1-3-1975

The Development and Analysis of Base Line Data for the Estimation of Incidence in the Handicapped School Age Population

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THE DEVELOPMENT AND ANALYSIS OF BASE LINE DATA FOR THE ESTIMATION OF INCIDENCE IN THE HANDICAPPED SCHOOL AGE POPULATION

Research Note 19
EPRC 2158-19

Prepared for:

THE ASSISTANT SECRETARY OF EDUCATION
U.S. OFFICE OF EDUCATION
WASHINGTON, D.C. 20202

EDUCATIONAL POLICY RESEARCH CENTER

STANFORD RESEARCH INSTITUTE

Menlo Park, California 94025

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SRI Project 2158

January 3, 1975

Educational Policy Research Center

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CONTRACT OEC-0-72-5016

EXECUTIVE SUMMARY

The purpose of this study was, first, to examine and critique the more popular incidence sources for handicapping conditions in the school age population, and second, to establish reasonably reliable base line data on which the future analysis of special population groups can be grounded. On the basis of this study, we suggest that the National Center of Health Statistics estimates become the primary source for further analysis due to both their reliability and comparability. It is questionable whether these figures could be refined further by conducting an independent national survey of school children.

Data reliability is important, since even very small errors in estimating the number of children to be served can have significant financial implications. For example, on the basis of individual state estimates of the excess costs of serving handicapped children, the average state expenditure is $726 per child. Since no state spends less than $400, this figure can be used as illustrative of minimal changes in costs for given errors in estimation. Thus, assuming an excess cost formula and a minimum reimbursement of $400 per child, a one-tenth of one percent error would cost approximately $18 million.

Another important aspect of this report is that it focuses on age group differences in the handicapped population. The use of aggregate estimates across age groups and grade levels has been somewhat misleading in the past. This is because there are significant differences in the age distribution of certain handicapping conditions, at least in terms of their impact upon the ability of a child to benefit from regular education. As suggested in this report, there is a significant drop in reported incidence at the age that typically corresponds to the transition period between elementary and secondary school. It is also interesting that the greatest differences in identification patterns between BEH and NCHS occur at the elementary level. The only difference at the secondary level is in the identification of the emotionally disturbed. The striking difference in distribution in age and grade levels in some handicapped classifications clearly identifies the need for federal consideration of these factors in developing a strategy for targeting of funds.

THE DEVELOPMENT AND ANALYSIS OF BASE LINE DATA FOR THE ESTIMATION OF INCIDENCE IN THE HANDICAPPED SCHOOL AGE POPULATION

Introduction

The purpose of this study was, first, to examine and critique the more popular incidence sources for handicapping conditions in the school age population, and second, to establish reasonably reliable base line data on which the future analysis of special population groups can be grounded.

The term "handicapped" is used in this report in the narrow sense defined by the federal legislation; thus, handicapped will refer to children who are:

> Mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, crippled, or other health impaired . . . . The term also includes children with specific learning disabilities to the extent that such children are health impaired.[1]

Basic disagreements among experts in the field of special education over who should be labeled mentally retarded, what constitutes a learning disability, and how to define an emotionally disturbed child reflect the complexity of delineating parameters. Appendix A illustrates the wide variation in both language and range of handicaps included in 1970 state statutes. Even the language of the federal EHA legislation reflects the

general lack of consensus regarding consistent definitions for handicaps. Careful reading of the earlier quotation from the EHA legislation uncovers the inconsistency of classifications. While auditory handicaps are separated into the hard of hearing and the deaf, children with visual handicaps are lumped into a single category, thus blurring the important distinction between the blind and the partially seeing child. In addition, while some classifications in the legislation are referred to as impairments, others are classified as handicaps. Although the terms handicap and impairment are used interchangeably, there is an important distinction that can be made between the two. An impairment may be considered as a condition which is below the accepted normal range. For example, a child with 20/50 visual acuity may be considered visually impaired, but not necessarily visually handicapped. The same is true for children with hearing or speech impairments. NCES has made a special effort to clarify this distinction in their current revision of the Pupil Accounting Manual for Local and State School Systems. For heuristic purposes, these distinctions, while important, will not be made in this report because current estimates must be evaluated within established frameworks. Nevertheless, in spite of the ambiguous language, it may be concluded that the desire of Congress was to support children with serious handicapping conditions that are primarily health related and, therefore, may affect their educational opportunities in a regular classroom.

Criticism of Historical and Current Popular Estimates

Table 1 presents the estimates most often quoted which have been used in the field of special education over the past twenty years. Because these estimates have appeared to be the best sources available, they have taken on an aura of authenticity. While these estimates may have validity, continuing conflict and disagreement surrounding them suggests a more rigorous examination to determine their reliability as base line data for future analysis of special populations. The authors of early incidence estimates carefully acknowledged their lack of a methodological framework within which the figures were generated. Operational definitions for the labeling and classification of children into handicapped categories were not delineated. Thus, these figures had to be accepted on face value with little understanding of what they really meant in terms of the kind of children served or in need of special education resources. Since the establishment of BEH, an attempt has been made to refine these data through state reporting surveys. State reports have been aggregated in an attempt to extrapolate total national incidence. Yet, this method, too, has serious limitations. Because of wide variations in state programs and classifications of handicapped youth, comparability is highly problematic.

However, a more serious criticism relates to the way in which these aggregate estimates have been used. That is, although the estimates have been generated on the basis of surveys of children in public school

Table 1

SELECTED ESTIMATED PREVALENCE RATES (%)
OF SCHOOL AGE (NONINSTITUTIONALIZED) HANDICAPPED CHILDREN

Source	Year	Visual	Hearing	Speech	Crippled	Special* Health	Emotional	M.R.	Learning	Mult.	Total
Mackie	1954	.200	1.500	2.000	1.500	1.500	2.000	2.000	--	--	10.700
Mackie	1963	.090	.575	3.500	1.000	1.000	2.000	2.300	--	--	10.465
B E H	1968	.100	.575	3.500	.500	--	2.000	2.300	1.000	--	9.975
Mackie	1969	.100	.600	3.500	.750	.750	2.000	2.300	--	--	9.970
Rossmiller	1970	.054	.100	3.600	.210	--	2.000	1.540	1.120	.070	8.690
B E H	1970 & 1971	.100	.575	3.500	.500	--	2.000	2.300	1.000	.060	10.035
Fleischmann	1973	.100	.575	3.500	.500	--	2.000	1.540	1.000	.070	9.285
Taylor	1973	.220	.570	3.500	.500	--	2.000	3.030	2.500	.060	12.380
Current BEH		.220	.570	3.500	.500	--	2.000	3.000	2.500	.060	12.350

* Generally included with crippled

programs, they have been used to extrapolate incidence to the entire school age population and the preschool population as well. In addition, these data have been used assuming even distribution of handicaps across age cohorts.*

In addition to the Mackie and BEH figures, there are three other estimates which are most often quoted: those of Richard Rossmiller, Graeme Taylor, and the Fleischmann Commission Report. Neither Rossmiller nor Taylor conducted surveys but rather relied upon existing estimates from special state studies and BEH to develop their estimates. The Fleischmann Commission, while it supported an independent survey of New York State schools' special education resources, relied in the end upon pooled estimates from diverse sources to arrive at a compromise set of figures.

Because of these serious limitations, it has been suggested that the only way to establish reliable incidence data is through a national survey of school age children. Yet, such a survey would be both time consuming and costly. Fortuitously, an intensive literature search uncovered an existing national survey of children published by the National Center for Health Statistics.[2] These series of publications are the result of a national health examination survey on a stratified random sample of all

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*As this report later shows, speech handicaps are a good example of an extremely skewed distribution across age groups--incidence is high in the early years and almost disappears by age 11.

noninstitutionalized children between the ages of 6 to 17. It represents findings of direct medical examination by a pediatrician, tests administered by a psychologist, statements from parents regarding the child's early development, and reports from the child's teacher relating to the perceived need for special placement. Because these data reflect multiple assessments on individual children, they represent, in our opinion, the best available data from which to extrapolate handicapping conditions. In addition, NCHS has related their findings to certain demographic and socioeconomic characteristics that allow cross tabulations among groups. The significance of the NCHS survey is that it provides a sound independent data base against which current BEH estimates can be compared and which can serve as a base line for future analysis of the handicapped population.

The Importance of Reliable Estimates

While it may seem unimportant to quibble over the relatively small differences in estimated incidence rates presented in Table 1, small errors in estimation can be very significant if the figures are used as base line data to project estimated financial need. For example, on the basis of individual state estimates of the excess costs of serving handicapped children (see Congressional Record, January 4, 1973), the average state expenditure is reported to be $726 per child. Using a conservative adjustment of two standard deviations below the mean, one arrives at a

cost per child of $400. Since no state spends less than this figure, it would therefore seem reasonable to use this number as illustrative of minimal changes in costs given errors in estimation. As Table 2 shows, if the NCHS data are used as the base line and an excess cost formula for reimbursement to states is assumed, the minimum reduction would be $125.3 million in the categories compared. To put it more simply, under an excess cost formula with a minimum reimbursement of $400 per child, it would cost approximately $18 million for every one-tenth of one percent error in estimating the incidence of handicapped children to be served.

As this research note later illustrates, however, these aggregate figures are of less utility for policy purposes than are estimates that separate children into elementary and secondary schools. Table 3 delineates cost factor differences on the basis of such a breakdown. As can be seen, discrepancies in estimation are ten times as great at the elementary level as at the secondary. Again, given the conservative estimate of $400 reimbursement per pupil, errors might cost at a minimum $9 million for each one-tenth percent change in elementary estimates and $8 million at the secondary level.

Problems Associated with the Classification of Handicapped Children

Table 4 suggests an important caveat in evaluating any incidence data based upon established disability classifications. As the table

Table 2

AGGREGATE DIFFERENCES IN EXCESS COST FACTORS GIVEN ERRORS IN THE ESTIMATION OF INCIDENCE*

Handicap	BEH Current (percent)	NCHS (percent)	Percent Difference	Number of Children (thousands)†	Dollar Equivalent @ $400/Child (millions)
Vision	..22	.83	+ .61	268.75	‡
Hearing	.57	.67	+ .10	44.06	‡
Speech	3.50	3.76	+ .26	114.55	‡
Orthopedic	.50	.25	- .25	-110.14	‡
Emotionally disturbed	2.00	2.35	+ .35	154.20	‡
Mentally retarded	3.00	1.25	-1.75	-771.00	‡
Total	9.79	9.11	-0.68	-299.59	-119.84

*Excluding the Special Health Category in Table 1, which is now included under Crippled, as well as exclusion of Learning Disabilities and Multiply Handicapped classifications for which there are no comparable estimates in the NCHS data.

†Computed for July 1, 1973, 6 to 17 per year population = 44.057 million.

‡Because of large variations in costs across handicapping conditions, average costs per handicap are not useful, thus only total excess cost factors are considered.

Table 3

DIFFERENCES IN EXCESS COST FACTORS GIVEN ERRORS IN THE ESTIMATION OF INCIDENCE AT THE ELEMENTARY AND SECONDARY LEVELS*

Handicap	Elementary Children (N=23.012 million)† BEH	NCHS	Percent Difference	Difference in Number of Children (thousands)	Total Dollars at $400 per Child (millions)	Secondary Children (N=21.045)† BEH	NCHS	Percent Difference	Difference in Number of Children (thousands)	Total Dollars at $400 per Child (millions)
Hearing	.3	1.0	+ .7	161	‡	.3	.3	0	0	‡
Vision	.1	1.4	+1.3	299	‡	.1	.2	.1	21	‡
Speech	6.1	6.2	+ .1	23	‡	1.1	1.1	0	0	‡
Orthopedic	.2	.3	+ .1	23	‡	.2	.2	0	0	‡
Mentally retarded	2.4	1.2	-1.2	-276	‡	1.4	1.3	-.1	-21	‡
Emotionally disturbed	1.5	3.4	+1.9	437	‡	.9	1.2	.3	63	‡
Total	10.6	13.5	2.9	677	$266.9	4.0	4.3	.3	63	$25.26

*Excluding the Special Health category in Table 1, which is now included under Crippled, as well as exclusion of Learning Disabilities and Multiple Handicapped classifications for which there are no comparable estimates in the NCHS data.

†Computed for July 1, 1973.

‡Because of large variations in costs across handicapping conditions, average costs per handicap are not useful, thus only total excess cost factors are considered.

illustrates, it is necessary to be sensitive to the possible biases that may be introduced into the labeling and placement process. The classification of handicapped students can be conceptualized as a rating continuum that moves from highly objective measures (such as the identification of orthopedically handicapped children) to progressively more subjective ratings (as the case of the emotionally disturbed and the learning disabled child). Such latter classifications can introduce heavy bias into the identification and labeling process.

Table 4

PROBLEMS ASSOCIATED WITH IDENTIFICATION OF HANDICAPS

Bias	Ortho-pedic	Hearing and Vision	Speech	Mental Retar-dation	Emotional and Learning Disabled
Objective	X	X	X		
Subjective and/or Test Bias				X	X

In the past, these categories have often served as "dumping grounds" for the slow learner, bilingual child, or behavior problem, all of whom are not, ipso facto, emotionally disturbed or mentally retarded. Because classifications toward the subjective end of the spectrum have the

potential for introducing heavy bias, there can be a high probability of error involved in the identification and labeling process. The demonstration of subjective diagnostician bias in the identification of persons as mentally retarded is supported by recent research findings. In one instance, for example, thirty-one psychologists were given three identical case studies which varied only with respect to the socioeconomic status of the client. It was found that the low socioeconomic status clients were more likely to be diagnosed as mentally retarded ($p < .01$) than were those clients of middle and high socioeconomic status.[3] Similar clinician bias was found in the identification of mental illness in individuals.[4]

This problem of classification has become particularly salient in light of attempts to locate large numbers of mentally retarded youngsters claimed to be unserved by the educational system. For example, as a result of a class action suit, the Pennsylvania State Department of Public Instruction was under a court mandate to locate 50,000 mentally retarded children claimed to be unserved.[5] A thorough search was made within the state, including a special door-to-door canvass in a suburban, an urban, and a rural area. While it was estimated in the court suit that there were between 50,000 and 100,000 excluded children, the search uncovered only 7,398 of whom only 2,571 had not been identified by any state agency. This is not to imply that exclusion of children from public education is not a serious problem but only to suggest that it is probably not of the magnitude claimed by many.[6]

The "Three Percent Myth"

One possible explanation for the differences between estimates of the incidence of mental retardation and reality may be the result of what sociologist Jane Mercer refers to as "the myth of the three percent"--the widespread acceptance that 3 percent of the population are mentally retarded.[7] Dr. Mercer claims that the three percent myth is the result of statistical bias that suggests cutoffs at the lower end of the normal curve to define children as retardates on the basis of poor performance on IQ type tests with little attention given to adaptive behavior.[8] Indeed, Dr. George Tarjan suggests that the three percent figure is based on the following assumptions: (1) that diagnosis is based essentially on a measured IQ below 70; (2) that mental retardation is identified in infancy; (3) that diagnosis does not change; and (4) that mortality of retarded individuals is similar to that of the general population.[9] Dr. Tarjan and his colleagues emphasize strongly that these assumptions "are not supported by clinical experience."[10]

Because of the difficulties associated with the classification of children in these highly subjective areas, categories such as emotionally disturbed, mentally retarded, and learning disabled should be viewed as "suspect" classes. There are multiple ambiguities associated with these labels, not only in terms of operational definitions but in the construct validity of tests used to identify such disabilities.

Establishing a Reliable Data Base for the Study of Incidence

Cognizant of the limitations of previous studies and the problems associated with labels, primary concerns in establishing a reliable data base were methodological consistency and comparability that would allow generalization to the national population. Subsidiary to these overriding concerns was a desire to establish some feeling for the extent to which, given methods of data collection, BEH figures represent fair estimates of the school age handicapped population.

Table 5 presents aggregate figures of current BEH estimates and statistically derived estimates from the NCHS data. In three out of six estimates, there are statistically significant differences between the two estimates. These three are the orthopedic, vision, and mentally retarded classifications. There are no statistical differences, however, in hearing, speech, or the emotionally disturbed. In the comparison of Table 5, the hypothesis that the greatest differences would be found at the subjective end of the classification scale is not confirmed. Only in the case of the mentally retarded is there a difference of extreme magnitude.

As pointed out earlier, however, aggregate data as presented in Table 5 has questionable utility for purposes of policy. This is because there are important differences in the age distribution of handicaps as they relate to the need for special education resources. When the 1970 BEH elementary and secondary figures are compared with NCHS breakdowns

Table 5

COMPARISON BETWEEN NCHS AND BEH SCHOOL REPORTED NEED FOR SPECIAL EDUCATION FOR THE TOTAL SCHOOL AGE POPULATION

Handicap	NCHS* (percent)	NCHS* SE	BEH Percent (current)	Z Value
Orthopedic	.25	.05	.50	+5.0†
Hearing	.67	.08	.57	-1.25
Vision	.83	.08	.22	-7.63†
Speech	3.76	.26	3.50	-1.0
Mentally retarded	1.25	.13	3.00	+13.5†
Emotionally disturbed	2.35	.18	2.00	+1.9†
Total	9.11	0.36‡	9.79	+1.9†

* Derived: $\hat{p}_{1+2} = \frac{N_1 \hat{p}_1 + N_2 \hat{p}_2}{N_1 + N_2}$ where N_1 = 6-11 age group (23.012 million)
N_2 = 12-17 age group (21.045 million)

$$SE\ \hat{p}_{1+2} = \frac{\sqrt{(N_1 . SE\hat{p}_1)^2 + (N_2 . SE\hat{p}_2)^2}}{N_1 + N_2}$$

† Significant at $p < .05$ (one-tailed test).

‡ Square root of sum of squares of column entries.

of the 6 to 11 and 12 to 17 age groups (Table 6), a consistent pattern is apparent. First, there is a significant drop in reported incidence at the age corresponding typically to the transition period between elementary and secondary school. Second, the greatest differences in identification between NCHS and BEH occur at the elementary level where all differences are quite large. At the secondary level, only estimates for the emotionally disturbed reflect a significant difference in identification of youth requiring special attention.

It is interesting to note that using the 1970 BEH figure for the orthopedically handicapped, there is no significant difference between BEH and NCHS. It is unclear why the BEH estimate rose from 0.2 to 0.5 percent between 1970 and 1971 (see Table 1). There are no known identifiable environmental causes that might account for this dramatic increase in orthopedic disabilities. Table 6 tends, therefore, to support more strongly the objective/subjective hypothesis of classification.

On the basis then of both reliability and comparability, the NCHS data are suggested as the base line for further study of incidence related policy questions. These base line data are presented in Tables 7 and 8.

Differences in Identification on the Basis of Sex and Age

Because the NCHS estimates are broken down into sex differences and age cohorts, it was of interest to examine possible age and sex trends. We present some of these identification patterns in graphic form.

Table 6

GRADE LEVEL COMPARISONS
BETWEEN BEH (1970) AND NCHS SCHOOL REPORTED NEED
FOR SPECIAL EDUCATION IN THE SCHOOL AGE POPULATION

Handicap	Elementary		BEH-NCHS (SE)‡	Z Value	Secondary		BEH-NCHS (SE)‡	Z Value
	NCHS (SE)*	BEH (SE)†			NCHS (SE)*	BEH (SE)†		
Hearing	1.0% (0.13)	0.3 (0.03)	-.6 (0.13)	4.5§**	0.3% (0.09)	0.3 (0.03)	0 (0.10)	0**
Vision	1.4 (0.14)	0.1 (0.01)	-1.3 (0.14)	9.2§**	0.2 (0.06)	0.1 (0.01)	-.10 (0.06)	1.6
Speech	6.2 (0.47)	6.1 (0.26)	-.1 (0.54)	.19**	1.1 (0.18)	1.1 (0.06)	0 (0.19)	0††
Orthopedic	0.3 (0.07)	0.2 (0.02)	-.1 (0.07)	1.4**	0.2 (0.07)	0.2 (0.02)	0 (0.07)	0**
Mentally Retarded	1.2 (0.17)	2.4 (0.16)	1.2 (0.23)	5.2§**	1.3 (0.21)	1.4 (0.09)	.1 (0.23)	.44**
Emotionally Disturbed	3.4 (0.32)	1.5 (0.11)	-1.9 (0.34)	5.6§**	1.2 (0.12)	0.9 (0.07)	-.3 (0.14)	2.1§**

*Sampling error, plus portion of measurement error.

†Sampling error only.

‡Calculated as $\sqrt{(SE_{NCHS})^2 + (SE_{BEH})^2}$.

§Significant at $p < .05$ (two-tail test).

**The significance or lack of significance is unaltered by test of effect of age-grade overlap of differences between elementary and secondary in NCHS data performed by interchanging average rates of 11 and 12 year olds, where averages are those of the 6 to 11 and 12 to 17 age groups, respectively, in NCHS data.

††The strong and significant downward trend in recommendations for speech therapy suggest that a less demanding test--interchange of actual sample proportions for 11 and 12 year olds--be used rather than attributing the 6 to 11 group means to 11 year olds and the 12 to 17 group means to 12 year olds. The result of this test is that the overlap on age and grade would not make the NCHS figure differ significantly from BEH (1970) at the .05 level.

Table 7

PERCENT OF CHILDREN 6 TO 11 YEARS OF AGE FOR WHOM SPECIAL RESOURCES WERE RECOMMENDED, BY TYPE OF PROBLEM, AGE, AND SEX
UNITED STATES, 1963-65*

Age and Sex	Special Resources Recommended by Type of Problem					
	Hearing	Vision	Speech Therapy	Ortho-pedic Handicap	Mentally Retarded	Emotion-ally Disturbed
Both Sexes	Percent of All Children					
Total, 6-11 years	1.0	1.4	6.2	0.3	1.2	3.4
6 years	1.3	1.0	8.8	0.3	0.5	1.9
7 years	1.3	1.0	7.1	0.3	0.7	2.4
8 years	1.0	1.7	6.5	0.3	0.7	3.5
9 years	0.7	0.9	5.8	0.3	1.9	4.2
10 years	1.0	2.2	3.9	0.3	1.7	3.3
11 years	0.7	1.6	3.8	0.5	1.6	4.1
Boys						
Total, 6-11 years	1.1	1.5	7.5	0.3	1.7	4.4
6 years	1.5	0.8	10.3	0.2	0.9	2.2
7 years	1.1	1.3	9.7	0.2	0.9	2.5
8 years	1.5	1.3	7.6	0.6	1.2	5.4
9 years	0.7	1.1	8.0	0.2	2.8	6.5
10 years	1.0	2.5	4.7	0.2	2.2	4.5
11 years	0.8	2.1	4.8	0.4	2.4	5.5
Girls						
Total, 6-11 years	1.0	1.4	4.9	0.4	0.7	2.2
6 years	1.2	1.3	8.3	0.4	0.2	1.8
7 years	1.7	0.7	5.2	0.3	0.5	2.6
8 years	0.6	2.2	5.5	-	0.3	1.6
9 years	0.7	0.7	3.9	0.5	1.2	2.1
10 years	1.0	2.0	3.3	0.4	1.2	2.3
11 years	0.7	1.3	3.1	0.5	0.9	3.0

*Source: National Center for Health Statistics Series 11, No. 113.

Table 8

PERCENT OF YOUTHS 12 TO 17 YEARS OF AGE FOR WHOM SPECIAL RESOURCES WERE RECOMMENDED, BY TYPE OF PROBLEM, AGE, AND SEX UNITED STATES, 1966-70*

Age and Sex	Special Resources Recommended by Type of Problem					
	Hearing	Vision	Speech Therapy	Ortho-pedic Handicap	Mentally Retarded	Emotion-ally Disturbed
Both Sexes	Percent of All Youth					
Total, 12-17 years	0.3	0.2	1.1	0.2	1.3	1.2
12 years	0.2	0.3	1.8	0.3	1.0	1.7
13 years	0.3	0.1	1.4	0.1	1.9	1.4
14 years	0.2	0.3	1.3	0.1	1.5	1.0
15 years	0.2	0.4	0.7	0.5	1.8	1.6
16 years	-	0.1	0.6	-	0.6	0.7
17 years	0.8	0.2	0.9	-	1.2	0.7
Boys						
Total, 12-17 years	0.4	0.2	1.3	0.1	1.9	1.7
12 years	0.5	-	1.7	-	1.4	2.3
13 years	0.3	0.3	1.7	0.2	2.6	2.1
14 years	0.2	0.3	1.2	-	2.1	1.6
15 years	0.3	0.8	1.0	0.3	2.7	2.0
16 years	-	-	0.9	-	0.6	0.4
17 years	1.3	0.2	0.9	-	1.6	1.3
Girls						
Total, 12-17 years	0.1	0.2	1.0	0.3	0.8	0.7
12 years	-	0.5	1.9	0.5	0.5	0.9
13 years	0.3	-	1.1	-	1.1	0.6
14 years	0.2	0.3	1.3	0.2	0.8	0.3
15 years	-	-	0.4	0.8	0.8	1.1
16 years	-	0.2	0.2	-	0.6	1.0
17 years	0.2	0.2	0.9	-	0.9	0.2

*Source: National Center for Health Statistics Series 11, No. 139.

Figure 1, for example, illustrates the relationship between age and the reported need for speech therapy. Speech problems appear to respond extremely well either to normal maturation processes or to speech therapy offered by the schools, as exhibited by the rather smooth, steady, significantly declining curve. By the age of 12, it appears that only the most serious difficulties are still present. The reported prevalence rates of both BEH and NCHS for speech defects do not differ at either school level and are strongly supported by other independent research findings.[11] Figure 2 sets out the reported differences between boys and girls by age. While there are significant differences in the reported need for speech therapy between boys and girls at the elementary level ($p < .002$), at the secondary school level, the two groups have converged ($p > .05$).

This age convergence, however, is not present in the more subjective classifications of the mentally retarded and the emotionally disturbed. Figure 3 presents the age and sex patterns of identification by schools of children labeled mentally retarded as reported by NCHS. The rise and fall across age cohorts does not suggest a strong age trend but the identification on the basis of sex is startling. These figures reported by NCHS for children identified as mentally retarded are also strongly supported by rigorous estimates of actual prevalence among noninstitutionalized children in the United States, England, and Scotland.[12]

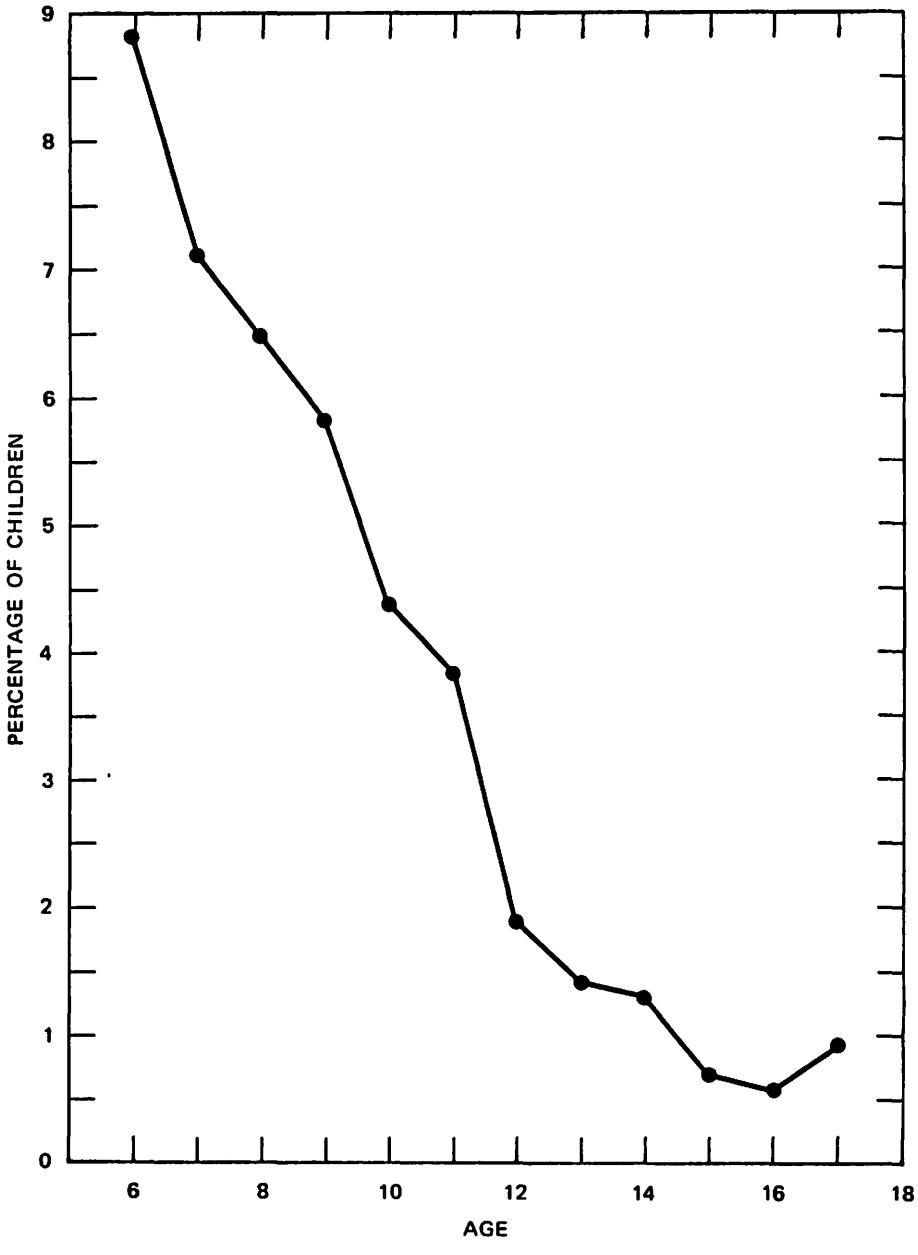

FIGURE 1 PERCENTAGE OF CHILDREN, BY AGE GROUP, FOR WHOM SPEECH THERAPY WAS RECOMMENDED BY THE SCHOOL

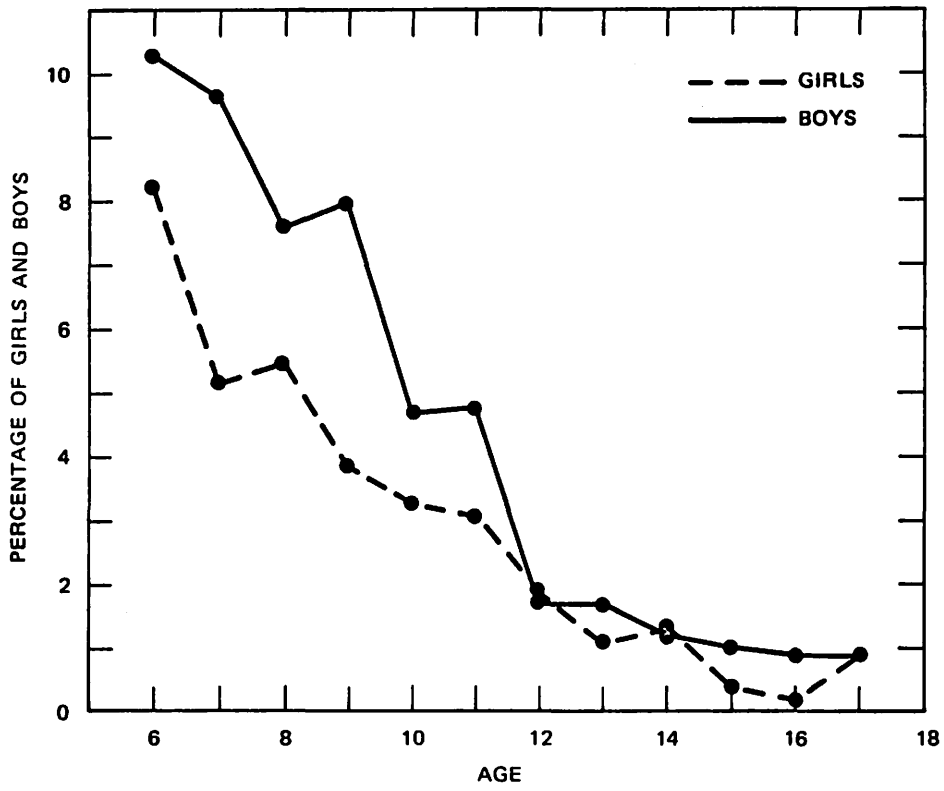

FIGURE 2 COMPARISON BETWEEN PERCENTAGE OF BOYS AND GIRLS FOR WHOM SPEECH THERAPY WAS RECOMMENDED BY THE SCHOOL

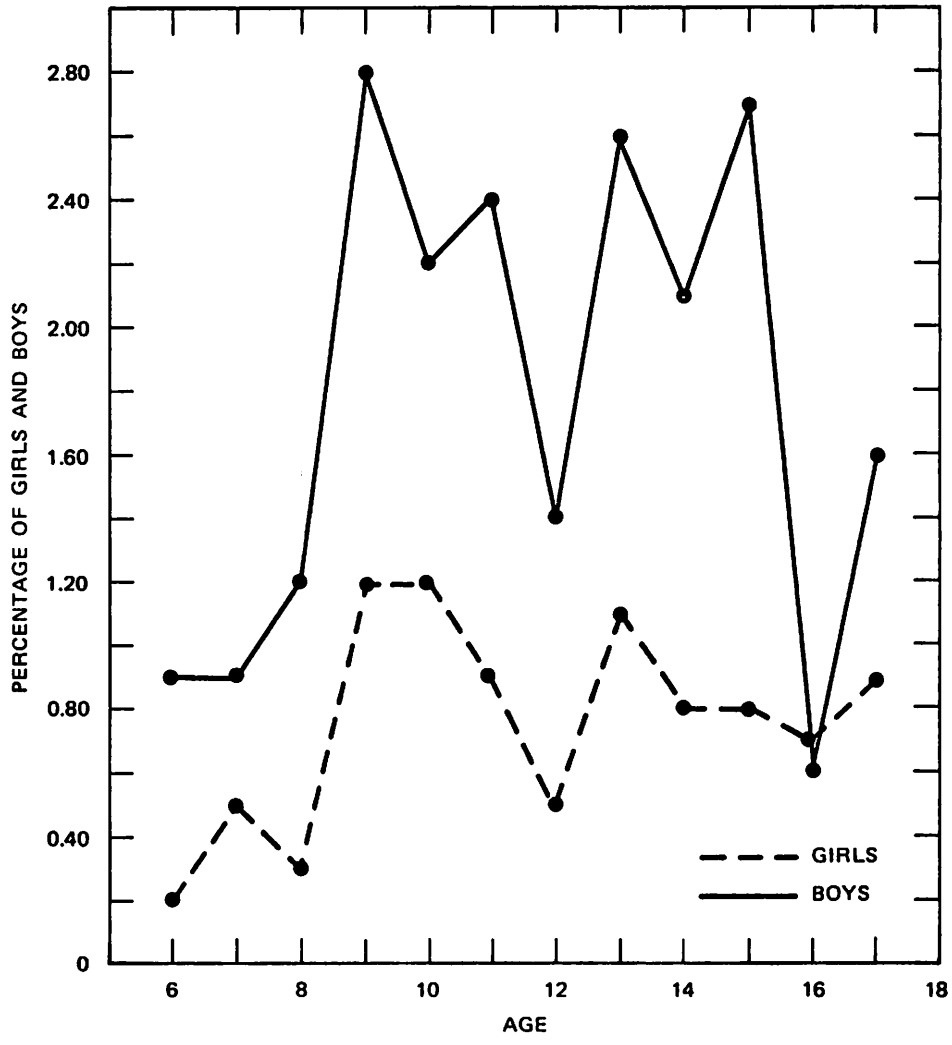

FIGURE 3 COMPARISON BETWEEN GIRLS AND BOYS IDENTIFIED BY THE SCHOOL AS MENTALLY RETARDED, BY AGE

Figures 4 and 5 are related to the identification of boys and girls by age and grade level as emotionally disturbed. These figures show there are not only strong age trends but large differences in identification related to sex differences ($p < .0002$ for both 6 to 11 and 12 to 17 age groups). While Figure 4 shows a distinct downward trend in identification with age, Figure 5 delineates more clearly the distinct duality between identification at the elementary and secondary school levels. Given the earlier caveat relating to the classification and labeling of the emotionally disturbed and what is known about schools, one might easily suggest an explanation for this labeling phenomenon:

> At age 6 school is a new experience. There is, therefore, a period in the early years of adjustment and socialization when children are given greater freedom to express themselves and make adjustments to a more structured environment. Thus, a teacher may well overlook behavior that would not be tolerated in subsequent years.
>
> Since the environment is new to the child, he or she is unsure of what is expected both in terms of performance and behavior. In addition, the child is bombarded with new tasks--learning the alphabet and numbers, putting both together to form words, sentences, larger numbers and, finally, adding and subtracting one number from another and creating stories out of words.
>
> However, by the time the child has reached the age of nine, these early tasks have been reasonably well mastered by most students. School has become routine for the child and he or she begins to expand his or her self-concept. This may lead to various behavior modes--unruliness, boredom, or conformance. What may only be a manifestation of learned responses to the school environment may be identified with the more pejorative labels of emotionally disturbed or mentally retarded. This suspicion is strengthened by the great difference between the number of boys and girls, for example, identified as having emotional difficulties. It may ony reflect the difference in

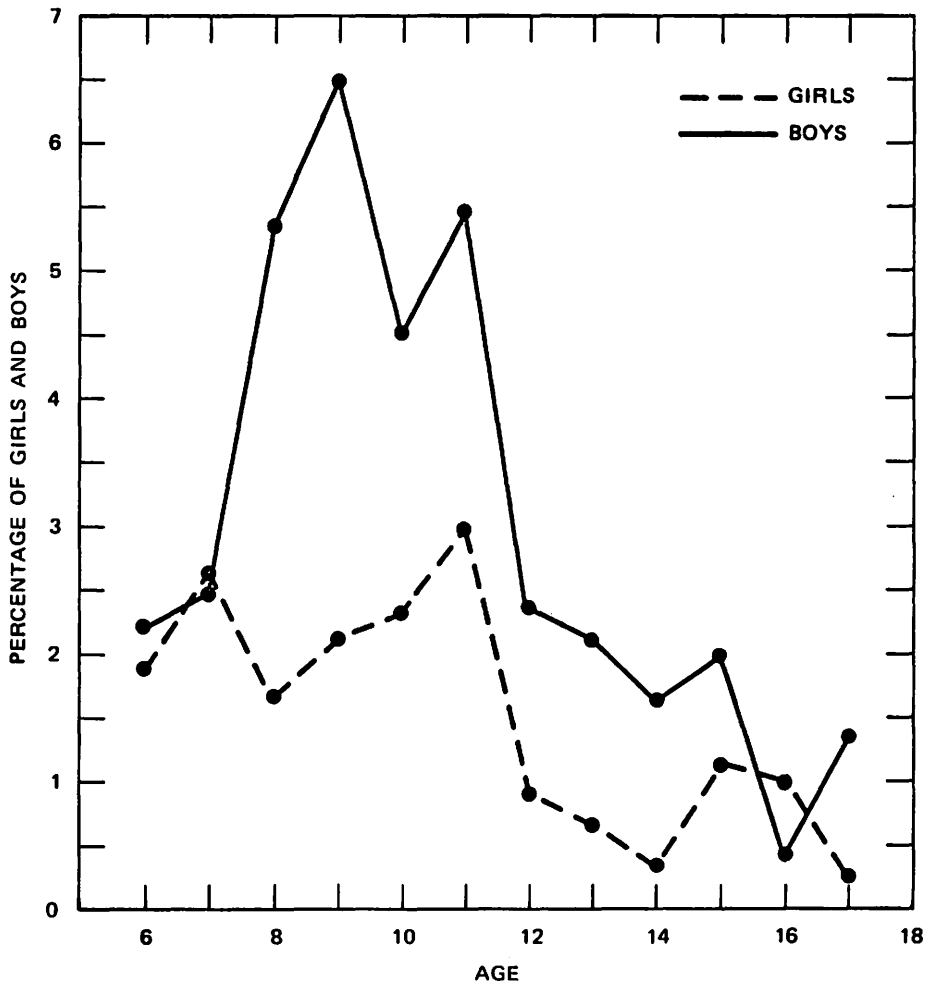

FIGURE 4 COMPARISON BETWEEN GIRLS AND BOYS IDENTIFIED BY THE SCHOOL AS EMOTIONALLY DISTURBED, BY AGE

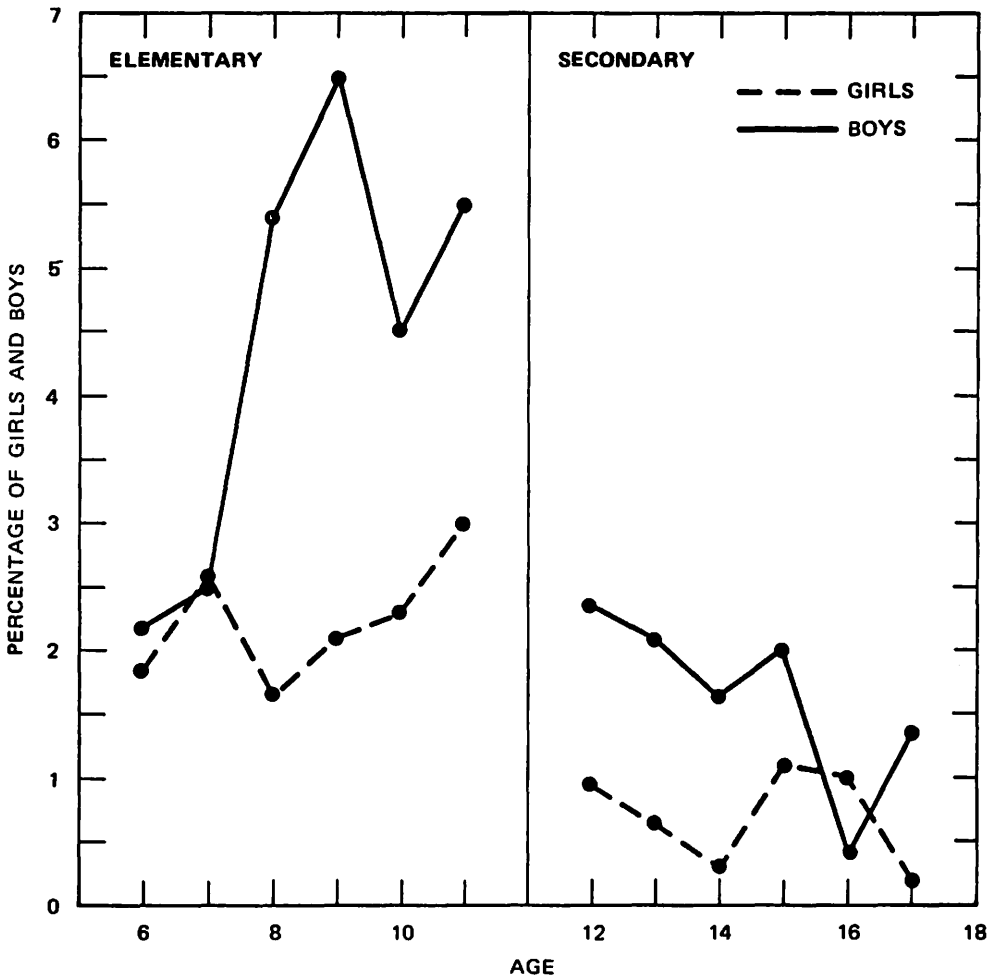

FIGURE 5 COMPARISON BETWEEN IDENTIFICATION OF CHILDREN AS EMOTIONALLY DISTURBED IN ELEMENTARY AND SECONDARY SCHOOLS BY AGE

the rate of socialization and maturation between boys and girls rather than serious emotional disturbances. The fact that there is such a significant "fade out" effect upon entry into secondary school is highly suggestive of such a situation.

The dramatic decline in the identification of children as emotionally disturbed between the ages of 11 and 12 suggests an environmental hypothesis. While elementary school is more child oriented, secondary school gives one greater freedom and less personal supervision; the child's day is broken into more diverse segments as opposed to the elementary self-contained classroom setting. While it has been suggested that children identified as mentally retarded and emotionally disturbed are those who often become the high school dropout, Tables 3 and 5 suggest that for the emotionally disturbed the decline in reported incidence takes place well before the child has entered high school, and for the mentally retarded there is no significant age trend.

This again suggests the necessity for caution in reliance upon reported school incidence of handicaps that introduce such high rates of subjectivity. Since the NCHS reports came from individual teachers and related to an individual child, there is reason to suspect less bias than in the District reported aggregate estimates.

Conclusions

The results of this preliminary analysis of current incidence suggest that, given the consistent and careful methdology of the NCHS study as well as other rigorous scholarly studies which support many of their findings, these figures are undoubtedly as reliable as are possible given the earlier caveat. It is certainly questionable whether an independent national survey of children should be supported until such time as the

NCHS data can be more thoroughly analyzed. Therefore, the NCHS figures are suggested as the base line data source for further analysis of the overlap between the handicapped and other special population groups.

In terms of establishing reliable estimates, Tables 2 and 3 both illustrate the economic costs of making small errors in the number of children to be served. Perhaps more important are the possible personal costs to a child of making an error in identification.

Unfortunately, it was not possible, given the NCHS data, to make comparisons of incidence estimates for learning disabilities or the multiply handicapped. In the case of the multiply handicapped the reported BEH figures appear to be quite small and thus the inability to include this group does not significantly affect the conclusions. However, in the case of learning disabilities, this exclusion means there are probably two percent or more additional children in need of special education resources, which can be added to the overall totals.

One of the important results of this report is to focus attention to age group differences. As Tables 1, 2, and 5 show, aggregate estimates across age and grade levels can be misleading. Tables 3 and 6 suggest the importance of separating incidence data into elementary and secondary estimates. The striking differences in distribution in age and grade level in some classifications clearly identify the need for federal consideration of these factors in developing a strategy for targeting of funds.

In addition, this report lends support to the demythologization of the 3 percent myth. NCHS findings as well as other rigorous studies support a 1.25 percent incidence estimate for the mentally retarded.

While the differences in identification based on sex illustrated by Figures 3 and 4 are important, it is not clear that this raises policy issues that should have federal priority at this time. Since it is possible that differences in identification are related to both the school environment and possible teacher bias, it should, however, be an issue of state and local concern.

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Appendix A

STATE DEFINITIONS OF HANDICAPPING CONDITIONS FOR EDUCATIONAL PURPOSES AND AGE LIMITATIONS (1970)

Appendix A

STATE DEFINITIONS OF HANDICAPPING CONDITIONS FOR EDUCATIONAL PURPOSES AND AGE LIMITATIONS (1970)

State	Definition	Age Requirements Minimum	Maximum
Alabama	Severely physically handicapped, mentally retarded, and others defined by regulations	3	None
	Special program:* The Alabama Institute for the Deaf and Blind conducts a preschool and junior college level program for deaf, blind, physically handicapped, and otherwise severely handicapped students.		
Alaska	Physically handicapped, educable mentally retarded, trainable mentally retarded, and emotionally disturbed	None	19
	Special program: The Department of Health and Welfare conducts the nursery level program for mentally retarded and physically handicapped.		
Arizona	Emotionally disturbed, educable mentally retarded, physically limited, and combinations thereof	No age limits	
	Trainable mentally retarded	Legal school age	
Arkansas	Defective hearing, physically impaired, speech impaired, slow learning, crippled, cardiopathic, tuberculosis, cerebral palsied, mentally retarded, and otherwise disabled	3	21
	Deaf blind	None	21
California	Mentally retarded, severely mentally retarded	5.9	21
	Physically handicapped, multiply handicapped	None	21
	Educationally handicapped	Law implies legal age	
	Special program: The California School for the Deaf conducts a special program for deaf children age 3 to 6 and their parents; experimental programs for children who are blind and/or deaf may be conducted as low as age 18 months.		
Colorado	Physically handicapped	3	21
	Educable mentally retarded and educationally handicapped	5	21

*Not all legally established programs for preschool and postsecondary programs have been listed. Representative programs have been selected.

State	Definition	Age Requirements Minimum	Maximum
Colorado (continued)	Trainable mentally retarded	5	18
	Homebound, hospitalized, speech handicapped	Legal school age	
Connecticut	Physically handicapped, socially and emotionally maladjusted, neurologically impaired, identifiable learning disabled, and mentally retarded	Legal school age	High School graduate or 21 whichever occurs first
	Special program: Preschool programs may be conducted for children whose educational attainment would be irreparably diminished without such a program.		
Delaware	Physically handicapped, maladjusted, mentally handicapped, learning disabled, gifted, and talented	4	21
Florida	Educable mentally retarded, trainable mentally retarded, speech impaired, deaf, hard of hearing, blind, partially sighted, crippled and other health impaired, gifted, emotionally disturbed, socially maladjusted, specific learning disabled	3	None
Georgia	Mentally retarded, physically handicapped, speech handicapped, multiply handicapped, autistic, intellectually gifted, hearing impaired, visually impaired, and any other exceptionality that may later be identified	Law implies legal age	
	Special program: A preschool program with no age limitations is authorized for the deaf, hearing impaired, and speech handicapped		
Hawaii	Children who deviate in physical, mental, social, or emotional characteristics to the extent that specialized training, techniques, and equipment are needed for maximum fulfillment	None	20
Idaho	Includes but not limited to physically handicapped, mentally retarded, emotionally disturbed, chronically ill, perceptually impaired, visually or auditorally handicapped, speech impaired, and academically talented	No lower limit (a law specially abolished such limit)	21
Illinois	Physically handicapped and multiply handicapped	3	21
	Maladjusted, educable mentally retarded, trainable mentally retarded, speech defective	5	21
Indiana	Physical or mental disability as defined by regulations and including the multiply handicapped	6 (Services may be to children between ages 3-6 and 18-21)	18
	Special program: An experimental program may be conducted for deaf blind as young as 6 mos.		

State	Definition	Age Requirements Minimum	Maximum
Iowa	Crippled, defective sight, hard of hearing, speech impairments, heart disease, tuberculosis, physical defects, emotionally maladjusted, and children intellectually incapable of regular instructional program	5 Children not in state institutions under 5 may receive services	21
	State school for the deaf	5	21 Permission may be given by Board of Regents to persons 21-35
Kansas	Mentally retarded	None	21
	Deaf, blind	7	21
	State school for the deaf and blind	5	21
	Homebound	6	21
	Crippled, speech impaired, heart disease, tuberculosis, cerebral palsy, emotionally and socially maladjusted, intellectually superior or inferior, physically or mentally defective	None	21 If special circumstances exist, upper limit may be extended 3 yrs.
	Special program: Hearing handicapped children may receive preschool services beginning at age 3.		
Kentucky	Physically handicapped, speech defective, educable mentally handicapped, trainable mentally handicapped, neurologically impaired, intellectually gifted, emotionally disturbed, functionally retarded, learning disabled, communications disorders, and others who may be defined by the state board of education	None	21
Louisiana	Slow learning, educable mentally retarded, trainable mentally retarded, blind and/or partially sighted, emotionally disturbed, cerebral palsied, gifted, crippled, other health impaired, deaf and/or hard of hearing, speech impaired	3	21
Maryland	Physically and mentally handicapped	6	18
	Special program: Children under age 6 may receive special education services if such services would help them to approach a degree of development similar to pupils in regular school programs.		
Massachusetts	Deaf, blind, aphasic, deaf blind, mentally retarded blind, speech handicapped, mentally retarded, physically handicapped, emotionally disturbed, learning impaired, perceptually handicapped	Legal school age	

State	Definition	Age Requirements Minimum	Maximum
Massachusetts (continued)	Special program: Deaf/blind, aphasic, mentally retarded, and blind children who are participating in a special program in state and private institutions are to receive 12 years of education but no age ranges are given.		
	Special program: A clinical nursery school program for the mentally retarded is authorized but no age range is given.		
Michigan	Deaf, hard of hearing, blind, partially sighted, speech defective, homebound, multiply handicapped, crippled, or otherwise physically handicapped, mentally retarded, children with behavior problems	None	None
Minnesota	Deaf blind, speech defective	4	21
	Trainable mentally retarded, educable mentally retarded and crippled	5	21
		Above limits considered legal school age but programs may be provided to children not yet school age	
Mississippi	Defective hearing, vision, speech, mental retardation, physical conditions	None (Law implies age 6)	21
	Special program: Day schools for the deaf may start programs under age 6.		
Missouri	Children who deviate from the average in physical, mental, emotional, or social developmental characteristics	3	21
Montana	Educable mentally retarded, trainable mentally retarded, custodial mentally retarded, physically handicapped, includes but not limited to cardiac, cerebral palsy, speech defective, and hearing and vision handicapped	Legal school age	
	Crippled children	5	16
	State school for the deaf and the blind	No lower limit within state schools	Legal school age
	If educational advantages to the child are determined exceedingly high, programs may start under age 6.		
Nebraska	Trainable mentally retarded	5	21
	Physically handicapped, crippled, visually handicapped, hard of hearing, speech defective, cardiopathic, tubercular, cerebral palsied or otherwise physically handicapped, educable mentally retarded	None	21
	Multiply handicapped, emotionally disturbed	No age range is given	

State	Definition	Age Requirements Minimum	Maximum
Nevada	Vision, hearing, speech, orthopedic, mental, and neurological disorders or defects, or any disabling condition caused by accident, injury, or disease	3	21
New Hampshire	Deaf	4	21
	Physically, emotionally, and intellectually handicapped	5	21
New Jersey	Mentally retarded, visually handicapped, auditorily handicapped, communication handicapped, neurologically or perceptually impaired, orthopedically handicapped, chronically ill, emotionally disturbed, socially maladjusted, and multiply handicapped	5	20
	Program may be conducted on a permissive basis to children under 5 and over 20 if they have no high school diploma or equivalent.		
New Mexico	Educable and trainable mentally handicapped	6	21
	School for the blind	5 (Program may be conducted for children under 5 on a permissive basis)	21
New York	Children who because of mental, physical, or emotional reasons cannot be educated in regular classes	Legal school age	
North Carolina	Gifted	Programs are only for children already entered into regular education programs	
	Physically and mentally handicapped	No age range given.	
North Dakota	Children with physical, mental, emotional, or social conditions with an educable mind	None	21
Ohio	Deaf, blind, physically handicapped, mentally retarded and emotionally handicapped	5	None
Oklahoma	Gifted, educable mentally retarded, trainable mentally retarded, speech defective, emotionally disturbed, perceptually handicapped, children with special health problems, children requiring services of a visiting counselor, specifically learning disabled as a result of neurological impairment, multiply handicapped	4	None
	Deaf blind, blind and partially blind, hard of hearing and deaf	2	None
Oregon	Blind, partially sighted, hard of hearing, deaf, speech defective, crippled, physically handicapped, extreme learning problems, socially or economically maladjusted	None	21
Pennsylvania	Children who deviate from the average in physical, mental, and social character to such an extent that they require special education services	Legal school age	

State	Definition	Age Requirements Minimum	Maximum
Pennsylvania (continued)	Private school program	6	21
Rhode Island	Mentally retarded, physically handicapped, and emotionally handicapped	Age limits are to be set by regulations of state board of ed.	
South Carolina	Physically handicapped, educable mentally retarded, trainable mentally retarded, emotionally handicapped	Legal school age	
	Hard of hearing	4	None
South Dakota	Physical or mental conditions that cannot be adequately provided for through the regular public schools	None	21
Tennessee	Children who are psychologically and physically exceptional but with an educable mind	Legal school age	
	Deaf	3	21
Texas	Hard of hearing, orthopedically handicapped, physically handicapped, mentally retarded, emotionally disturbed, language or learning disabled	3	21
Utah	Exceptional physical or mental condition	6	18
Vermont	Physical or mental deviations	None	21
Virginia	Physically handicapped, emotionally disturbed, mentally retarded	Legal school age	
Washington	Specific learning and language disabilities, physical or mental handicap, social or emotional maladjustment, or other handicapping conditions	6	21
		Programs may begin at age 3 on a permissive basis	
	Schools for the deaf and blind	6	21
		Children in state schools for deaf and blind may receive special ed. services under 6 and over 21	
West Virginia	Visually impaired, hearing impaired, physically handicapped, orthopedically handicapped, epileptic, mentally retarded, speech handicapped, multiply handicapped, autistic, intellectually gifted, socially or emotionally maladjusted (including the delinquent), learning disabled both physically and psychologically, and others which may be identified by the state superintendent of free schools	6	21
		Programs may be conducted on a permissive basis for children aged 3-6	

State	Definition	Age Requirements	
		Minimum	Maximum
Wisconsin	Crippled, cardiac, visually handicapped, auditorily handicapped, speech handicapped, mentally retarded, and otherwise physically handicapped	None	21
Wyoming	Mental, physical, psychological, or social maladjustment	Legal school age	