

The Continuing Shortage of Child and Adolescent Psychiatrists

CHRISTOPHER R. THOMAS, M.D., AND CHARLES E. HOLZER, III, PH.D.

ABSTRACT

Objective: The national shortage of child and adolescent psychiatrists has prompted efforts to improve recruitment. It is uncertain whether these efforts will be sufficient to address this shortage and its impact on youth mental health services. **Method:** Data were compared from 1990 to 2001 by state, county characteristics, number of youths, and percentage of youths living in poverty to determine any changes in the number and distribution of child and adolescent psychiatrists. Trends in the number of residents and age distribution of child and adolescent psychiatrists were also analyzed. **Results:** The number of child and adolescent psychiatrists has increased, but it still falls below estimates projected to adequately serve youth mental health needs. Disparities in child and adolescent psychiatrist distribution persist, with significantly fewer in rural counties or counties with a high percentage of children living in poverty. The age of child and adolescent psychiatrists has shifted, with fewer below age 35. The number of residents in training has not changed significantly since 1995. **Conclusions:** The shortage of child and adolescent psychiatrists remains and is still accentuated for those living in rural areas or in poverty. Despite the increased number of child and adolescent psychiatrists, the number of residents and changes in workforce age indicate that the shortage will continue. *J. Am. Acad. Child Adolesc. Psychiatry*, 2006;45(9):000-000. **Key Words:** child and adolescent psychiatrists, child mental health services, workforce.

Although there is no comprehensive national study on the prevalence of psychiatric disorders among children and adolescents, it is estimated that one in five youths will develop a mental disorder (U.S. Department of Health and Human Services, 1999). Numerous studies have concluded that there is a severe shortage of child and adolescent psychiatrists in the United States (American Academy of Child Psychiatry, 1983; Council on Graduate Medical Education, 1990; Graduate Medical Education National Advisory Committee, 1980; U.S. Department of Health and Human Services, 1999). Estimates on the supply of available child and adolescent psychiatrists vary from 10% (Council on Graduate Medical Education, 1990) to 45% (Graduate

Medical Education National Advisory Committee, 1980) of the number needed to meet the mental health needs of American youth. In a previous report, the authors found that this shortage is compounded by an inequitable distribution of child and adolescent psychiatrists (Thomas and Holzer, 1999), so that children living in poverty or rural areas are less likely to have access to child and adolescent psychiatrists. This is particularly important in addressing the mental health needs of children because those living in poverty are at greater risk for developing mental disorders (Center for Mental Health Services, 1997) and the number of children living in poverty has increased recently (National Center for Children in Poverty, 2006).

Recognition of the shortage of child and adolescent psychiatrists has resulted in calls for the improvement of recruitment and the expansion of training (Beresin, 1997; Beresin and Borus, 1989; Beresin and Enzer, 1990). Despite the identified need, the number of child and adolescent psychiatry residency training programs has decreased from 130 in 1980 to 114 in 2005 (Koppelman, 2004). The American Academy of Child and Adolescent Psychiatry's Task Force on Work Force Needs commissioned a report from the U.S. Bureau of

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Drs. Thomas and Holzer are with the Department of Psychiatry & Behavioral Sciences, University of Texas Medical Branch at Galveston.

Reprint requests to Dr. Christopher R. Thomas, Department of Psychiatry & Behavioral Sciences, University of Texas Medical Branch at Galveston, 301 University Blvd., Galveston, TX 77555-0193; e-mail: crthomas@utmb.edu.

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Health Professions, National Center for Health Work Force Information and Analysis to assess the situation and determine future needs (Kim, 2003). The report projected that the demand for child and adolescent psychiatric services would double between 1995 and 2020. The study estimated that 12,624 child and adolescent psychiatrists would be needed in 2020 to provide the same level of service available in 1995, but that there would only be a projected supply of 8,312 available based on current funding and recruitment. In other words, the shortage of child and adolescent psychiatrists will only grow worse if the current levels of support and training are merely maintained. Although these and previous studies have estimated the demand for and availability of child and adolescent psychiatrists, most are based on models using cross-sectional data. Given the severity of the shortage, it is important to follow the actual trends over time in the number of child and adolescent psychiatrists and their distribution to know the scope of the problem and the impact of any changes.

METHOD

Data Sources

The primary source of data for addressing trends in the distribution of child and adolescent psychiatrists was the Area Resource File (ARF) of the Department of Health and Human Services, Bureau of Health Professions, Office of Research and Planning. Through various contractors the Bureau of Health Professions has maintained a county-level file that describes the characteristics of the health care system and, in particular, the availability of health professionals and hospitals. The 2003 ARF used was obtained from Quality Resource Systems (Fairfax, VA). Most of the data included in the file are drawn from governmental agencies such as the National Center for Health Statistics and the U.S. Bureau of the Census or from private agencies such as the American Medical Association (AMA). Additional data have been included directly from publications of the U.S. Bureau of the Census.

Child and Adolescent Psychiatrists. Several categories of data are available in the ARF regarding child psychiatry, including number of child and adolescent psychiatrists, number of child psychiatry residents, and number of hospitals with child psychiatric services. Detailed data on child and adolescent psychiatrists that was contained in the ARF is from the AMA Physician Masterfile, which contains data on all physicians, both AMA members and nonmembers, who have met the educational and credentialing requirements necessary for recognition as physicians in the United States. These data include age, office- or hospital-based practice, and type of practice. Location and numbers of child and adolescent psychiatrists involved in clinical care, administration, teaching, and research are also provided. "Office-based practice" includes any child psychiatrist whose major professional activity is examining patients. "Total clinical care" includes office-based practice and

full-time hospital staff and residents. Data are listed for the years 1990, 1995, 2000, and 2001. For the purpose of this study, total number of child and adolescent psychiatrists, office-based practice for child psychiatry, total clinical care for child psychiatry, and number of child psychiatry residents were compared by state and county. In addition, the age range of those child and adolescent psychiatrists were compared over time to describe the composition of the workforce. Finally, census data on the number of child and adolescent psychiatrists were obtained from the American Council on Graduate Medical Education (ACGME) and the American Psychiatric Association (APA) Office of Graduate and Undergraduate Education to determine any changes in numbers of child and adolescent psychiatrists. The APA conducted a voluntary census of psychiatric residency programs before 2000, until the ACGME began to provide census data on residency programs by specialty.

Youth. Data on youth were obtained from the Census of Population and Housing (2000 Summary Tape Files on CD-ROM prepared by the U.S. Bureau of the Census). The information included location and number of youth by age group and poverty status. Poverty status indicates whether youth are living in households at or below 100% of the federal poverty guidelines. For the purpose of this study, the total number of youth ages 0 through 17 and youth ages 0 through 17 living in poverty were compared by state and county.

State and County. State and county location are provided in the ARF from the 2003 Federal Information Processing Standards Publication, National Bureau of Standards. Although the structure of the file is based primarily on U.S. counties, there are several instances in which the record structure has been modified to accommodate unusual county structures. The first of these is the state of Alaska, which is treated as a single area (i.e., no divisions by county). This is consistent with its small population relative to large land area. The second change is that most independent cities have been included with their surrounding counties. The primary example of this is Virginia, where incorporated cities are designated locally as being separate from the surrounding counties. This becomes awkward for the present analyses because independent cities typically have the majority of services for both the city and the surrounding county, making it misleading to treat them separately. This study incorporates both of these changes, with Alaska treated as a single county, and cities included as part of the counties in which they are located to provide a uniform basis of comparison.

The ARF provides two means for characterizing the population and community characteristics of counties. The first of these is the population density. A second and more descriptive measure is the Rural-Urban Continuum Code for Metropolitan and Non-Metropolitan Counties. There are nine levels or types of counties or combined cities/counties. These levels are based on the population size for the county, whether the county is a metropolitan area, and whether the county is adjacent to a metropolitan area. This classification differentiates between a rural county with an evenly distributed population and a county with an equal population concentrated in a city. It also indicates whether a county with low density is a suburb and next to an urban center or it is more isolated; this describes situations in which the population in a rural county may have access to health care from an adjacent metropolitan county. Although it expresses more than one dimension and is not a true linear scale, it can be used to categorize counties for the comparisons made in this study. The classification was revised in 2003 and differs from the one used in the prior study (Thomas and Holzer, 1999), with the reduction from 10 to 9 levels by the

combination of central and fringe metropolitan counties with populations >1 million.

Analysis

The analyses for distribution by state and county were completed and compared for child and adolescent psychiatrists in clinical care, administration, teaching, and research, and for all groups combined. The patterns were similar across all groups. The results presented are for only the total of all child and adolescent psychiatrists because this represents the best possible depiction of potentially available mental health providers.

The distribution of child and adolescent psychiatrists by state was determined on the basis of reports from 1990, 1995, 2000, and 2001. To place this information within the context of clinical service, the number of youth ages 0 through 17, the percentage of youth living in poverty, and the rate of child and adolescent psychiatrists per 100,000 youth were compiled by state from 1990 and 2000 census data (Table 1). Although important with respect to state and federal mental health policy planning, these data are at a large regional level and does not fully characterize the distribution of child and adolescent psychiatrists. It also does not account for situations in which children and families can cross state lines to reach child psychiatric services.

The distribution of child and adolescent psychiatrists was further defined with respect to community characteristics and number of youth living in poverty by comparing counties. Counties were grouped on the basis of the Rural-Urban Continuum codes for population and community structure. The percentage of counties with one or more child and adolescent psychiatrists, the mean number of child and adolescent psychiatrists, and the mean and maximum rate of child and adolescent psychiatrists per 100,000 youth in each county were calculated for 2000 (Table 2). The percentage of youth living in poverty by the 2000 U.S. Census was calculated for each county and counties were grouped into categories by percentage. As with the Rural-Urban Continuum, the percentage of counties with one or more child and adolescent psychiatrist, the mean number child and adolescent psychiatrists and the mean and maximum rate of child and adolescent psychiatrists for 100,000 youth in each county were calculated for 2000 (Table 3). The pattern of distribution by the Rural-Urban Continuum and by percentage of children living in poverty were compared to findings from the previous study (Thomas and Holzer, 1999) to determine whether there were any shifts since 1995.

The number of all psychiatry residents, including general, addiction, child and adolescent, geriatric, and psychosomatic, are listed in Table 4 by year along with the number of child and adolescent psychiatry residents. Information was obtained from the APA census from 1990 to 1997 and from the ACGME census from 2000 to 2006. The APA census depended on direct reports from programs and the rate of response was incomplete in 1998–1999, with the number of child and adolescent psychiatry residents at 577. This represented only 9.5% of the total number of residents in that academic year, far below the usual 11% to 12% of previous census reports, and therefore was considered inaccurate. The APA census was not conducted in 1999–2000.

The numbers of all child and adolescent psychiatrists provided in the ARF were calculated by age for those younger than 35, 35 to 44, 45 to 54, 55 to 64, and older than 65 for the years that were available: 1985, 1989, 1994, 1995, 2000, and 2001. This does not represent the description of a cohort followed over time, but rather the composition of the workforce by age at specific points in time.

RESULTS

The national distribution of child and adolescent psychiatrists summarized in Table 1 varies greatly by state and this variation is consistent over the time period examined. This variation in distribution is more apparent when considering the rate of child and adolescent psychiatrists per 100,000 youth, from 3.1 for Alaska to 21.3 for Massachusetts in 2001. The five states with the lowest rates of child and adolescent psychiatrists per 100,000 youth in 2001 (Alabama, Alaska, Nevada, Oklahoma, and Wyoming) were <4.0. In contrast, the five states with the highest rates for 2001 (Connecticut, Hawaii, Maryland, Massachusetts, and Rhode Island) were >18.0. The 42.0 for the District of Columbia is inflated because it is a metropolitan health care center for surrounding counties in Maryland and Virginia and includes a large portion of child and adolescent psychiatrists involved in activities other than clinical care.

Overall, the national distribution of child and adolescent psychiatrists by state has shown a slight general increase from 1990 to 2001. The rate of child and adolescent psychiatrists per 100,000 youth for the United States as a whole was 8.67 in 2001, as compared to 6.73 in 1990, and the state-by-state mean was 8.57 with a median of 7.10. In 1990, five states had rates of child and adolescent psychiatrists per 100,000 youth <2.0 whereas no states were below that level 10 years later. Only one state, Alaska, decreased in the total number of child and adolescent psychiatrists. Although some states had dramatic increases in the total number of child and adolescent psychiatrists from 1990 to 2001, such as Maryland (added 64), the increase in youth population resulted in essentially no change in the ratio of providers to population.

The distribution of child and adolescent psychiatrists by county on the Rural-Urban Continuum is summarized in Table 2. The mean rate of child and adolescent psychiatrists per 100,000 youth for counties by classification varied from 0.0 to 6.9. Although metropolitan counties were more likely to have child and adolescent psychiatrists than rural counties, almost half of the metropolitan counties did not have even one child and adolescent psychiatrist. Counties varied greatly within categories with respect to the rate of child and adolescent psychiatrists per 100,000 youth as seen in the maximum rate for each category.

TABLE 1
Changes in Number of Child and Adolescent Psychiatrists by State, 1990–2001

State	No. Youth 0–17, 2000 Census	Youth Living in Poverty, %	No. Child and Adolescent Psychiatrists (/100,000 Youth) ^a			
			1990	1995	2000	2001
Alabama	1,122,612	21.46	23 (2.2)	29 (2.6)	46 (4.1)	44 (3.9)
Alaska	190,507	11.80	7 (4.1)	8 (4.2)	4 (2.1)	6 (3.1)
Arizona	1,362,701	19.27	43 (4.5)	64 (4.7)	69 (5.1)	73 (5.4)
Arkansas	680,058	21.85	12 (2.0)	18 (2.6)	28 (4.1)	32 (4.7)
California	9,221,463	19.45	539 (7.1)	605 (6.6)	688 (7.5)	700 (7.6)
Colorado	1,096,790	11.26	80 (9.4)	110 (10.0)	122 (11.1)	128 (11.7)
Connecticut	839,574	10.37	121 (16.4)	141 (16.8)	153 (18.2)	161 (19.2)
Delaware	193,962	12.27	8 (5.0)	12 (6.2)	14 (7.2)	14 (7.2)
District of Columbia	114,332	31.71	39 (34.7)	47 (41.1)	45 (39.4)	48 (42.0)
Florida	3,634,572	17.61	150 (5.3)	198 (5.4)	232 (6.4)	255 (7.0)
Georgia	2,165,774	17.14	66 (3.9)	106 (4.9)	119 (5.5)	128 (5.9)
Hawaii	294,325	14.07	34 (12.3)	48 (16.3)	53 (18.0)	59 (20.0)
Idaho	368,131	14.30	9 (3.0)	13 (3.5)	17 (4.6)	17 (4.6)
Illinois	3,239,229	14.33	144 (5.0)	186 (5.7)	202 (6.2)	211 (6.5)
Indiana	1,572,806	12.17	44 (3.1)	65 (4.1)	76 (4.8)	81 (5.2)
Iowa	732,334	11.00	29 (4.1)	42 (5.7)	37 (5.1)	35 (4.8)
Kansas	711,220	11.97	65 (10.0)	66 (9.3)	71 (10.0)	68 (9.6)
Kentucky	993,841	20.81	46 (4.9)	65 (6.5)	78 (7.8)	84 (8.5)
Louisiana	1,218,453	26.63	49 (4.0)	70 (5.7)	79 (6.5)	81 (6.6)
Maine	300,978	13.66	20 (6.6)	28 (9.3)	34 (11.3)	41 (13.6)
Maryland	1,353,419	10.66	180 (18.6)	192 (14.2)	229 (16.9)	244 (18.0)
Massachusetts	1,495,967	12.03	252 (18.9)	257 (17.2)	299 (20.0)	319 (21.3)
Michigan	2,592,595	13.87	165 (6.8)	178 (6.9)	192 (7.4)	190 (7.3)
Minnesota	1,286,539	9.61	53 (4.6)	65 (5.1)	83 (6.5)	89 (6.9)
Mississippi	774,404	27.03	6 (0.8)	18 (2.3)	28 (3.6)	31 (4.0)
Missouri	1,426,102	15.74	63 (5.3)	86 (6.0)	91 (6.4)	101 (7.1)
Montana	229,944	19.03	4 (1.8)	11 (4.8)	12 (5.2)	13 (5.7)
Nebraska	449,615	12.33	10 (2.4)	25 (5.6)	33 (7.3)	40 (8.9)
Nevada	509,731	13.98	7 (2.5)	12 (2.4)	16 (3.1)	17 (3.3)
New Hampshire	308,901	7.79	24 (8.7)	29 (9.4)	28 (9.1)	31 (10.0)
New Jersey	2,081,474	11.08	121 (6.8)	158 (7.6)	185 (8.9)	190 (9.1)
New Mexico	507,568	25.03	25 (5.7)	47 (9.3)	44 (8.7)	44 (8.7)
New York	4,674,191	19.99	626 (15.0)	729 (15.6)	778 (16.6)	784 (16.8)
North Carolina	1,961,317	16.10	75 (4.7)	141 (7.2)	158 (8.1)	165 (8.4)
North Dakota	160,899	13.97	5 (2.9)	9 (5.6)	14 (8.7)	14 (8.7)
Ohio	2,885,141	14.40	121 (4.4)	167 (5.8)	189 (6.6)	192 (6.7)
Oklahoma	890,264	19.64	22 (2.7)	27 (3.0)	28 (3.1)	29 (3.3)
Oregon	844,270	14.71	33 (4.7)	56 (6.6)	63 (7.5)	66 (7.8)
Pennsylvania	2,918,988	14.70	243 (8.8)	313 (10.7)	329 (11.3)	342 (11.7)
Rhode Island	247,509	16.88	21 (9.4)	30 (12.1)	39 (15.8)	47 (19.0)
South Carolina	1,009,093	18.83	43 (4.7)	89 (8.8)	91 (9.0)	102 (10.1)
South Dakota	202,726	17.15	3 (1.5)	5 (2.5)	9 (4.4)	11 (5.4)
Tennessee	1,397,236	17.99	45 (3.8)	82 (5.9)	83 (5.9)	90 (6.4)
Texas	5,873,930	20.53	249 (5.2)	342 (5.8)	370 (6.3)	382 (6.5)
Utah	716,831	10.13	23 (3.7)	39 (5.4)	33 (4.6)	36 (5.0)
Vermont	147,579	11.43	15 (10.6)	16 (10.8)	20 (13.6)	21 (14.2)
Virginia	1,735,824	12.27	114 (9.5)	128 (7.4)	158 (9.1)	164 (9.4)
Washington	1,509,780	13.69	57 (4.6)	83 (5.5)	96 (6.4)	99 (6.6)
West Virginia	401,775	24.34	12 (2.7)	17 (4.2)	17 (4.2)	20 (5.0)
Wisconsin	1,367,386	11.18	65 (5.1)	96 (7.0)	108 (7.9)	112 (8.2)
Wyoming	128,097	14.47	2 (1.5)	3 (2.3)	4 (3.1)	5 (3.9)

^a Ratio per 100,000 youth for 1990 and 1995 used 1990 U.S. Census data, 2000 and 2001 used 2000 U.S. Census data.

TABLE 2
Rural-Urban Continuum Distribution of Child Psychiatrists, 2000

Rural-Urban Code	Counties (<i>N</i> = 3141)	Counties With ≥1, %	Mean No./ County	Mean No./ 100,000 Youth	Max. No./ 100,000 Youth
Metropolitan areas of ≥1 million population	413	54.0	9.9	6.9	162.3
Metropolitan areas of 250,000–1 million population	325	50.8	3.6	5.6	112.7
Metropolitan areas of <250,000 population	351	47.0	1.3	5.4	102.4
Urban population of ≥20,000, adjacent to a metropolitan area	218	21.6	0.3	2.1	42.2
Urban population of ≥20,000, not adjacent to a metropolitan area	105	39.0	0.7	4.4	39.1
Urban population of 2,500–19,999, adjacent to a metropolitan area	609	5.7	0.1	1.2	68.4
Urban population of 2,500–19,999, not adjacent to a metropolitan area	450	7.1	0.1	1.7	92.6
Rural population of <2,500, adjacent to a metropolitan area	235	1.3	0.0	0.3	29.9
Rural population of <2,500, not adjacent to a metropolitan area	435	0.9	0.0	0.3	38.4

The distribution of child and adolescent psychiatrists by county for percentage of youth living in poverty is summarized in Table 3. The mean rate of child and adolescent psychiatrists per 100,000 youth for counties varied from 0.0 to 5.4. Only counties with <20% of youth living in poverty had a mean rate of ≥3.0/100,000 youth. As with the Rural-Urban Continuum, the rate of child and adolescent psychiatrists per 100,000 youth varied greatly within each level of percentage of youth living in poverty.

Table 4 provides the number of all psychiatry residents and child and adolescent psychiatry residents by year from 1990 to 2006. The numbers include all levels of training and therefore do not represent the number of residents expected to graduate in any one year. In addition, the numbers potentially include residents that do not complete training. Because child and adolescent psychiatry training requires 2 years, an

approximate estimate of graduates for the following year would be half of the total in a given year. Although the number of programs has decreased over time, the number of training positions appears to have stabilized since 1995 at a little more than 700 or about 350 in each year of training. Figure 1 presents the changes over time in composition by age of child and adolescent psychiatrists. Although there has been a general increase in all of the age groups since 1985, the number of child and adolescent psychiatrists under the age 35 has decreased since 1995.

DISCUSSION

In planning mental health services, two issues must always be considered: the number of those requiring care and the resources available. As already mentioned, information on the prevalence of mental disorders

TABLE 3
Percentage of Youth Living in Poverty (Ages 0–17), and Distribution of Child Psychiatrists by County, 2000

Youth Living in Poverty, 2000, %	Counties (<i>N</i> = 3140)	Counties With ≥1, %	Mean No./ County	Mean No./ 100,000 Youth	Max. No./ 100,000 Youth
0–10	508	37.0	3.6	5.4	162.3
10–20	1,494	25.4	1.8	3.0	97.9
20–30	814	14.4	1.2	1.9	102.4
30–40	239	10.0	1.7	1.5	88.8
40–50	71	9.9	1.0	1.1	28.6
50–99	14	0.0	0.0	0.0	0.0

TABLE 4

ACGME and APA Office of Graduate and Undergraduate Education Census of Residents

Academic Year	No. of All Psychiatry Residents	No. of Child and Adolescent Psychiatry Residents
2005–2006 ^a	5,801	742
2004–2005 ^a	5,681	715
2003–2004 ^a	5,608	707
2002–2003 ^a	5,479	681
2001–2002 ^a	5,422	655
2000–2001 ^a	5,719	702
1999–2000	5,755	683
1998–1999	Census not done	
1997–1998	Inadequate response	
1996–1997	6,046	717
1995–1996	6,087	758
1994–1995	6,089	754
1993–1994	6,059	679
1992–1993	6,095	584
1991–1992	6,159	563
1990–1991	6,016	494

Note: ACGME = American Council on Graduate Medical Education; APA = American Psychiatric Association.
^a ACGME data.

among youth in the United States is limited. Although the number of child and adolescent psychiatrists available is more certain, there is no agreement as to the optimal number necessary to provide adequate mental health care. Even with these limitations, there can be no doubt that there is and continues to be a shortage of child and adolescent psychiatrists. Considering the potential need for services, the U.S. Surgeon General’s 1999 report estimate of 14 million children with a diagnosable mental disorder meant that there was 1 child and adolescent psychiatrist for every 2,238 youth requiring mental health care (U.S. Department of Health and Human Services, 1999). Not all of those children may require the services of a child and adolescent psychiatrist, but the problem remains even when considering only those with severe mental disorders. Using the Methodology for Epidemiology of Mental Disorders in Children and Adolescents (MECA) study (Shaffer et al., 1996) prevalence rate of 5.4% for any *DSM-IV-TR* disorder with a severe rating (Children’s Global Assessment Scale ≤ 50), there was 1.6 child

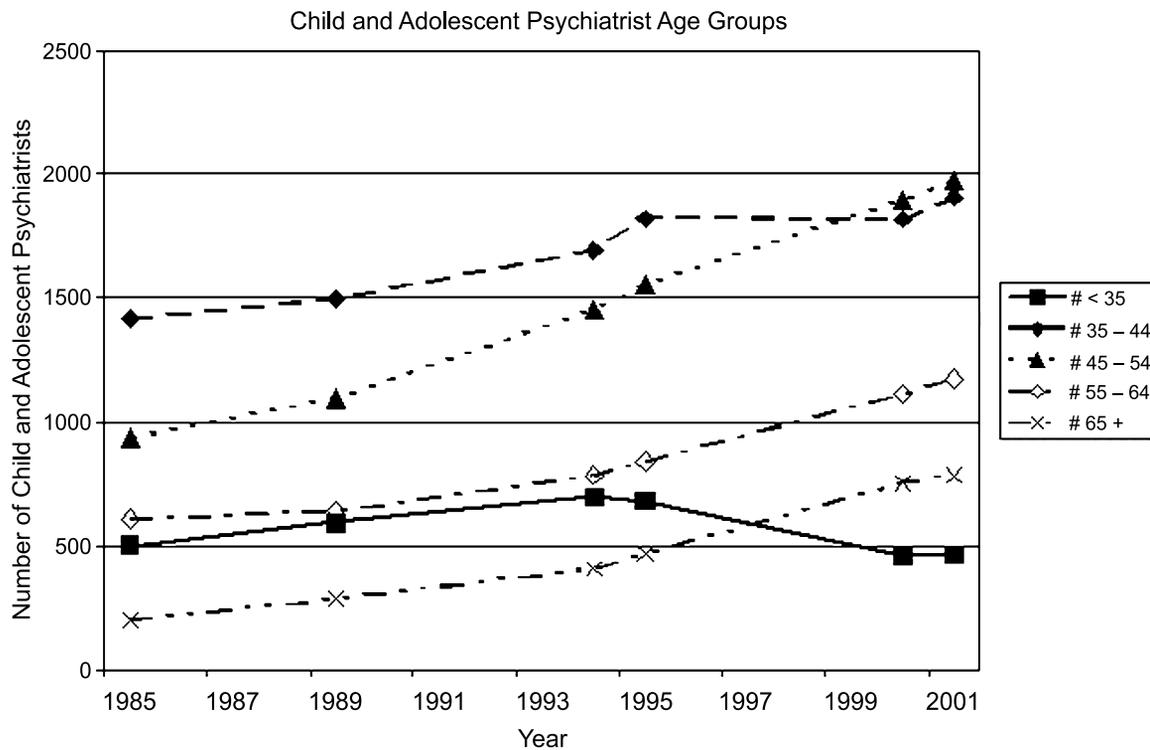


Fig. 1 Trends in number of child and adolescent psychiatrists by age group.

and adolescent psychiatrist per 1,000 youth with severe mental disorders in 2001. Although this represents an improvement over the rate of 1.25 in 1990, the increment it represents over a decade would indicate that the shortage will continue to persist.

Models based on systems of care reinforce the conclusion that there is a continuing work force shortage. The Graduate Medical Education National Advisory Committee Report (Graduate Medical Education National Advisory Committee, 1980, Council on Graduate Medical Education, 1990), using a managed care and multidisciplinary model, estimated a requirement representing about 14.38 child and adolescent psychiatrists per 100,000 youth. Only six states (Connecticut, Hawaii, Maryland, Massachusetts, New York and Rhode Island), met or exceeded that rate in 2001. This was an improvement over 1990, but it is slight because the new states meeting the level in 2001, Hawaii and Rhode Island, have relatively small populations of youth compared to other states.

As found in the previous study (Thomas and Holzer, 1999), the wide variation in the national distribution of child and adolescent psychiatrists persists at a state and local level and this intensifies the shortage for youth living in specific areas. Thirty-five states were below the national average of 8.67 child and adolescent psychiatrists per 100,000 youth in 2001, the same number below the national average in 1990. The disparity among rural, urban, and metropolitan counties also continues, with the mean rates varying from 0 to 9.9 in 2001, again unchanged since 1990. Although metropolitan centers of >1 million population fare better than rural counties, 190 metropolitan counties did not have even one child and adolescent psychiatrist. In other words, although there has been a slight general increase in the number of child and adolescent psychiatrists, this has not altered the inequitable distribution found in the previous study (Thomas and Holzer, 1999), which exacerbates the shortage across the nation.

The inverse relationship of number of child and adolescent psychiatrists to percentage of youth living in poverty also persists at both the state and county levels. Increases in the total number of child and adolescent psychiatrists have not reduced the disparity in availability of services by socioeconomic status. It appears that wealthier counties have not reached saturation in service, and incentives for practice in underserved areas are insufficient. The shortage of child and adolescent

psychiatrists is therefore accentuated for those youth with a greater need for mental health services because they live in poverty. There was some improvement in the reduction of number of youth living in poverty in the 1990s that is reflected in the 2000 census data, however, recent reports indicate that trend has now reversed and the number of children living in low-income families is once again rising (National Center for Children in Poverty, 2006). Regardless of the socioeconomic status of children, market forces and public mental health policy during the past decade have not directed the limited number of child and adolescent psychiatrists to the areas of greatest need or even provided an equitable distribution.

These findings are consistent with the geographic disparities in children's mental health care described in a recent study using data from the National Survey of America's Families (Sturm et al., 2003). That report was limited to data from only the 13 most populous states and considered only access to all mental health at a statewide level. It found that there was great variability among the states on the relative need for and the use of mental health services by children and families that was not accounted for by demographics. The authors conclude that differences in unmet need and utilization of mental health services were driven by state mental health policies and market forces. Because it only considered statewide data, it was not able to examine the issues related to urban-rural differences or community prevalence of poverty as in this study.

The relative stability in the number of training positions in child and adolescent psychiatry during the past 15 years supports the view that the production of new practitioners will be relatively constant unless there are dramatic changes. It is reasonable to expect that the slight increments found in the present study will probably continue based on projections of population and training numbers. Although the increasing age of child and adolescent psychiatrists is consistent with changes in the physician workforce overall (Cooper, 1995), one interesting change that requires further study is the decrease in numbers of child and adolescent psychiatrists younger than age 35. Because the number of training positions has remained the same, this may indicate a shift, with older residents entering training. One possible reason for this shift is the relative number of international medical graduates that entered child psychiatry residencies in the 1990s. A previous study of

international medical graduates among general psychiatry residency programs found that the average age was greater than that of U.S. medical school graduates (Blanco et al., 1999). The age of matriculating U.S. medical students has remained relatively unchanged from 1992 to 2001, with a mean of 23.7 years and a median of 23 years (AAMC Data Warehouse, 2001). Unless increases in longevity and age of retirement offset this possible rise in the average age of graduating child and adolescent psychiatrists, it may contribute to a smaller workforce overall. Another concern with the aging workforce are reports that physicians ≥ 55 years old practice 12% less than those younger than age 55 (Cooper, 1995).

Strengths and Limitations

The strengths of the present study include the national scope of the data considered and the considerations in trends in the workforce over time. There are several limitations to this study that are related primarily to the nature of the physician data. The exact extent of the physicians' practice is not known including whether the practice is full-time or part-time, the practice included adult patients, and the physician practices in additional counties besides the one listed for primary location, and the total patient care volume. A recent survey of early-career child and adolescent psychiatrists found that 79% work full-time with an average of 49 hours/week, 20% work part-time with an average of 25 hours/week, and 1% did not work (Stubbe and Thomas, 2002). Child and adolescent psychiatrists can travel or provide care by telemedicine to remote locations and there are programs that support this approach that are not captured in this study. The impact on the study is probably small because this type of practice is uncommon and most practitioners provide care for only one county. In addition, travel to and from remote locations by clinicians would limit the time and availability of patient care to rural areas. Thus, the presentation of data regarding the total number of child and adolescent psychiatrists in this study probably overestimates the total available clinical care.

Clinical Implications

Child and adolescent psychiatrists are not the only mental health providers for youth, but the shortage of trained child and adolescent mental health professionals is not limited to psychiatry (U.S. Department

of Health and Human Services, 1999, President's New Freedom Commission on Mental Health, 2003). It could be argued that the shortage of child and adolescent psychiatrists may be addressed in part through the increased numbers of related mental health and primary care practitioners (Koppelman, 2004). Even the role of prescribing psychotropic medication is shared with pediatricians. The recent concern over antidepressants and adolescent suicidal ideation and behavior (Bridge et al., 2005) and the resulting decrease in antidepressant prescriptions after the FDA ruled they must carry a black box warning (Rosack, 2005) highlight the need for specialists trained in psychopharmacological treatment of youth. In this case and others, the role of child and adolescent psychiatrists as part of the mental health care system for youth remains essential.

The calls for increased recruitment efforts and policies that support and provide incentives for child mental health professionals are certainly warranted (Kim, 2003; Koppelman, 2004), but the trends found in the present study indicate that they are insufficient in reducing the shortage of child and adolescent psychiatrists for the foreseeable future. Efforts to date also have not addressed the basic disparities for children living in rural or impoverished areas in access to child and adolescent psychiatric care. In addition to efforts to increase the size of the workforce, the continuing shortage and barriers to care must be addressed. Work on community systems of care in partnership with other disciplines (Huang et al., 2005) and use of new technologies, such as telepsychiatry, can overcome some of the obstacles in reaching those in need. Tolan and Dodge (2005) have argued that the crisis requires a comprehensive reorganization of child mental health services emphasizing improved access for symptomatic youth, prevention efforts for high-risk youth, short-term interventions in primary care settings, and mental health promotion in developmental settings. Greater presence and expansion of mental health services in primary care settings can improve access and amplify the impact of limited resources (Ringeisen et al., 2002). Training must prepare child and adolescent psychiatrists for the reality of practice in the face of the continuing shortage with the skills and knowledge necessary for clinical reality (Morris and Hanley, 2001; Huang et al., 2004). Development and dissemination of effective treatments that take into

account the limited workforce should also be a priority. The Substance Abuse and Mental Health Services Administration has created the “Science to Service Agenda” listing of promising approaches to reduce the gap in mental health services (<http://www.modelprograms.samhsa.gov>). Research and training policies and priorities must recognize the continuing shortage of child and adolescent psychiatrists for the foreseeable future and focus on developing optimal systems of mental health care in light of that reality.

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