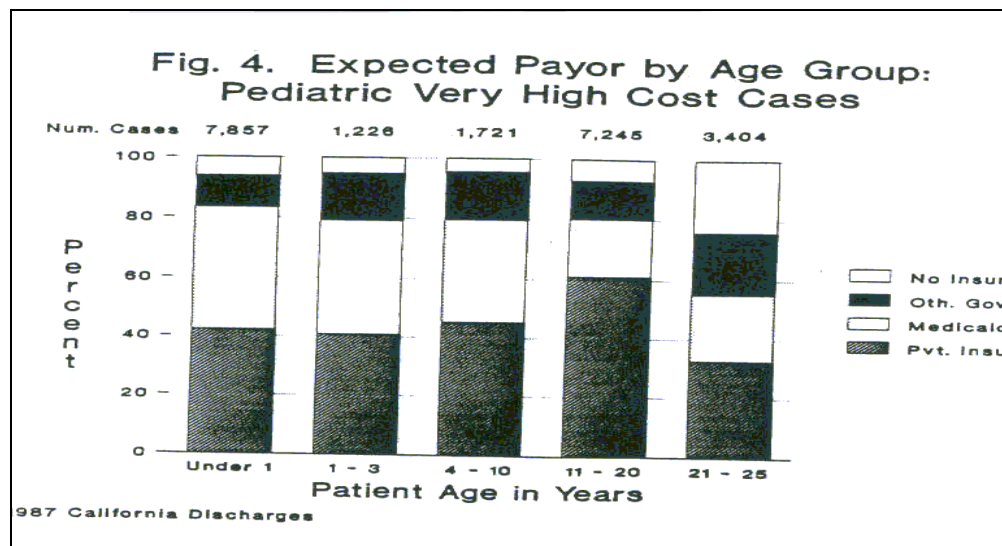
As seen in Figure 2, about half of the very high cost cases (with charges over \$25,000) were privately insured and a third had Medicaid coverage. A seventh were in the Other Government category, which includes Title V (Maternal and Child Health Program) and California's Short-Doyle mental health services. About 9% of the cases with charges over \$25,000 were in the No Insurance group and 5% were classed as self-pay. Since very few families can pay such high bills out-of-pocket, most self-payment cases are probably uncompensated.

In contrast, about 15% of cases costing less than \$5,000 have no insurance and 11% are self-pay. As shown in Figure 3, the share of cases with no insurance declines steadily as the cost of cases rises. Three possible causes include: (1) Hospitals do not serve seriously ill children without insurance or provide lower cost service to them; (2) Hospitals and/or patients more aggressively seek alternative payment sources for expensive hospitalizations (e.g., they find charities or government programs to pay for particular cases or patients' families may spend down into Medicaid eligibility) and (3) Families without insurance seek less care for seriously ill children. There is some evidence of all three situations, but it is beyond the scope of this project (and data base) to fully determine the causes of the differences in levels of insurance between low and very high cost hospitalizations.



Only half of all California children's hospitalizations are expected to have private insurance and government financing is almost as large (with the small balance being self-pay and miscellaneous sources). Even if we assume a 9% undercount of HMO patients, the share of private patients is still about half. In contrast, national survey data for 1987 indicate that about two-thirds (69%) of persons under 25 had private insurance (Short, Cantor and Beauregard, 1989). The large role of other government programs is larger than expected. Although programs, such as Title V and the Short-Doyle mental health program, are usually viewed as small, they may finance a disproportionate share of high cost hospitalizations for children. It is not clear if the surprisingly large role of other government programs is a unique situation for California or is a broader

phenomenon not previously identified due to lack of comparable analyses in other States.



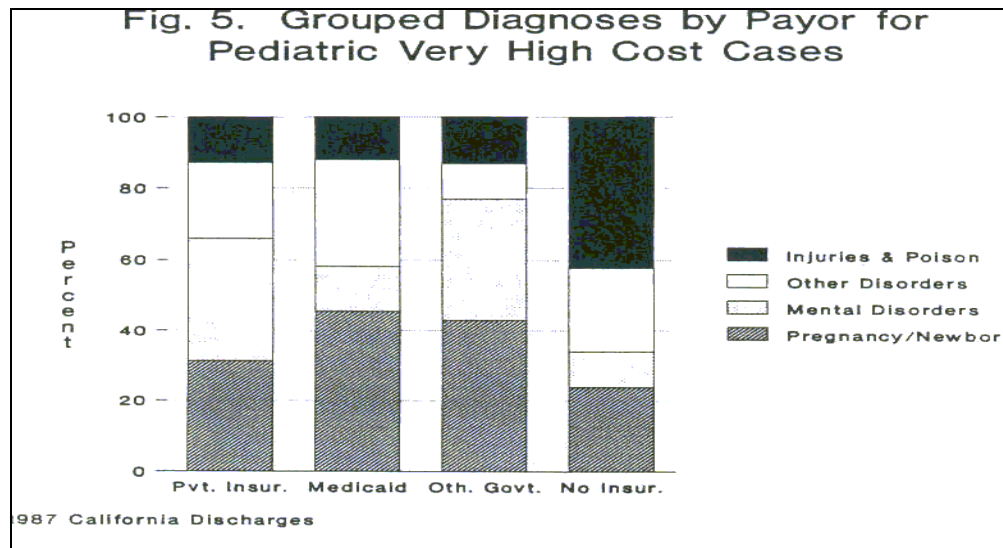
The level of uninsured care for very high cost cases is not evenly distributed across the age spectrum. Figure 4 demonstrates that the share of very high cost cases without insurance is highest for young adults 21 to 25 years old. The share of cases paid by Medicaid drops sharply as age increases. The share of cases paid by private insurance rises for the 11 to 20 year age range and drops again for the 21 to 25 age range.

Other research indicates that about half of those without insurance in the U.S. are under 25 years old (Bureau of the Census, 1990). The age trends seen in these data are roughly consistent with national data indicating that lack of insurance is greatest among those 18 to 24 years old (30.2% in 1987) and that public insurance (i.e., Medicaid, CHAMPUS, Medicare) coverage declines with age of child (from 15.8% for those under 6 to 6.5% for those 18 to 24) (Short, Monheit and Beauregard, 1989). The share of the uninsured is similar for the non-elderly with and without Activities of Daily Living limits (Griss, 1988), although the disabled have more Medicaid and less private insurance. These data suggest that many of the uninsured may still have care financed by another government or non-government program.

As shown in Figure 5, different payors cover different types of very high cost care, as based on the principal diagnoses. Injuries and poisonings comprise almost half (42%) of the group without insurance, about three times higher than for the other groups. Far fewer of those without insurance have diagnoses relating to pregnancy or newborn care (including congenital abnormalities, neonatal intensive care and maternal care) and mental disorders (including mental retardation, drug/alcohol dependence and other psychiatric disorders) than for other payors. About half of the Medicaid cases are related to pregnancy and newborn care. In the Other Government category, a large proportion of cases have mental health diagnoses, probably due to California's Short-

Doyle mental health program. The actual role of Medicaid is probably somewhat greater than shown here, since some Short-Doyle mental health expenditures are eventually reimbursed by Medicaid.

In part, these differences in diagnoses may be attributable to the age differences in the insured and uninsured populations. The uninsured group is older and has more injuries which are more common to that group. Similarly, the uninsured have fewer problems for the very youngest, e.g., pregnancy and newborn problems. In part, the diagnosis differences may reflect differences in the types of problems for which hospitals are willing to provide expensive care to uninsured people.



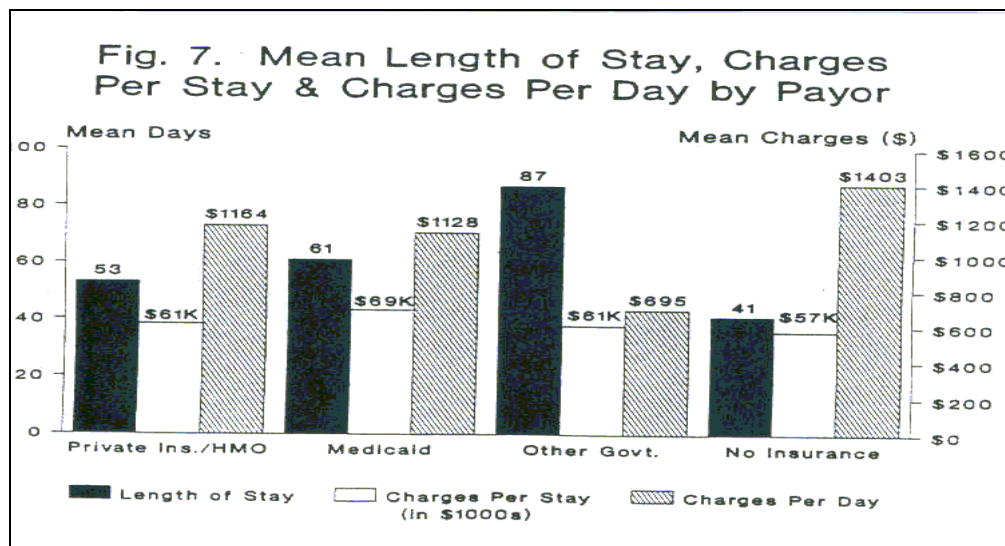
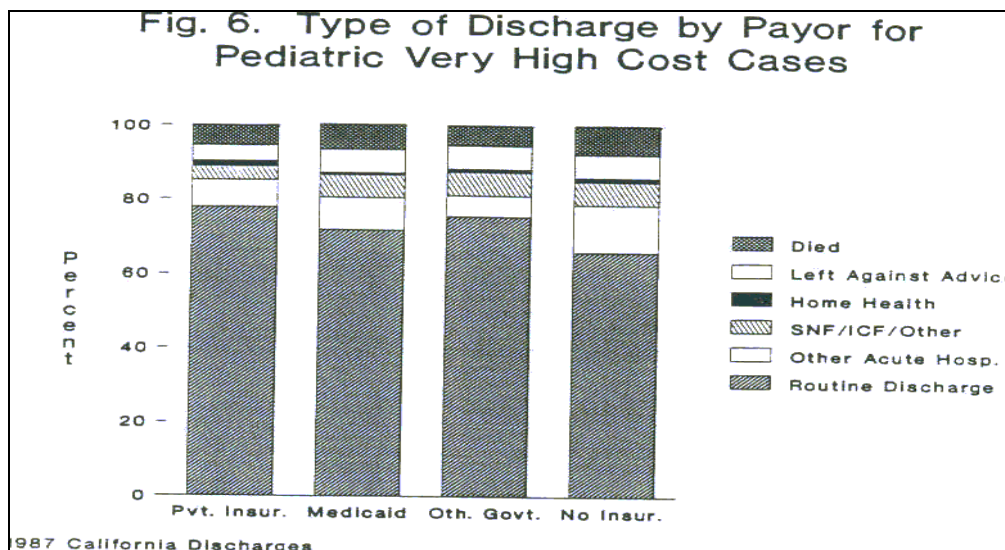
There are modest differences in types of discharges by payor, as shown in Figure 6. The uninsured have fewer routine discharges and more transfers to other acute care hospitals or other facilities (Skilled Nursing Facilities (SNFs), Intermediate Care Facilities (ICFs) and other facilities) than the insured groups; they also have somewhat more deaths. Private hospitals may transfer uninsured patients to public hospitals or institutions for further care. However, data quality is weak for this variable.

Patients without insurance have the shortest lengths of stay in hospitals and the lowest mean charges, but the highest charges per day, as shown in Figure 7. In effect, the uninsured have intense medical services, but are discharged somewhat sooner. This may be a cost-saving measure taken by hospitals or may reflect the different age and case mix between insured and uninsured patients. For example, psychiatric patients may have relatively low costs per day, but may have very long stays.

This exploratory study indicates some problems in access for hospital care for very high cost children and young adults without insurance. Lack of insurance is most acute for young adults. The relatively small share of mental disorders among uninsured patients may indicate particular problems in access to care for the uninsured with psychiatric problems. Those without insurance are more likely to be admitted on an

emergency basis and to be transferred to another acute care hospital. Those with no insurance have shorter hospital stays, but receive intense services during their stays.

Finally, we should remember that a large proportion of these very high cost disorders are preventable. Many pregnancy/newborn problems can be prevented through better prenatal care, improved nutrition, prevention of substance use (including tobacco, alcohol and drugs) and genetic screening. Most injuries and poisonings are preventable through measures, such as improved auto safety and use of seat belts. Many mental health and other medical/surgical disorders are either preventable or could be identified earlier and treated in less intensive settings. While it is natural to be concerned about treatment of these problems, prevention programs can and should play an important role too.



# BACKGROUND

This report is one part of a larger project on severely disabled children and their health care needs being conducted by Systemetrics/McGraw-Hill under contract to the Office of Social Services Policy, Office of the Assistant Secretary for Planning and Evaluation. Most of the project examines the experience of severely disabled children in the Medicaid program. This exploratory report looks at the broader experience of severely ill children whether on Medicaid, privately insured or uninsured.

The data base for analysis is the 1987 California State Abstracts, which include all hospital discharges for all payors. Hospital costs are a dominant share of all medical costs, especially for the non-institutionalized. In this case, the severely disabled children are selected if the charge for a single hospital stay exceeds \$25,000. While not corresponding precisely with standard definitions of disabled children (based on functional/developmental limitations or on chronic conditions), these serious illnesses with long hospital stays certainly reflect at least a temporary disability. More generally, we might think of these very serious illnesses as largely indicating the onset of a potential disability (e.g., a neonatal defect, a serious injury or severe infection) or the consequence of a disabling condition (e.g., kidney transplants due to renal defects or other sequelae of congenital and chronic conditions, or psychiatric problems, including drug or alcohol dependence).

The definition used for very high cost cases, hospital charges over \$25,000, is stricter than usual definitions of catastrophic expenses. McManus (1986) cites various standard definitions:

- Out-of-pocket expenses greater than some dollar level, such as \$2,000,
- Out-of-pocket expenses greater than a percent of family income, such as 10 to 15%,
- Total medical expenses greater than some annual level, such as \$10,000.

Hospital discharge data only give us charges per stay. We cannot ascertain out-of-pocket expenses and costs other than inpatient care. However, we certainly know that the very high cost patients are very sick children whose families generally must bear crushing expenses for medical care. The particular virtue of hospital discharge data is that the samples are huge. Such children are quite rare (about 0.2% of the population under 26 years in California) and only administrative data bases can provide enough cases for analysis.

This study includes children between 0 and 25 years of age, which is broader than standard definitions of childhood. This reflects some interest in young adults (21 to 25 years old), as part of the continuum of child development.

These analyses basically seek to answer two sets of questions:

1. Who is paying for the hospital care for these very high cost cases? Especially, how many children are uninsured?
2. What are the differences in the characteristics of very high cost cases among those who are privately insured, publicly insured and those without insurance? What are the differences in age, diagnosis, type of discharge, length of stay, and so on?

Unfortunately, we cannot definitely say that differences are due to insurance status. Level and cost of medical care are intricately entangled with insurance status. For example, very high medical bills can enable people to become Medicaid eligible through spend down. Disabled children are more likely to be eligible for Medicaid through SSI disability. Parents whose children have serious medical problems are more likely to try to maintain private insurance, even if it means keeping a poorer job. Some catastrophic expenditures may not be covered by private insurance due to special exclusions, such as pre-existing conditions or maximum benefit levels. Finally, while hospitals may be willing to write off a portion of their bills for uninsured persons as bad debt or free care, they are more likely to try to identify a payment source for expensive patients.

To further complicate matters, in some cases those without insurance may avoid hospital care, depressing their prevalence. In some cases, the uninsured may delay care and arrive sicker, which may increase expenses or mortality rates. As a consequence of these and other confounding factors, these findings should be considered exploratory in nature.

## SOURCE OF DATA AND METHODOLOGY

The California State 1987 Abstracts data base contains all hospital discharges from California acute care, psychiatric and alcohol/drug treatment hospitals in Calendar Year 1987, as collected and edited first by the Office of Statewide Health Planning and Development and then by SysteMetrics/McGraw-Hill. All California hospitals are required to submit discharge records for all patients within 6 months of the close of each year. Each record corresponds to a single hospital discharge and contains information, such as: age, diagnosis, length of stay, expected principal payor and charges.

For this project, SysteMetrics first extracted all cases 25 years old or younger; this includes 1.06 million discharges. For analysis of all cases, regardless of cost, we selected a 10% random sample with 105,985 records. For analyses of very high cost cases, all discharges with total charges over \$25,000 were extracted; there were 21,453 such cases. All cases with missing or miscoded data had been excluded. In general, there was an extremely low level of missing data, e.g., less than 0.5% for any data category.

The one exception is missing charge data. About 9% of all cases (including adults) were missing total charges and excluded from analysis. These are mostly patients enrolled in Kaiser-Permanente health maintenance organization (HMO) plans who are treated in Kaiser hospitals. Unlike most HMOs, Kaiser owns hospitals which are mostly used to treat persons enrolled in Kaiser plans. Since these are capitated patients who are treated in-house, no one is billed and no charges are generated. The net effect of this exclusion is that HMO patients are underrepresented in these analyses. However, since we are classifying cases by cost, there is no simple alternative.

Defining insurance/payor groups was more difficult than expected. California hospitals indicate twelve specific categories of expected principal payor. For analytical simplicity, we compressed these into two variables with eight and four categories, as shown below:

PAYOR	PAYOR8	PAYOR4
Blue Cross/Blue Shield Other Indemnity Insurer HMO/Prepaid Health Plan	} Private	Private
Medi-Cal	Medicaid	Medicaid
Medicare	Medicare	} Other Govt.
Worker's Compensation Title V Other Governmental	} Other Govt.	
Self-Pay No Charge (free, charity, teaching, research) Other Non-Governmental Medically Indigent Under Section 17000	Self-Pay No Charge Other Non Govt. Indigent Care	

Some of these categories are relatively broad. Other Governmental programs (aside from Medicare, Title V and Worker's Compensation) may include Migrant Health, special funds for AIDS, alcohol, drug treatment, special State or local government programs, etc. An important and relatively unique program in California is the Short-Doyle program, a State/county mental health program which covers inpatient, outpatient and community services. In some counties, Short-Doyle funds essentially fund the public mental health hospital. When Short-Doyle services are provided to Medicaid patients, Medicaid subsequently reimburses them. Thus, some mental health claims eventually covered by Medicaid may appear in the Other Government category. By some definitions, many of the patients in the Other Government category may be considered uninsured, e.g., those with Title V or Short-Doyle funding. However, some of these might be considered somewhat insured, in the sense that they may have been assured of coverage prior to entering the hospital. Others are insured, e.g., CHAMPUS and Medicare. Some are at least partly insured, e.g., the worker's compensation patients who are insured for these work-related problems. Thus, the Other Government categories are uncertain with respect to their insurance status.

Other Non-Government funding may include foundation or specially raised funds, e.g., funds for muscular dystrophy or an earmarked hospital charity fund. California also operates Section 17000, a State/county medically indigent program for hospital care of poor uninsured persons, such as adults without children and illegal aliens. We have grouped these cases with the No Insurance category since their eligibility is determined after hospital admission. Thus, they entered the hospital with no assurance of medical coverage.



# CAVEATS

There are several caveats regarding these data:

1. The unit of analysis is a single hospital inpatient discharge. Since personal identifiers are missing, we cannot follow a patient over the year. Some disabled children with catastrophic expenses may have repeat hospitalizations or may transfer from one institution to another. These analyses miss the patterns of multiple admissions. These charges include the few hospitalizations lasting more than a year.
2. Only inpatient hospital costs are measured. The data do not include: outpatient care, physician charges, pharmaceuticals, medical equipment, special diets, institutional care, home care, physical therapy, etc. They also fail to count other social costs imposed by severe children's illnesses, such as home modification, missed parental work days, transportation, child care, special education or tutoring, etc.
3. Maternal and infant discharges and costs cannot be linked if the mother and infant have separate bills. Maternal obstetric bills usually do not include more than routine hospital costs for neonatal care. Fragile babies who receive neonatal intensive care generally have separate bills.
4. Cost data are total hospital charges. "Charges" are the amounts that the hospital wants to be paid for services rendered, based on the resources used and their standard charge rates. In light of complex hospital review and reimbursement policies, charges may be much higher (and sometimes lower) than actual "payments" made by payors. Generally, charges are somewhat better at indicating actual resource utilization by different patients, since they are relatively individualized, while payments may be averaged out, especially in prospective payment systems. In 1987, California Medicaid paid with prospective payments to selected hospitals, which offered lower prices for care in the selective contracting process. HMOs also often pay discounted rates. Blue Cross/Blue Shield usually pays the actual "cost" of the stay, somewhat less than charges. Commercial insurers (e.g., Prudential, John Hancock, etc.) often pay the charges billed.

Charges do not accurately reflect the actual cost to a payor for services. But charges are an appropriate and relatively equitable measure of cost for comparisons across payors.

5. Payor type is the hospital's expected principal payor. This does not include all payors for a given bill. For example, a typical privately insured patient may have the bulk of his or her bill paid by the insurer, but has to pay the deductible (and perhaps co-payments) out-of-pocket. A Medicaid patient with private insurance may have the bulk of the bill paid by the private insurer and have deductibles and co-payments reimbursed by Medicaid. Complex cases may have a variety of public and private

payors, including Title V (Maternal and Child Health Block Grant), charities and research funding.

Further, the expected payor may not be the actual payor. A privately insured patient's bill may be rejected (e.g., due to a pre-existing condition or some other uncovered service) and eventually be billed directly to the patient (and perhaps be unpaid) or become eligible for Medicaid reimbursement as the patient spends down. California Medicaid has no limits on the number of days per stay, but does use periodic utilization review to limit hospital stays.

Expensive claims, which are the focus of this report, are more complex than lower cost claims. Insurers give them closer review and they are also more prone to problems, such as exceeding maximum claims levels.

The net effect is that the share of costs borne by private insurance is probably overrepresented in the data base and the share of costs eventually assigned to free care/bad debt is underestimated.

6. The data are static and cross-sectional. Over a longer time period, e.g., 10 years, a higher proportion of the population will have catastrophic expenditures at some point. Similarly, a higher proportion of the disabled population is without insurance at some time than is without insurance in 1987.
7. These analyses underrepresent HMO cases, since we excluded the cases without charge data. As noted earlier, this is mostly HMO patients being served in HMO hospitals in which no charges are reported.
8. Data quality are limited by the accuracy and knowledge of medical records staff who record these data. Discharge status may be an especially weak field. This field is not needed for billing.

To get a sense of the implications of some of these caveats, we can compare the analyses for California children with annual Medicaid expenditures over \$25,000 in 1986, reported by Burwell and Herz in an earlier report from this project (1990). Noninstitutionalized children (not in long-term care facilities) averaged 3.2 discharges in the year, while institutionalized children with inpatient hospital stays averaged 2.1 discharges in the year. However, for noninstitutionalized children, hospital care represented 90% of the Medicaid costs (Ellwood and Herz, 1990).

Even so, the total number of Medicaid children with annual expenditures over \$25,000 in 1986 was 6,409, which is almost identical to the 6,428 patients identified as having hospital stays with charges over \$25,000 with Medicaid as the expected principal payor in 1987. Presumably, the major offsetting factor is that Medicaid payments are well below the charge levels for these very high cost cases. As an example of the magnitude of these differences, Johns (1985) notes that for nine California hospitals in California, the Medi-Cal payment rates were 55 to 60% of charges. Since Medi-Cal

generally pays a negotiated per them rate which is uniform for all types of patients, then we should expect that the ratio of payments to charges will be even lower (perhaps below 50%) for these difficult cases. For other payors, actual payments will be somewhat closer to charges. Prospective payment systems will almost inherently underpay expensive cases, as high cost cases are averaged against low cost cases.

# RESULTS

## Comparisons of Lower and Higher Cost Hospital Stays

Very high cost cases are important both because they form a large fraction of the cost of hospital care and because the patients are among the sickest persons, with complex medical and social needs. The severity of their illnesses and the high cost of their care lends potential for case management services to either decrease costs and to improve the quality of care, especially coordination between hospital and non-hospital care.

We begin by examining general differences between the very high cost cases (over \$25,000 per stay) and lower cost stays. Table 1 (corresponding to Figure 1 in the Summary) presents the distribution of pediatric cases by cost category. Although cases with charges over \$25,000 are only 2% of the cases, they form more than a third (37%) of the total charges for hospital care. In fact, the very highest cost cases (over \$100,000) were one-third of 1 percent of the cases, but about a seventh (13%) of the total charges. Since some private insurance plans have maximum benefit levels of \$100,000, this gives an idea of the small number of people who might be affected, but the large dollar levels involved.

In total, these very high cost pediatric cases racked up total charges over \$1.3 billion in 1987, compared to \$3.8 billion for all cases for persons under 26 years old and \$20.4 billion for all hospitalizations for patients of all ages in California in 1987.

<b>TABLE 1. Distribution of Cases and Total Charges by Charge Category for Hospital Discharges Among 0-25 Year Olds, California, 1987</b>				
<b>Level of Charges Per Hospital Discharge</b>	<b>Number of Cases</b>		<b>Total Charges</b>	
	<b>Number</b>	<b>%</b>	<b>Dollars (in millions)</b>	<b>%</b>
\$0 to \$5,000	902,320	85.9	\$1,357.4	35.4
\$5,001 to \$10,000	82,400	7.8	\$564.5	14.7
\$10,001 to \$25,000	44,290	4.2	\$584.2	15.2
\$25,001 to \$50,000	13,040	1.2	\$446.3	11.6
\$50,001 to \$100,000	5,160	0.5	\$354.6	9.2
Over \$100,000	2,640	0.3	\$531.7	13.9
<b>TOTAL</b>	<b>1,049,850</b>	<b>100.0</b>	<b>\$3,838.7</b>	<b>100.0</b>

NOTE: Based on a 10% sample of all cases without missing data. All frequencies are multiplied by 10 to estimate for the entire State in 1987.

Corresponding to our interest in the payors for care, we can analyze who is paying for different levels of hospital care. As seen in Table 2 (and Figure 3 in the Summary section), there are differences in the payors for low and high cost care. In the

higher cost categories, the shares in the Medicaid and No Insurance category decline and the share in the Other Government category grows. Below \$25,000, the No Insurance group is 15.7% of cases, while it diminishes to 10.1% for cases over \$25,000. More specifically, the self-pay group declines from 11.1% of cases with costs below \$25,000 to 5.5% of cases with costs above \$25,000.

<b>TABLE 2. Distribution of Cases by Expected Principal Payor and Charge Category, Persons 0-25 Years, California, 1987</b>						
<b>Expected Principal Payor</b>	<b>Number of Cases (% in charge category shown in parentheses below)</b>					
	<b>\$0 - 5,000</b>	<b>\$5,001 - 10,000</b>	<b>\$10,001 - 25,000</b>	<b>\$25,001 - 50,000</b>	<b>\$50,001 - 100,000</b>	<b>Over \$100,000</b>
Private/HMO	415,110 (46.0%)	36,430 (44.2%)	22,030 (49.7%)	6,050 (46.4%)	2,280 (44.2%)	1,350 (51.1%)
Medicaid	307,890 (34.1%)	26,770 (32.5%)	12,090 (27.3%)	3,370 (25.8%)	1,740 (33.7%)	740 (29.9%)
Medicare	1,960 (0.2%)	1,030 (1.3%)	710 (1.6%)	290 (2.2%)	60 (1.2%)	0 (0%)
Other Govt.	38,570 (4.3%)	6,010 (7.3%)	4,010 (9.1%)	1,940 (14.9%)	570 (11.1%)	300 (11.4%)
<b>NO INSURANCE:</b>						
Self-Pay	103,320 (11.5%)	7,440 (9.0%)	3,260 (7.4%)	740 (5.7%)	300 (5.8%)	110 (4.2%)
No Charge	2,550 (0.3%)	260 (0.3%)	100 (0.2%)	50 (0.4%)	0 (0%)	20 (0.7%)
Other Non-Govt.	11,390 (1.3%)	1,350 (1.6%)	810 (1.8%)	270 (2.1%)	140 (2.7%)	50 (1.9%)
Indigent Care	21,530 (2.4%)	3,110 (3.8%)	1,280 (2.9%)	330 (2.5%)	70 (1.4%)	20 (0.7%)
<b>TOTAL</b>	<b>902,320 (100%)</b>	<b>82,400 (100%)</b>	<b>44,290 (100%)</b>	<b>13,040 (100%)</b>	<b>5,160 (100%)</b>	<b>2,640 (100%)</b>
Subtotal for No Insurance Group	138,790 (15.4%)	12,160 (14.8%)	5,450 (12.3%)	1,390 (10.7%)	510 (9.9%)	200 (7.6)
<b>NOTE: Based on a 10% sample of all cases without missing data. All frequencies are multiplied by 10 to estimate for the entire State in 1987.</b>						

The decline in the role of the No Insurance and self-pay groups as costs rise is important, although the interpretation is difficult. Alternative explanations include: (1) Hospitals may be unwilling to treat uninsured seriously ill patients or provide lower cost care to uninsured patients. Under an increasingly competitive environment, hospitals, especially private hospitals, may be unwilling to treat the uninsured. There is strong evidence that hospitals provide less care to uninsured persons. Weissman and Epstein (1989) found that, controlling for diagnoses, age, and other factors, non-elderly uninsured people in the Boston area had 7% lower lengths of stay and 7% fewer procedures than privately insured patients, although this was not true for public hospitals. (2) Hospitals probably are more aggressive in seeking potential payors for high cost cases. The increase in the role of the Other Government payors may indicate

attempts by hospitals to bill these programs for high cost uninsured patients. In many cases, high cost patients may be eligible for Medicaid through spending down their income and/or assets. (3) A final possibility is that families without insurance seek less care for seriously ill children. There is substantial evidence that increasing out-of-pocket costs decreases the demand for health care (Leibowitz, et al., 1985). However, we would not normally think this applies for such serious illnesses. Nonetheless, the possibility exists that some of the effect is due to decreased consumer demand, as opposed to hospital policies.

Below the \$25,000 mark, Medicaid pays for 33.7% of the cases, but above \$25,000 it only pays for 28.1%. We had expected that the share of Medicaid cases would rise as costs increased, since middle-class families were more likely to spend down into eligibility or take advantage of SSI institutionalization rules with high cost cases. One possible explanation is that, since Medicaid is a relatively poor payor, hospitals reduce the level of care to Medicaid patients or seek alternative payment sources. Another, is that, although there are special eligibility rules for high cost cases to enter Medicaid, they are rarely used because the Medicaid eligibility system is so complicated.

Perhaps the most surprising finding is the important role of Other Government programs as costs rise. Other Government programs (including Medicare) cover 5.1% of cases below \$25,000, but 15.2% above \$25,000. Although the data do not permit refined analysis, these may reflect impacts of two key programs: California's Title V program and its Short-Doyle mental health program. The Title V program, specifically the California Children's Program, does pay for hospital care for disabled children with no other insurance source. Its income criteria are broader than Medicaid's, going as high as \$40,000. In Fiscal Year 1987-88, the program paid for 2,800 hospitalizations with a mean cost of \$6,700, which is about double the overall mean cost of child hospitalizations (\$3,700) (Martin Green, CCS, personal communication, July 1990). The Short-Doyle program covers inpatient (as well as outpatient) psychiatric care, which is usually expensive due to long hospital stays. Thus, the Other Government programs appear to have a disproportionate role in financing high cost care.<sup>3</sup>

Overall, private insurance is the expected principal payor for only about half of the cases (all charge categories), which is less than expected. (Again, bear in mind that we excluded about 9% of cases whose charges were missing, but these appear to mostly be HMO cases.) The 1987 National Medical Expenditure Survey (Short, Monheit and Beauregard, 1989) indicate that about two-thirds of children under 19 have private insurance (67.5% for those under 6, 71.8% for those 6 to 18, and 63.3% for those 19 to 24 years). Analyses cited by Griss demonstrate that among the non-elderly, the level of uninsurance is similar between those with and without disabilities, as measured by Activities of Daily Living (Griss, 1988). However, those with disabilities were more likely to have Medicaid and less likely to have private insurance. This may be because the

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<sup>3</sup> While these findings were somewhat surprising, staff at the California hospital association found the role of the Other Government programs plausible. To the best of our knowledge, there is no equivalent data base which indicates the actual payors for all hospital care to confirm whether the discharge data are accurate.

disabled are more likely to be eligible for Medicaid (e.g., through SSI) and less likely to have private insurance, if they or their parents cannot work or if they are uninsurable due to their conditions.

If California insurance coverage is like the nation's we would expect that private insurance ought to pay for two-thirds of the hospitalizations. Similarly, public programs are the expected payor much more often than expected. The NMES found that 6 to 16% of the children had only public insurance (15.8% for those under 6, 11.3% for those 6 to 18 and 6.5% for those 19 to 24), while we find that government programs are expected to pay for about two-fifths of the hospital stays. California has a relatively generous Medicaid program, so we might expect somewhat higher public insurance levels in that state. These discrepancies may indicate the greater health problems of the poor and the greater probability of having health conditions requiring hospitalization.

These findings are at variance with findings for newborns from the 1984 National Hospital Discharge Survey (Kozak and McCarthy, cited by McManus, 1986), who found higher levels of uninsured status as costs increased. They reported that 17% of all newborn discharges were expected self-pay, 15% Medicaid, 61% private insurance, and 6% other sources, but for those with hospital stays over 14 days, 25% were self-pay, 22% were Medicaid and 42% were private, indicating that self-pay and Medicaid burdens increase as costs rise. In contrast, our California data for infants under 1 find 11% self-pay for all infant discharges, falling to 4% for those with charges over \$25,000. Medicaid rises slightly from 35% for all infants and 38% for infants with charges over \$25,000 and private insurance falls slightly from 48% to 43%.

Part of the differences are Medicaid-related. California has a generous Medicaid program and nationally Medicaid coverage of infants and pregnant women has widened since 1984, which reduces the uninsured level. The other difference may be that hospitals have become more cost-conscious and competitive since 1984. Buffeted by the Medicare Prospective Payment system and competition in the private and Medicaid markets, they may have been less willing to treat uninsured patients, reduced care to uninsured patients and/or tried harder to find payors for expensive cases to reduce their uncompensated care levels.

Table 3 indicates differences in age ranges across different charge categories. The most noteworthy finding is the U-shaped share of patients under 1 year of age. Infants are about half of the \$0 to \$5,000 range discharges, decline in importance for the mid-range stays (\$5,000 to \$25,000), then rise again, becoming a majority of the cases over \$100,000. This probably reflects two basic modes of hospital care for infants: normal neonatal and infant care, which is relatively inexpensive, vs. neonatal intensive care and its sequelae (e.g., technology dependent infants), which can be very expensive. Children 1 to 10 years old are relatively healthy and comprise a small share of the hospital cases across the range of costs. Older children and adolescents tend to comprise a growing share of the hospital cases as costs rise. This may be because important diagnoses in this age range, psychiatric and injuries, are often expensive hospitalizations.

Table 4 briefly indicates the type of hospital used across the cost categories. General acute care hospitals provide the great majority of care in all cost ranges, but psychiatric and alcohol/drug treatment hospitals grow in importance as costs rise. Psychiatric hospitals comprise about a fifth of cases with costs over \$25,000 per stay.

<b>TABLE 3. Distribution of Cases by Age Group and Charge Category, Persons 0-25 Years, California, 1987</b>						
<b>Age Group</b>	<b>(age group as percent of charge category)</b>					
	<b>\$0 - 5,000</b>	<b>\$5,001 - 10,000</b>	<b>\$10,001 - 25,000</b>	<b>\$25,001 - 50,000</b>	<b>\$50,000 - 100,000</b>	<b>Over \$100,000</b>
Under 1 Year	50.7%	19.5%	23.4%	30.0%	40.3%	53.0%
1-3 Years	4.4%	6.8%	5.8%	5.5%	4.5%	7.2%
4-10 Years	4.4%	7.9%	7.8%	8.7%	5.2%	8.7%
11-20 Years	17.5%	30.7%	37.3%	38.7%	32.4%	18.2%
21-25 Years	23.0%	35.0%	25.9%	17.2%	17.6%	12.9%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NUMBER IN CATEGORY	902,320	82,400	44,290	13,040	5,160	2,640

NOTE: Based on a 10% sample of all cases without missing data. All frequencies are multiplied by 10 to estimate for the entire State in 1987.

<b>TABLE 4. Distribution of Cases by Hospital Type and Charge Category, Persons 0-25 Years, California, 1987</b>					
<b>Hospital Type</b>	<b>(hospital type as percent of charge category)</b>				
	<b>\$0 - 5,000</b>	<b>\$5,001 - 10,000</b>	<b>\$10,001 - 25,000</b>	<b>Over \$25,000</b>	<b>All Charges</b>
General Acute Care	98.5%	93.2%	82.9%	78.1%	97.1%
Psychiatric	1.3%	5.1%	14.2%	21.3%	2.5%
Alcohol/Drug Treatment	0.2%	1.7%	2.8%	0.6%	0.4%
NUMBER IN CATEGORY	902,320	82,400	44,290	20,840	1,049,850

NOTE: Based on a 10% sample of all cases without missing data. All frequencies are multiplied by 10 to estimate for the entire State in 1987.

## Who Are the Very High Cost Patients?

At this point, we can start to describe more fully the very high cost patients (with charges over \$25,000 per stay). The following analyses are based on the extract of all discharges with charges over \$25,000 for persons 0 to 25 years of age. In some cases, the numbers differ very slightly from those presented in the previous section. The analyses of all pediatric cases was based on a 10% sample and is subject to sampling



error. The following analyses of very high cost cases uses the whole population of very high cost patients.

Table 5 compares the age distribution for all Californians under 26 years and the very high cost patients. Roughly a third of the very high cost cases are under 1 year old and a third are 11 to 20 years old, with the remaining third split the other ages. However, it may be most useful to think in terms of a population prevalence rate, the number of very high cost hospital cases per 100,000 population of that age range. Overall, the average chance of a young person having a very high cost hospitalization is quite small - 198 per 100,000 or about 0.2%.<sup>4</sup> However, the prevalence is about 9 times higher for infants under 1 year old, almost 2% of all infants have such expensive hospitalizations. Young children are the least likely to have very expensive hospital stays, less than 100 per 100,000. As they age to older adolescence and young adulthood, the risk rises to 160 to 180 per 100,000. Also shown in the far right column is the percent of very high cost cases represented by the different ages.

Table 6 and Table 7 show the racial/ethnic and gender distributions for the very high cost patients. Black children are overrepresented among the very high cost children. While they comprise 12% of the very high cost cases, blacks are 7.5% of all Californians.<sup>5</sup> Hispanics and other people of color appear to be distributed roughly proportionate to their distribution in the overall population. Whites appear somewhat underrepresented. These findings are consistent with many findings of greater health burdens in the black community. Males constitute about three-fifths of the very high cost cases. Similar traits were found in our Medicaid analyses.

<b>TABLE 5. Age Distribution of Children and Young Adults in California and for Hospital Discharges with Costs Over \$25,000, 1987</b>				
<b>Age</b>	<b>State Population* (in 1000s)</b>	<b>Very High Cost Cases</b>	<b>Rate of High Cost Cases (per 100,000 population)</b>	<b>% of High Cost Cases by Age</b>
Less than 1	462	7,857	1,701	36.6%
1-3 Years	1,386	1,226	88	5.7%
4-10 Years	2,764	1,721	62	8.0%
11-20 Years	3,985	7,245	182	33.8%
21-25 Years	2,250	3,404	151	15.9%
0-25 Years	10,847	21,453	198	100.0%
* The California age distribution is extrapolated from tabulated Census data for 1987.				

<sup>4</sup> These rates are slightly overstated, since they do not account for multiple high cost admissions by the same person over the year. However, they illustrate the approximate population prevalence rate.

<sup>5</sup> Comparing racial mix is difficult since the hospital statistics and Census statistics are reported differently. Census data treat race and Hispanic ethnicity as different categories, while they are grouped together in the hospital data. Further, we have just used Census race data for all ages in California in 1987, assuming that it is roughly similar for all ages.

<b>TABLE 6. Racial/Ethnic Distribution of Very High Cost Cases, Persons 0-25 Years, California, 1987</b>	
<b>Racial/Ethnic Group</b>	<b>Percent of Cases</b>
White	59.8%
Black	12.1%
Hispanic	21.6%
Native American/Eskimo	0.3%
Asian	4.3%
Other	1.9%

<b>TABLE 7. Gender Distribution of Very High Cost Cases, Person 0-25 Years, California, 1987</b>	
<b>Gender</b>	<b>Percent of Cases</b>
Male	59.0%
Female	41.0%

## **What are the Medical Problems of Very High Cost Patients?**

Table 8 presents the percent of cases, percent of total charges and mean charge per stay for 21 groups of principal diagnoses for the very high cost pediatric cases in California. For these complex cases, there may be secondary or lower level diagnoses which indicate other problems, complications or underlying conditions. For analytical simplicity we used principal diagnoses. There are three groups which represent more than 10% of the cases or the charges: mental disorders (25.5% of cases and 18.6% of total charges), other condition originating in perinatal period (22.2% of cases and 27.6% of charges and injuries and poisonings (15.3% of cases and 14.9% of charges). It is noteworthy that AIDS and related conditions form less than 1% of the cases and total charges for this group.

In subsequent analyses we grouped these into four broad categories:

1. Pregnancy/Newborn      Complications of pregnancy, childbirth & puerperium; congenital anomalies; premature/inadequate birthweight; and other conditions originating in the perinatal period, Thus, this grouping includes both maternal and infant disorders and congenital abnormalities which may extend beyond the first year of life.
2. Mental Disorders      Mental disorders; mental retardation.
3. Injuries & Poisonings      Injuries and poisonings
4. Other Disorders      All other diagnoses, including infections, neoplasms (cancers and tumors), respiratory, digestive and circulatory problems, AIDS, etc.

**TABLE 8. Percent of Cases, Total Charges, and Mean Charges Per Stay by Diagnosis Code Groupings Among Very High Cost Cases, Persons 0-25 Years, California, 1987**

Diagnosis Category		ICD-9 Codes	Description (Examples)	Percent of Cases	Percent of Total Charges	Mean Charges Per Stay (\$)
1.	Infectious and parasitic diseases, except AIDS	001-041, 045-139*	Tuberculosis, whooping cough, chicken pox, venereal disease	2.0	2.0	\$62,339
2.	Neoplasms, except AIDS	140-239*	Malignant and benign forms	3.9	4.8	76,505
3.	Endocrine, nutritional, metabolic and immunity disorders, except AIDS	240-279*	Diabetes, vitamin deficiency, PKU, cystic fibrosis	1.0	0.9	56,982
4.	Disease of blood and blood-forming organs	280-289	Anemia, hemophilia	0.7	0.9	75,578
5.	Mental disorders	290-316	Psychoses, autism, personality disorders, alcohol and drug dependence	25.5	18.6	46,035
	A. Mental retardation	317-319	Mild, moderate, severe and profound forms	0.2	0.2	57,407
6.	Diseases of nervous system and sense organs	320-389	Encephalitis, multiple sclerosis, epilepsy, muscular dystrophies, blindness, otitis media	2.1	2.3	68,862
7.	Diseases of the circulatory system	390-459	Chronic rheumatic heart disease, hypertension, congestive heart failure	1.8	1.7	59,384
8.	Diseases of the respiratory system	460-519	Pharyngitis, pneumonia, asthma	3.7	3.2	55,656
9.	Diseases of the digestive system	520-579	Dental caries, peptic ulcer, gastroenteritis	2.4	2.4	61,192
10.	Diseases of the genitourinary system	580-629	Renal failure, endometriosis	1.3	1.0	49,496
11.	Complications of pregnancy, childbirth and the puerperium	630-676 V22-V26, V28	Ectopic pregnancy, miscarriage, placenta previa, preterm labor, normal delivery, breech presentation	0.5	0.4	45,076
12.	Diseases of the skin and subcutaneous tissue	680-709	Impetigo, acne	0.4	0.3	51,510
13.	Diseases of the musculoskeletal system and connective tissue	710-739	Systemic lupus erythematosus, rheumatoid arthritis, acquired deformities	1.4	1.0	44,023
14.	Congenital anomalies	740-759	Spina bifida, hypoplastic left heart syndrome, cleft palate, Down's syndrome	6.7	7.2	68,415
15.	Other conditions originating in perinatal period	760-763, 766-779 V27, V30-V39	Maternal causes of perinatal morbidity and mortality, cesarean delivery, drug withdrawal syndrome in newborn, respiratory distress syndrome	22.2	27.6	\$78,556
	A. Premature/inadequate birthweight	764-765	Slow fetal growth, extreme immaturity, low birthweight	5.0	6.7	83,707
16.	Symptoms, signs and ill-defined conditions	780-799	Coma, convulsions, pyrexia, sudden infant death syndrome	0.8	0.9	67,742
17.	Injury and poisoning	800-999, E800-E999	Fractures, concussions, traumatic amputations, superficial injuries, burns, spinal cord injury, poisoning by psychotropic agent, poisoning by bacteria vaccines, mechanical complication of device, implant or graft, postoperative infection, railway, motor vehicle, aircraft, accidental poisonings, drowning, falls	15.3	14.9	61,647
18.	Miscellaneous "V" Codes	V01-V21, V40-V82	Organ/tissue transplant, dependence on machines, fitting/adjusting device, routine exams	2.2	2.2	63,607
19.	AIDS, ARC and HIV	042-044*	AIDS, ARC, HIV infection, pneumocystis carinii pneumonia, Kaposi's sarcoma	0.7	0.8	72,782

\* AIDS, ARC and HIV also includes selected diagnoses, relating to pneumocystis carinii pneumonia, Kaposi's sarcoma and other immune problems. These were excluded from other categories to avoid double-counting.

In general, pregnancy/newborn disorders comprise over a third of the very high cost cases (34.4%) and an even larger share of the costs (41.9%). These problems are disproportionately expensive. In contrast, although mental disorders are over a quarter of the cases, they are less than a fifth of the costs. They are less costly per case. Readers should recall that these data do not depict the overall prevalence or costs of these diagnoses for all pediatric patients. This is a sample only for those with charges over \$25,000.

Three other ways to view patients are in terms of the type of medical facility treating them, the type of admission and type of discharge. These are shown in Table 9, Table 10 and Table 11, respectively. The great majority of cases were treated in general acute care hospitals, although about a fifth were seen in psychiatric hospitals and less than 1% seen in alcohol/drug treatment hospitals. Admission status can be useful as a sign of the relative urgency of the disorder; it is somewhat unexpected that a sixth of the very high costs cases were classified as elective.

Discharge status is one crude sign of outcomes of the hospital stay. About three-quarters of the stays were classified as routine discharges. About 8% were transferred to another acute hospital. Reasons for transfer may include: shifting a patient to a more medically appropriate facility, e.g., as a transfer of a complex case to a tertiary care hospital; transfer to a facility more convenient for the patient or physician, e.g., transferring a patient to a hospital closer to home after a patient is stabilized; and transfer for economic reasons, e.g., transfer of an uninsured patient from a private to a public hospital, this is sometimes called "dumping." It is a little surprising that less than 3% of these serious cases were discharged to a nursing facility (ICF or SNF) or with home health care. However, discharge status data is often considered poor quality; medical records staff are often not informed on the actual status of a patient. Hopefully, more actually obtained subsequent nursing home or home health care than are reflected in these data. Only 6% were coded as died. Considering the severity of the illnesses among these very high cost children, this rate seemed relatively low. Finally, about 5% left against advice. This may indicate patients who left because they were discontent with their medical care, who felt that they were all right to go home or who felt compelled to leave early for economic reasons.

## **Differences Among Expected Principal Payors**

At this point, we can examine whether different payors serve different types of patients and whether their care varies according to payor. Again, we warn that these findings are essentially exploratory and that differences in case mix, cost, etc. may not be due to the payor, but to some other confounding factors.

Hospital Type	Percent of Cases
General acute care	78.7%
Psychiatric	20.6%
Alcohol/drug	0.6%

NOTE: These data differ slightly from those in Table 4, since that one was based on a 10% sample. This is based on all cases with charges over \$25,000.

Types of Admission	Percent of Cases
Emergency	29.8%
Urgent	36.9%
Elective	16.5%
Newborn	16.4%
Delivery	0.4%

Discharge Status	Percent of Cases
Routine Discharge	74.6%
Transfer to Other Acute Care Hospital	7.9%
Skilled Nursing Facility (SNF)	1.0%
Intermediate Care Facility (ICF)	0.4%
Other Facility	3.5%
Home Health Care	1.1%
Left Against Advice	5.3%
Died	6.1%

Table 12 (corresponding with Figure 2) begins by showing the distribution of payors for the cases with charges over \$25,000. Again, we underestimate private coverage by about 9%, due to the exclusion of the cases with missing charges, which are mostly due to Kaiser patients treated at Kaiser hospitals.

As children age, the mix of payors for high cost cases changes greatly. As shown in Table 13 (and Figure 4), the share of cases paid by Medicaid consistently declines as children age. This is probably a function of the greater poverty among young families and the somewhat looser eligibility rules for Medicaid for children. The share in the No Insurance category rises beginning in the 11 to 20 year age range and becomes the highest in the 21 to 25 range. These older groups are often losing both family insurance coverage and Medicaid and gain eligibility to the Medically Indigent program as uninsured adults. Even so, they also have the highest range of self-pay for high cost

cases. Private insurance peaks for the 11 to 20 age range and then drops precipitously by 21 to 25. Although we have extended the analyses to those over 25, it seems likely that insurance status improves with older age, as people become either more economically secure or become Medicaid eligible again through the birth of children. The risk of uninsurance is greatest among the young adults. This may be a particular problem, since, as noted earlier, the rate of very high cost illnesses per 100,000 population is about twice as high in this age range as in the 1 to 10 age range.

Expected Principal Payor	Number	%
Private insurance/HMO	10,126	47.2
Medicaid	6,428	30.0
Medicare	304	1.4
Other Govt. (Worker's Compensation, Title V, Other Govt.)	2,619	12.2
<b>NO INSURANCE:</b>		
Self-Pay	1,163	5.4
No Charge (charity, teaching, research, etc.)	49	0.2
Other Non-Government	357	1.7
Indigent Care under Section 17000	407	1.9
NOTE: These data differ slightly from those in Table 2, since this is based on all cases over \$25,000, while Table 2 was based on a 10% sample of all cases.		

Payor	Under 1	1-3 Years	4-10 Years	11-20 Years	21-25 Years
Private	42.1%	40.7%	45.3%	61.1%	24.0%
Medicaid	41.0%	38.3%	34.3%	19.1%	22.6%
Other Govt. (incl. Medicare)	10.6%	15.7%	15.9%	12.7%	20.8%
<b>NO INSURANCE:</b>					
Self-pay	4.3%	2.7%	1.8%	4.8%	12.1%
No Charge	0.1%	0.2%	0.0%	0.3%	0.6%
Other Non-Govt.	1.4%	2.0%	2.0%	1.5%	2.4%
Indigent Care	0.5%	0.3%	0.8%	0.6%	9.0%
No Insurance Subtotal	(6.3%)	(5.3%)	(4.5%)	(7.2%)	(24.0%)
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%

There are very distinct patterns of the types of medical disorders paid for by different insurers, as seen in Table 14 and Figure 5. Unlike all other groups, almost half (42%) of the No Insurance group discharges are due to injuries and poisonings. Only about 10% of the No Insurance cases were for mental disorders. For both Medicaid and Other Government Programs, just under half of the high cost cases are related to

pregnancy or newborn disorders and about one-eighth are due to injuries and poisonings. However, Other Government was associated with far more mental health cases (34%) than Medicaid (13%), while Medicaid had more cases of other disorders. Private insurance had the highest share of mental health cases (35%).

The high share of Other Government funding going to mental health cases was surprising. It appears that a major reason for this emphasis is California's Short-Doyle program, the state/county program covering inpatient and community mental health services (though not substance abuse services). The state allocates funds to counties who may use them in public mental health hospitals or contract out to private hospitals. The level of Medicaid funding for mental health may be somewhat underestimated since Short-Doyle may initially cover a hospitalization, but eventually be reimbursed by Medicaid when treating a Medicaid recipient. All Californians are eligible for Short-Doyle services, although the program seeks third-party payors and screens people for income to establish a sliding fee scale for uninsured services.

Undoubtedly, much of the explanation for these differences is due to the different age mix for each payor. Table 15 shows the relation of age and type of diagnosis. Three basic patterns are seen:

- Under 1 Year. Dominated by pregnancy/newborn problems.
- 1 to 10 Years. Dominated by other medical problems, such as neoplasms, infections, respiratory and digestive problems. Congenital anomalies are also relative common in the 1 to 3 age range (18.6%).
- 11 to 25 Years. Mental disorders and injuries and poisonings are more common, although other disorders are still common.

Thus, the high proportion of injuries and poisonings among the No Insurance group is partly attributable to the fact that the uninsured include many older children and young adults. Of course, to the extent that insurance changes access to care, the age mix is confounded by insurance type also.

The type of admission is a sign of the relative urgency of the medical disorder. We would expect that many hospitals may be unwilling to provide care to uninsured people unless the situation is an emergency and that uninsured people will delay care and have a disproportionate level of emergency care. Table 16 displays the type of admission among different payors. Indeed, the rate of emergency admissions in the No Insurance group is almost twice as high as for those with private insurance. This is also consistent with the profile of older patients with more injuries and poisonings. In a way, it is unexpected that there is any elective care in the No Insurance group.

<b>TABLE 14. Diagnostic Groupings by Expected Principal Payor for Very High Cost Cases, Persons 0-25 Years, California, 1987</b>					
<b>Payor</b>	<b>Pregnancy/ Newborn</b>	<b>Mental Disorders</b>	<b>Other Disorders</b>	<b>Injuries &amp; Poisoning</b>	<b>TOTAL</b>
Private	31.2%	34.7%	21.2%	12.8%	100.0%
Medicaid	45.5%	12.6%	29.9%	12.0%	100.0%
Other Govt. (incl. Medicare)	43.0%	34.0%	10.0%	13.0%	100.0%
<b>NO INSURANCE:</b>					
Self-pay	28.0%	13.1%	16.6%	42.3%	100.0%
No Charge	8.2%	12.2%	44.9%	34.7%	100.0%
Other Non-Govt.	27.2%	9.0%	37.2%	26.6%	100.0%
Indigent Care	13.8%	2.2%	27.0%	57.0%	100.0%
No Insurance Group	23.9%	10.1%	23.7%	42.3%	100.0%
NOTE: See text for definition of categories					

<b>TABLE 15. Diagnostic Grouping by Age Category Among Very High Cost Cases, Persons 0-25 Years, California, 1987</b>					
<b>Age Category</b>	<b>Pregnancy/ Newborn</b>	<b>Mental Disorders</b>	<b>Other Disorders</b>	<b>Injuries &amp; Poisoning</b>	<b>TOTAL</b>
Under 1 Year	86.2%	0.0%	12.2%	1.6%	100.0%
1-3 Years	21.0%	0.7%	59.9%	18.5%	100.0%
4-10 Years	7.9%	33.4%	42.5%	16.2%	100.0%
11-20 Years	1.7%	57.6%	21.7%	19.1%	100.0%
21-25 Years	2.8%	22.2%	37.8%	37.1%	100.0%
NOTE: See text for definition of categories					

<b>TABLE 16. Admission Type by Expected Principal Payor Among Very High Cost Cases, Persons 0-25 Years, California, 1987</b>						
<b>Payor</b>	<b>Emergency</b>	<b>Urgent</b>	<b>Elective</b>	<b>Newborn</b>	<b>Delivery</b>	<b>TOTAL</b>
Private	24.1%	42.6%	17.4%	15.7%	0.2%	100.0%
Medicaid	35.9%	28.7%	12.8%	21.8%	0.7%	100.0%
Other Govt. (incl. Medicare)	27.3%	37.5%	24.3%	10.7%	0.1%	100.0%
<b>NO INSURANCE:</b>						
Self-pay	45.7%	30.7%	12.0%	11.1%	0.4%	100.0%
No Charge	53.1%	20.4%	20.4%	6.1%	0.0%	100.0%
Other Non-Govt.	28.0%	41.7%	14.3%	15.7%	1.3%	100.0%
Indigent Care	47.7%	35.1%	8.9%	7.9%	0.5%	100.0%
No Insurance Group	43.1%	33.4%	11.9%	11.3%	0.4%	100.0%



<b>TABLE 17. Discharge Status by Expected Principal Payor Among Very High Cost Cases, Persons 0-25 Years, California, 1987</b>						
<b>Payor</b>	<b>Routine Discharge</b>	<b>Other Acute Hospital</b>	<b>SNF, ICF or Other Facility</b>	<b>Home Health</b>	<b>Left Against Advice</b>	<b>Died</b>
Private	77.9%	7.3%	3.6%	1.5%	4.3%	5.4%
Medicaid	71.6%	8.6%	6.1%	0.6%	6.3%	6.8%
Other Govt. (incl. Medicare)	75.6%	5.5%	6.3%	0.9%	6.3%	5.4%
<b>NO INSURANCE:</b>						
Self-pay	62.0%	16.0%	6.5%	0.9%	5.8%	8.9%
No Charge	71.4%	6.1%	10.2%	0.0%	2.0%	10.2%
Other Non-Govt.	71.7%	10.1%	5.9%	0.3%	5.9%	6.2%
Indigent Care	72.2%	5.7%	5.9%	2.2%	8.4%	5.7%
No Insurance Group	66.1%	12.6%	6.3%	1.0%	6.2%	7.8%
NOTE: See text for definition of categories						

Discharge status is a crude measure of the outcome of a hospitalization. As noted before, there may be data quality problems for this variable. Table 17 and Figure 6 show the discharge status for the very high cost pediatric cases. The noteworthy finding is that those in the No Insurance group are about 50 to 100% more likely to be transferred to another acute care hospital than those with private insurance or Medicaid. The most likely explanation is that private hospitals are transferring uninsured patients to public hospitals. In general, uninsured patients are more likely to be transferred to another setting, including other hospitals or nursing homes. Insofar as the first hospital has already provided substantial care (more than \$25,000 worth), this probably means that these patients have been stabilized and received much treatment. Thus, there may not be a problem in terms of quality of care, as such. Finally, the No Insurance and Medicaid groups had slightly higher mortality rates than the Private Insurance and Other Government groups. One likely explanation is that uninsured and Medicaid patients had more medical/surgical (and fewer psychiatric diagnoses) which are more likely to be fatal.

Finally, we examine the differences between expected principal payors in terms of the mean length of stay, mean charges per hospital stay and mean charges per day of hospitalization. These measure the resources used by these very expensive patients and are depicted in Table 18 and Figure 7. Those in the No Insurance group have by far the lowest mean length of stay and the lowest mean charges per stay, but have the highest mean charges per day. Although these uninsured people have intensive services while they are in the hospital, they are discharged relatively quickly. This may indicate a cost-saving strategy by hospitals through earlier discharge of uninsured people. However, it may also be reflective of the casemix of patients, e.g., many trauma victims who require intensive services while in the hospital, but relatively shorter stays.

<b>TABLE 18. Mean Length of Stay, Mean Charges Per Stay and Charges Per Day of Hospitalization by Expected Principal Payor for Very High Cost Cases, Persons 0-25 Years, California, 1987</b>				
<b>Payor</b>	<b>Mean Length of Stay (days)</b>	<b>Mean Charges Per Stay (\$)</b>	<b>Mean Charges Per Day (\$/day)</b>	<b>n</b>
Private	52.6	\$61,205	\$1,164	10,126
Medicaid	61.3	69,142	1,128	6,428
Other Govt. (incl. Medicare)	87.1	60,489	695	2,619
<b>NO INSURANCE:</b>				
Self-pay	40.3	54,753	1,359	1,163
No Charge	35.9	56,962	1,587	49
Other Non-Govt.	48.9	72,202	1,477	357
Indigent Care	35.6	51,414	1,444	407
No Insurance Group Means	40.8	57,272	1,403	1,976
<b>GRAND MEANS (All patients)</b>	<b>58.8</b>	<b>63,124</b>	<b>1,074</b>	<b>21,453</b>

In contrast, the Other Government group has the highest length of stay, but the lowest charges per day. This is partly because this group includes many psychiatric patients. Psychiatric patients may have no expensive procedures, but very long periods of hospitalization. Private patients and Medicaid patients had similar charges per day, but Medicaid patients had slightly longer stays, leading to slightly higher charges per stay.

There is substantial evidence that many medical procedures and many hospital days are medically inappropriate or unnecessary. The fact that some groups have shorter lengths of stay, lower rates of hospitalization or lower costs does not necessarily mean that they are receiving poorer quality care or that their outcomes are worse. Nonetheless, these data suggest large differences in the way that the medical care system handles children and young adults depending on how they are insured.

# CONCLUSIONS

This exploratory study has two main purposes. First, it provides a broad view of hospital care for seriously ill children and young adults, which can be used for comparison with Medicaid analyses. Second, it particularly looks at problems of the uninsured. This exploratory study has revealed a multitude of differences in the nature of very expensive hospitalizations among children and young adults in California, depending on their insurance status. We focused on cases in which the total hospital charges exceeded \$25,000 per stay among persons 0 to 25 years old at the time of discharge. Although the very high cost cases are only 2% of the hospitalizations, they account for more than a third of the charges. The rate of very high cost hospitalization is highest among infants under 1 year of age, due to a variety of expensive neonatal conditions.

Very high cost patients were roughly split between public and private payors. The role of private insurance was somewhat smaller than expected and the role of other government programs was larger than expected. Part of this, however, may be unique to California, which has a generous Medicaid program and other health care programs, compared to other states.

It was harder to classify insurance status than expected. The main variable used was expected principal payor, as listed by the hospital. About three-quarters of the very high cost cases had insurance as we usually define it: private insurance, HMO coverage, Medicaid or Medicare. Just under one quarter had a broad mix of payor sources, including Title V, worker's compensation, CHAMPUS, self-pay, no charge, other non-government and California's Short-Doyle mental health program and Section 17000 medically indigent program. By some definitions, many or most of these may be classified as uninsured people. For this study, we created a group, Other Government Programs, which included Medicare, Title V, worker's compensation and other government programs. We also created another group, the No Insurance group, which included self-pay, no charge, other non-government (e.g., foundations) and the indigent care program. We do not know how well the expected principal payor corresponds with actual payors.

The analyses indicated various, related problem areas for those without insurance:

- As hospital stays become more expensive, the share of patients without insurance or who are self-pay declines. This may indicate that those without insurance have reduced access to care for serious illnesses, that hospitals are more aggressive in identifying payors for expensive cases or that those without insurance seek less care.
- Young adults 21 to 25 years old appear to be at greatest risk of high cost cases without insurance. They often lack either private insurance or Medicaid.

- Access to inpatient mental health care may be a special problem for the uninsured. Access for trauma victims may be better; almost half of the high cost cases in the No Insurance group were being treated for injuries and poisonings.
- Those without insurance may have more difficulty in being admitted without an emergency condition.
- There is a greater probability of being transferred to another acute care hospital among the uninsured.
- Those without insurance appear to be discharged earlier and to have lower cost stays, although they may have intensive services during their hospital stays.

Current health policy discussions tend to focus on two aspects of very high cost cases and disabled children. On one hand, discussions emphasize the need for expansion of public and private insurance coverage to ensure adequate care for the needy children and to avoid financially devastating expenses to their families (e.g., Newacheck and McManus, 1988, American Academy of Pediatrics, 1987, Rosenbaum, 1987, Griss, 1988). This study does reveal some access problems among the uninsured. However, the number of self-pay patients was smaller than expected, largely due to the larger than anticipated role of other government programs. This study focused on hospitalizations, which are usually much better covered than outpatient care, drugs, medical devices, nursing home or home health care, counseling, etc.). However, a recent survey by Fox and Newacheck suggests that private insurance policies may be broadening coverage for home care and other cost-effective services in recent years (Fox and Newacheck, 1990). We could not examine problems in other forms of health care or in high out-of-pocket costs among families of disabled children. Our data shed some light on maximum insurance benefits, which sometimes start as low as \$100,000.

On the other hand, discussions emphasize the potential for cost containment in these high cost cases. The greatest savings are achievable in cases which cost the most. Much discussion today focuses on medical case management (Henderson, et al, 1988) or rationing (Medicine & Health, 1990). Usually in case management, a nurse or other health professional is assigned to a patient with severe illnesses to oversee and coordinate care between the hospital, outpatient settings and the home. The case manager authorizes care and is empowered to provide non-standard benefits (such as home modification or special therapy) which will improve the quality of care and/or reduce costs. A principal goal of case management is helping to get people out of hospitals sooner, generally the most expensive treatment setting, and into lower cost (and often more appealing) community settings. Many of these very high cost cases, especially the high risk newborns are probably amenable to case management services. However, case management can sometimes cost more than it saves. These data showed surprisingly few discharges involving nursing homes or home health care. Hopefully, this an artifact of poor data quality and discharge planning is more thorough

than it appears. From the perspective of rationing, the issue is whether it is worthwhile to spend large amounts for a small number of people, many of whom are likely to die anyway. These data confirm that a small fraction of people incur a large portion of costs. However, only 6% have the discharge status of died. While it seems likely that this code would be more accurate than the nursing home and home health codes, data quality is an issue. Rationing is controversial and raises vexing ethical issues.

It would be an injustice to conclude without mentioning that many, perhaps the majority, of these very high cost problems are preventable. Most of the injuries and poisonings are preventable. Key efforts include improved auto safety design and use of seat belts. Many of the pregnancy and newborn problems could be avoided through better prenatal care, improved nutrition, prevention of substance use (including tobacco, alcohol and drugs), and genetic screening. Many of the mental health and other medical/surgical disorders could be prevented (e.g., AIDS and substance use prevention) or at least be identified earlier and treated in less intensive settings than the hospital. While policy-makers should consider how to widen coverage for disabled children and how to contain health care costs through case management, they should not forget the importance of prevention and public health programs which can reduce the incidence and costs of treatment in the long term.

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