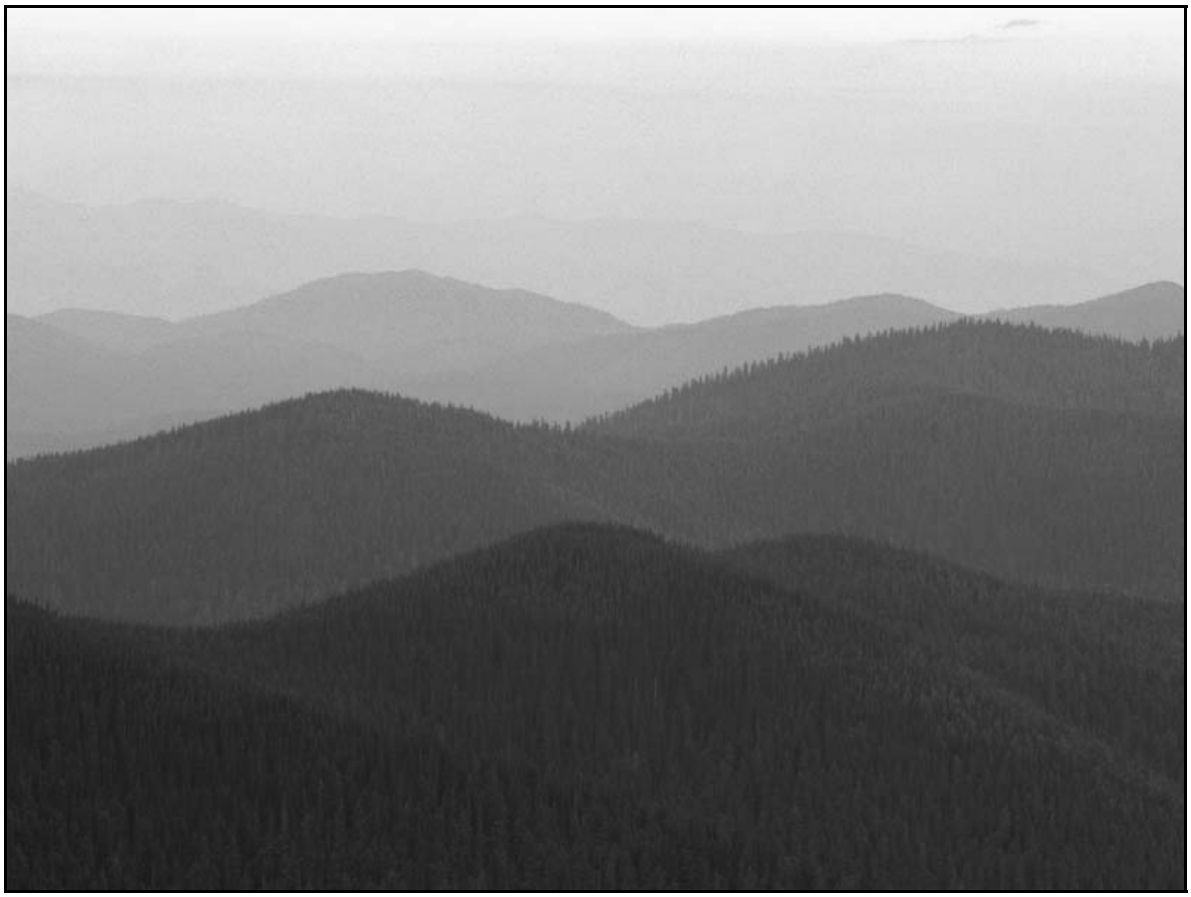

Guide to the Mental Health Service Cost Data for the Great Smoky Mountain Study:

Prepared as source documentation for the manuscript “Service costs of caring for adolescents with mental illness in a rural community, 1993-2000.”

This work was supported in part by grants DA11301 and MH57761 and Independent Scientist Award MH01167 from the National Institutes of Health to E. Jane Costello, Ph.D., and Faculty Scholar awards from the William T. Grant Foundation to the Drs. Costello and Angold.

Table of Contents:

*** Use CASA service table to determine service settings included in each category**

Introduction:

The following guide presents unit cost data information for the services included in the manuscript “Service costs of caring for adolescents with mental illness in a rural community, 1993-2000.” The goal is to provide sufficient information for independent verification of cost estimates, although the sheer volume of resources collected and contacts made to estimate unit costs across the 21 service settings puts complete documentation beyond the scope of this document. Please feel free to contact William Copeland, Ph.D., at william.copleand@duke.edu with additional questions.

Source of information on types and units of services

Information about the types of service and the number of units used per child were collected using the *Child and Adolescent Services Assessment* (CASA; Burns, Angold, Magruder-Habib, Costello, and Patrick, 1996). The information on cost data presented below is organized according to CASA categories found on pages 5 and 6 (table 1) are we including a copy of the CASA? (i.e., overnight/inpatient, outpatient, other professional help) even where these categories do not overlap with service categories used in the manuscript. Additional information about the measure is available from the references listed below:

Ascher BH, Farmer EMZ, Burns BJ, Angold A. The Child and Adolescent Services Assessment (CASA): Description and psychometrics. J Emotional Behav Disord 1996;4:12-20.

Farmer EMZ, Angold A, Burns BJ, Costello EJ. Reliability of self-reported service use: Test-retest consistency of children's responses to the Child and Adolescent Services Assessment (CASA). J Child Fam Stud 1994;3(3):307-25.

Additional information on utilization of psychotropic medications was collected using the Child and Adolescent Psychiatric Assessment (CAPA; Angold, Cox, Prendergast, Rutter, & Simonoff, 2000). Further information is available from the reference listed below:

Angold A, Prendergast M, Cox A, Harrington R, Simonoff E, Rutter M. The Child and Adolescent Psychiatric Assessment (CAPA). Psychol Med 1995;25:739-53.

General information on cost computations:

Cost estimates were calculated by multiplying reported service units by unit costs. The CASA obtains ser vice units for Outpatient services and Other Professional services through items inquiring about the minutes per visit and the number of visits. Total units are computed by multiplying the average minutes per visit by the total number of visits. The total minutes are then divided by the number of minutes associated with the unit cost to produce an average unit cost.

A typical cost estimated might be $15 for 15 minutes of outpatient therapy. If the individual reported hourly appointments each week for 9 weeks, then the total units of outpatient individual therapy would be 36 (i.e., 9 hour visits * 4 * 15 minute units per hour). At $60 per hour mean cost for individual outpatient therapy the total cost for this patient would be $540 for outpatient therapy. Total costs for various services are summed together to get a total estimate of service costs for the individual.

The primary cost estimates provided in the manuscript are average annual costs per individual and total annual costs per 100,000 population. Annual average costs per individual were computed by multiplying 3 month estimates by 4 to obtain annual estimates. As subjects were assessed annually for 4 years, if an individual reported service use at more than one time point, separate estimates were averaged across the individual. Averaging across the individual controls for correlated data points. Estimates for a population of 100,000 involved weighting the sample to 100,000 population from the GSMS population.

Table 1.
CASA Service Settings

Overnight/inpatient ('/' indicates no distinction in billing rate)
Psychiatric Hospital
General Hospital Psychiatric Unit
Inpatient alcohol or drug treatment unit/Detox
Medical Inpatient unit in hospital
Residential treatment center
Detention Center/Training School/Jail
Group Home/Emergency Shelter
Therapeutic Foster Care
Boarding School
Outpatient mental health treatment
Partial Hospitalization/day program
Drug/Alcohol clinic
Mental Health Center/Clinic
Community Health Center
Crisis Center
In-home counseling/crisis services
Private Professional treatment
Other professional help
School guidance counselor/school psychologist/school social worker
Special classes/BEH
Social Services
Probation officer/juvenile correctional counselor
Family doctor/Other MD
Hospital ER
Religious Counselor
Other healer/alternative practitioner
Special class/LD or MR

Educational tutoring
School Teacher
School Nurse
Other ‘non-professional’ help
Crisis Hotline
Self-help group (AA, NA)
Adult family member/ Relative
Non-professional adult help

Explanation of service use provided within manuscript:

Service use for mental health problems was identified using the CASA an interview for the parent and child that provides details of use of 39 types of service during the 3 months preceding the interview. For each type of service used, information was collected about the number of sessions, the length of visits, and the focus of treatment. The CASA also asked about family income and health insurance. For this paper, 21 of the 39 types of service covered in the CASA were categorized into seven domains: inpatient hospital, other inpatient, outpatient, school, primary care, juvenile justice, and informal services. Services excluded from these analyses either involved no formal costs (e.g., talking to a sibling or parent) or, as with many social services, the primary object of the expenditures by the agency was the parent (e.g., investigating allegations of abuse).

Table 2.
Unit costs and treatment settings by service category

Service Categories	Treatment settings	Units	Unit Cost Estimates
Inpatient hospital	Psychiatric hospital	24 hours	368.82 – 439.65
	Psychiatric unit of general hospital	24 hours	368.82 – 439.65
	Drug/Alcohol/Detoxification Unit	24 hours	368.82 – 439.65
	Medical inpatient unit in hospital	24 hours	368.82 – 439.65
Other Inpatient	Residential Treatment Center	24 hours	200.00 – 223.00
	Group Home/Emergency Shelter	24 hours	79.00 – 195.00
	Therapeutic foster care	24 hours	58.16 – 108.83
Outpatient	Partial hospitalization program	1 Hour	10.92 – 19.60
	Drug/Alcohol clinic	1 Hour	63.48 -108.32
	Mental health center/Clinic	1 Hour	63.48 -108.32
	Community health center	1 Hour	63.48 -108.32
	In-home counseling/crisis services	1 Hour	21.16 – 40.40
	Private professional treatment	1 Hour	63.48 -108.32
School	School guidance counselor/psychologist/social worker	1 Hour	16.14 – 21.10
	Boarding school	24 hours	125.00 – 166.33
	Special Education for behavioral or emotional functioning	1 school day	29.59 – 37.89
Primary Care	Family doctor/Pediatrician	15 min	29.07– 34.52
	Hospital Emergency Department	24 hours	368.82 – 439.65
Juvenile Justice	Probation/juvenile correctional counselor	Per contact	6.53 – 7.76
	Detention Center/Training School/Jail	24 hours	180.00 – 180.00
Informal Services	Religious counselor	1 Hour	14.84 – 16.32
	Other healer/ alternative practitioner	1 Hour	14.84 – 16.32

Cost Data for Overnight/Inpatient Treatment settings:

Overnight/inpatient ('/' indicates no distinction in coding)
Psychiatric Hospital
General Hospital Psychiatric Unit
Inpatient alcohol or drug treatment unit/Detox
Medical Inpatient unit in hospital
Residential treatment center
Detention Center/Training School/Jail
Group Home/Emergency Shelter
Therapeutic Foster Care
Boarding School

Source information for Hospital-based services (i.e., psychiatric hospital, general hospital psychiatric unit, inpatient alcohol or drug treatment/detox):
Cost information is estimated from per diem contract rates for Medicaid reimbursement to individual hospitals in North Carolina. Negotiated rates for hospitals in the GSMS area varied little. Rates were obtained for each calendar year from 1995 to 2000. Rates for 1993 and 1994 were estimated by projecting from trends in costs between 1995 and 2005. Rates reflect only the negotiated rates, but do not include any financial offsets arrangements made between an individual hospital and the North Carolina Division of Medical Assistance. Rates only approximate costs associated with an inpatient hospitalization. List of rates were obtained by personal communication with Roger Barnes, Director of Hospital Reimbursement, in the North Carolina Division of Medical Assistance.

Source information for residential services funded by Medicaid/Department of Social Services (i.e., Residential treatment center/ Group Home/Emergency Shelter/ Therapeutic Foster Care):
Rates are estimated by combining costs from two funding streams: Medicaid and DSS. Medicaid reimburses for treatment costs, whereas DSS normally reimburses for room & board (R&B). In rare circumstances, individual families pay for R&B. Medicaid reimburses

at different rates based on the type of residential setting. Prior to 1999, two levels of residential treatment were reimbursed (moderate and high), whereas in 2000 residential reimbursement rates were expanded to four categories. Categories vary on the basis of number of beds, level of monitoring, and services provided. CASA residential categories (listed above) do not fall neatly within the Medicaid categories. For example, the CASA category of group home can be coded as either a level II or level III Medicaid residential placement, based on various aspects of the group home. The CASA does not collect sufficient information to draw this distinction. This applies to both residential treatment centers and group homes. In these cases, a range of estimates were generated to account for all possibilities. Information about Medicaid rates were obtained from Medicaid communiqués listed on the North Carolina Division of Mental Health, Developmental Disabilities, and Substance Use Services website (http://www.dhhs.state.nc.us/mhddsas/medicaid/index.htm). Additional information was obtained through personal communication with Pat Jeter, Director of Medicaid rate setting for residential services.

DSS reimburses for room and board. R&B rates differed as a function of the type of residential setting and the size of the setting (# of beds). Again, the CASA did not collect information as to the number of beds in the facility, requiring that multiple estimates be generated for these costs. R & B rates for other residential settings (i.e., RTCs and group homes) are estimated from standard rates first published in June 2001. These rates reflect costs of R & B services from the preceding years. Thus, these rates are thought to be a reasonable approximation of R & B costs for these services from 1993-2000. During the period of 1993-2000, no standard rates were employed for group homes or residential treatment centers by North Carolina DSS. R & B rates for therapeutic foster care were standard throughout 1993-2000. DSS R & B rate information was obtained from Angelina Spencer and Tina Baumgarner at the Department of Social Services.

<u>Source information for Detention Center/Training School/Jail:</u>
Rates for Detention Center/Training school/Jail were obtained through personal communication with Lee Crites, chief court counselor for NC's 30th judicial district. Lee Crites and his assistant,

Marilyn Sproull, compiled cost estimates for a 1 night stay at a detention center/training school/jail. Figures obtained were both specific to North Carolina's 30th judicial district and statewide administrative and overhead budgets. Statistical cost information was also obtained in cooperation with Smoky Mountain Counseling Center in order to verify accurate Medicaid reimbursement rates for various services provided. Administrative overhead averages were obtained through consultation with state-level administrative staff and several annual reports from the North Carolina Department of Juvenile Justice & Delinquency Prevention.

Source information for Boarding School:

Four children in the GSMS study attended boarding schools within the period of time assessed in the current study. These four children attended two different boarding schools. Costs were obtained through direct inquiry with the schools as to the relative cost of education and room and board. Rates were deflated using a proportion of the consumer price index between the year of the estimate and the year of attendance. The names of the school will not be provided to preserve confidentiality.

Cost data for Outpatient treatment services:

Outpatient mental health treatment
Partial Hospitalization/day program
Drug/Alcohol clinic
Mental Health Center/Clinic
Community Health Center
Crisis Center*
In-home counseling/crisis services
Private Professional treatment
*Not included in cost estimates (see below)

Strategy of estimating outpatient treatment costs:

Outpatient mental health services are billed based upon the format of service contact rather than the service setting itself. For example, the billed rate for individual therapy in a mental health clinic is the same as the billed rate in a private setting. However, the billed rate for individual therapy is different from the rate for family therapy. A list of service formats from the CASA is presented below.

Formats of Service Contact
Assessment/Evaluation/Testing
Individual Therapy
Group Therapy
Family Therapy
Counseling for Parent or Partner
Family Group
Case Management
In-home counseling/crisis services

In most cases, the cost of the service does not vary based upon the level of training of the clinician, as only clinicians with a limited range of training are allowed to bill for a given service. There are exceptions to the this billing protocol for partial hospitalization/day program, crisis

center, and in-home counseling/crisis services. In the cases of the partial hospitalization/day program, the service cost is a fixed per unit cost, as it is for in-home counseling/crisis services. Crisis center services are billed under a different method in which they are not funded by the number of children they treat, but rather receive a per diem cost for being available to the meet the needs of children in duress. Only six children reported use of a crisis center in the current study. The majority of these events were related to pregnancy center visits. This category was thus not included in the cost estimates.

Medicaid rates may underestimate the total costs to society as private insurers may reimburse at a higher rate, although comparisons made on page 20 of this document suggest the discrepancy between public and private reimbursement rates may be minimal.

When services were received in a given setting, the CASA then inquires about the service format (e.g., individual therapy, case management). In some cases, the child or parent reports receiving more than one service within the particular setting. Information obtained on the frequency and duration of the service contact is not specific to the service format, but to the service setting. Thus, if the respondent reports receiving more than one service in a period of time, the data do not contain what proportion of the time should be allocated to each service. We assumed that equal time is spent for each service. In many cases, similar services are associated with similar Medicaid rates, thus minimizing estimation error. For example, if a child received case management, family therapy, and individual therapy in one session, then the total units of service contact are divided equally between the three types of service formats.

Prior to 1998, information on treatment setting but not on service format was collected. Two strategies were employed to estimate costs for the period prior from 1993 to 1998: 1) Service contact in an outpatient treatment setting was assumed to be the most commonly reported service format in subsequent waves: individual treatment (occurred in over 85% of forms in which an outpatient treatment is endorsed); 2) Units of service contact were multiplied by the proportion of service format contacts reported by subjects in waves 6 to 8. Thus, if individual therapy was reported 80% of the time and case management was reported the remaining 20% of the time, then

these ratios were applied to waves 1 to 6. The paper provides estimates using the first strategy, although other results are available on request from the authors.

Source information:

Cost information was estimated from Medicaid rates for 15 minute units of service under applicable service codes. Information about Medicaid rates were culled from Medicaid communiqués listed on the North Carolina Division of Mental Health, Developmental Disabilities, and Substance Use Services website (http://www.dhhs.state.nc.us/mhddsas/medicaid/index.htm). Published Medicaid rate information was available for all of the years included in the current analysis (1993-2000). These Medicaid rates are not expected to be a precise estimate of service costs. Area mental health centers bill the division of medical assistance under these rates. Cost settlements are completed annually to reconcile the cost of providing services with payments received. While cost settlement information is available from mental health centers, the total cost settlement cannot be directly inferred from the individual service codes.

Cost data for Other Professional Help settings:

This category includes various types of services. School settings, the most frequently accessed for mental health services, were included in this category along with the following settings primary care, child welfare agencies, religious counseling, and juvenile justice. Service settings are grouped together where similar.

Other Professional Help settings
School guidance counselor/school psychologist/school social worker
Special classes/Behavior or Emotional
Social Services*
Probation officer/juvenile correctional counselor
Family doctor/Other MD
Hospital Emergency Room
Religious Counselor
Other healer/alternative practitioner
Special class/Learning disability or impairment*
Educational tutoring*
School Teacher*
School Nurse*
*Not included in cost estimates (see below)

<u>Excluded services:</u>
Excluded school services included special class/LD or MR, contact with the school nurse or a teacher, and use of educational tutoring. While these categories may involve some means for addressing mental health issues, costs for inclusion in these programs were not included due to the heterogeneity of reasons for using these services. In many cases, these services are accessed for reasons unrelated to mental health concerns. The data did not indicate whether these services were provided because of the child's behavioral problems or for other reasons. Social services were excluded, for example, where services address parent rather than child behavior.

Source information for school guidance counselor/school psychologist/school social worker:
Estimation of costs for contact with school providers utilized salary information obtained from the Bureau of Labor Statistics within the Department of Labor. Salary information was obtained from the Occupational Employment Survey (OES; http://www.bls.gov/oes/current/oes_nc.htm).

Description of OES from Bureau of Labor Statistics website:

The OES program conducts a semi-annual mail survey designed to produce estimates of employment and wages for specific occupations. The OES program collects data on wage and salary workers in nonfarm establishments in order to produce employment and wage estimates for over 700 occupations. Data from self-employed persons are not collected and are not included in the estimates. The OES program produces these occupational estimates by geographic area and by industry. Estimates based on geographic areas are available at the National, State, and Metropolitan Area levels. The Bureau of Labor Statistics produces occupational employment and wage estimates for over 450 industry classifications at the national level. The industry classifications correspond to the sector, 3, 4, and 5-digit North American Industry Classification System (NAICS) industrial groups.)

Salary information was deflated to the year of interest in the study using the consumer price index. Hourly salary was estimated by dividing the salary by 220 (the number of school days estimated that teachers work) and then divided by hours within a workday (8 hours). Using salary information to estimate costs of a given service are problematic. In almost all circumstances, costs will be underestimated because they do not include the cost of indirect resources such as administrative support and office supplies, and maintenance. Personal correspondence with financial officers in the study school districts suggests that estimation of such costs would be unreliable, burdensome, and labor intensive; thus our estimates should be considered conservative.

Examination of records for a random sample of children/parent dyads reporting this service indicated students primarily received services

from the school guidance counselor, although children and parents were not able to make this distinction in all cases. Thus salary costs for school guidance counselors were used to estimate all costs in this category. Again, this estimate will be conservative as school guidance counselors earn, on average, lower salaries than school psychologists and school social workers.

Source information for Special class/Behavior or Emotionally handicapped (BEH):

The Individuals with Disabilities Education Act (IDEA) was originally enacted by Congress in 1975 to make sure that children with disabilities had the opportunity to receive a free appropriate public education. To qualify for services under this act children must have a documented disability and evidence that this disability adversely affects their educational functioning. Categories of disability include but are not limited to emotional impairment, developmental delays, physical impairments, and learning impairments. Children qualifying to receive such services often, but not always, receive educational and remedial services outside of the general classroom. The current study focused on children qualifying for special education under a behavioral/emotional disability. Estimates of yearly costs for special education were obtained from a report by the Office of Special Education Programs within Department of Education (website: http://www.csef-air.org/publications/seep/national/Rpt8.pdf). The rate of endorsement of this service was 1% in our sample, equivalent to national rates of children qualifying for special education for behavioral/emotional concerns.

Source information for contact with a probation officer/juvenile correctional counselor:

Rates for probation officer/juvenile correctional counselor were obtained through personal communication with Lee Crites, chief court counselor for NC's 30th judicial district. Lee Crites and his assistant, Marilyn Sproull, compiled cost estimates for yearly probation estimates. Estimates were specific to North Carolina's 30th judicial which includes 7 of the 11 counties included in the GSMS. Administrative overhead averages were obtained through consultation with state-level administrative staff and several annual reports from the North Carolina Department of Juvenile Justice & Delinquency Prevention.

Source information for contact with a family doctor/other MD:
Unit costs for contact with a family doctor/other MD were obtained, as for other outpatient services, through Medicaid rates for 15 minute visits. Although information collected does not allow us to specify the billing code for the visit, all visits used North Carolina reimbursement rates for the 99214 procedure code. This code is described as "Office visit, E&M, established pt., moderate complexity." Contact with various primary care physicians corroborated this code as commonly used for mental health concerns. The North Carolina Medicaid rates were obtained from the website: http://www.dhhs.state.nc.us/dma/.

Source information for Hospital Emergency Room:
See section on Overnight/inpatient rates for hospitals on page 7.

Source information for contact with a religious counselor or other healer/alternative practitioner:
Unit costs for contact with a religious counselor or other healer/alternative practitioner were estimated using salary information. All estimates were obtained from the OES on the Bureau of Labor Statistics website. Hourly rates were available for all labor categories. Again, this strategy may underestimate overhead and administrative expenses.

Cost data for Medication rates:

Information on utilization of psychotropic medications was collected using the CAPA. Cost estimates were imputed from the Medical Expenditures Panel Survey (MEPS). Although children and parents reported on a variety of psychotropic medications, in both the CAPA data and the information from MEPS the only categories with sufficient numbers to generate reliable estimates were stimulant medications and antidepressants, so these are the two categories used to estimate medication costs.

(Description from the MEPS webite: http://www.meps.ahrq.gov/)

MEPS collects data on the specific health services that Americans use, how frequently they use them, the cost of these services, and how they are paid for, as well as data on the cost, scope, and breadth of private health insurance held by and available to the U.S. population.

The Agency for Healthcare Research and Quality (AHRQ), formerly called the Agency for Health Care Policy and Research, began fielding MEPS in March 1996. AHRQ conducts MEPS in conjunction with the National Center for Health Statistics (NCHS) and through contracts with Westat, a survey research firm headquartered in Washington, DC, and the National Opinion Research Center, which is affiliated with the University of Chicago.

We extracted estimates for total annual medication costs for children ages 13-16 using either stimulants or antidepressants. A comprehensive list of stimulant and antidepressants medications used to search the MEPS dataset is available from the authors. Yearly estimates of expenditures were unreliable due to the low total number of subjects ages 13 to 16 using stimulant medications or antidepressants, and even lower numbers using any other psychotropic medications. Rates from 1996 to 2000 were averaged (after adjustment to 2000 real dollars). Mean annual expenditures for stimulant and antidepressant were then adjusted back to the appropriate year.

Table 3.
Selected comparisons with other cost estimates

Service Categories	Treatment settings	Units	Our Unit Cost	Range reported in Literature (source)
Inpatient hospital	Psychiatric hospital	24 hours	368.82 – 439.65	$519 (Leslie and Rosenheck, 1999); $1161 (Harwood et al., 1998) Note: General inpatient estimates quoted
	Psychiatric unit of general hospital	24 hours	368.82 – 439.65	$199.53 (Sledge et al., 1996); $1161 (Harwood et al., 1998) Note: Higher end of range is for general inpatient
	Drug/Alcohol/Detoxification Unit	24 hours	368.82 – 439.65	$105.29 (Salome et al., 2003)
	Medical inpatient unit in hospital	24 hours	368.82 – 439.65	$199.53 (Sledge et al., 1996); $1161 (Harwood et al., 1998) Note: Higher end of range is for general inpatient
Other Inpatient	Residential Treatment Center	24 hours	200.00 – 223.00	$121.38 (Anderson et al., 1996); $146.52 (Salome et al., 2003)
	Group Home/Emergency Shelter	24 hours	79.00 – 195.00	N/A
	Therapeutic foster care	24 hours	58.16 – 108.83	N/A
Outpatient	Partial hospitalization program	1 Hour	10.92 – 19.60	N/A
	Drug/Alcohol clinic	1 Hour	63.48 -108.32	$85.10 (Salome et al., 2003); $137.97 (MEPS data from 2002)
	Mental health center/Clinic	1 Hour	63.48 -108.32	$62.64 (French & Martin, 1996); $80.46 (MEPS data from 2002)
	Community health center	1 Hour	63.48 -108.32	$62.64 (French & Martin, 1996)

	In-home counseling/crisis services	1 Hour	21.16 – 40.40	N/A
	Private professional treatment	1 Hour	63.48 -108.32	$83.50 (French & Martin, 1996)
School	School guidance counselor/psychologist/social worker	1 Hour	16.14 – 21.10	N/A
	Boarding school	24 hours	125.00 – 166.33	N/A
	Special Education for behavioral or emotional functioning	1 school day	29.59 – 37.89	N/A
Primary Care	Family doctor/Pediatrician	15 min	29.07– 34.52	$51 (Cohen and Nettleman, 2000); $101 (Young and Ireson, 2003); $80.46 (MEPS data from 2002) Note: Available estimates are per visit, rather than per unit of time.
	Hospital Emergency Department	24 hours	368.82 – 439.65	$249.21 (Williams et al., 1996); $531.28 (French and Martin, 1996); $269.26 (MEPS data from 2002)
Juvenile Justice	Probation/juvenile correctional counselor	Per contact	6.53 – 7.76	$14.56 - $31.40 (Cowell et al., 2005) Note: Estimate is for adult probation contact in Florida.
	Detention Center/Training School/Jail	24 hours	180.00 – 180.00	$59.85 (Camp & Camp, 1999)
Informal Services	Religious counselor	1 Hour	14.84 – 16.32	N/A
	Other healer/ alternative practitioner	1 Hour	14.84 – 16.32	N/A

Table 3 above compares by service setting the study's range of estimates to those found in the literature. A possible disadvantage of the estimates used in this study is that they reflect Medicaid reimbursement rates rather than the possibly higher, actual cost of care. Despite the fact that no published study provides detailed estimates for the specific services noted and for North Carolina, the table demonstrates that in many settings, particularly outpatient and primary care, the study range of estimates overlapped those found in the literature.

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