1. Comparing the Early Adulthood of Youth With Disabilities Between 1990 and 2005: Study Background and Methods

In an effort to document the secondary school experiences and postsecondary outcomes of students with disabilities over the last two decades, the U.S. Department of Education (ED) sponsored two longitudinal research studies 15 years apart. The first study, the National Longitudinal Transition Study (NLTS), generated nationally representative information about secondary-school-age youth who were receiving special education services in 1985.[7] To assess the status of youth with disabilities[8] in the early 21st century, ED commissioned the National Longitudinal Transition Study-2 (NLTS2) to generate nationally representative information about secondary-school-age youth who were receiving special education services in 2000.[9] NLTS2 addresses many of the same issues as NLTS (e.g., participation in postsecondary education and social involvement of out-of-high school youth), but extends its scope by collecting broader information related to these issues, such as information related to receipt of accommodations and supports from postsecondary schools or extent of seeing or communicating by computer with friends outside of work or school.

The tremendous range and scope of changes in American society and its economy that occurred in the years between NLTS and NLTS2 are reflected in many aspects of our lives. Increasing diversity in our population and family structures (Aulette 2009; Jacobs and Gerson 2001; Klein 2004; U.S. Census Bureau 2008), innovations in communication and information technologies (Anton, Silberglitt, and Schneider 2001; Collins and Halverson 2009; McRobbie 1999; Wellman et al. 2008), and the globalization of the economy are only a few of the many trends that have had far-reaching impacts on all of us (Henderson 1999; Joshi 2009). Other changes particularly affect students, such as the growing emphasis on the use of "high stakes" tests in holding schools accountable for the academic performance of their students (Supovitz 2009; William 2010) and the growing number of "school choice" options available to parents (Berends et al. 2009; Grady, Bielick, and Aud 2010).

In chronicling "the good news and the work ahead" in educating children with disabilities, the American Youth Policy Forum and the Center on Education Policy (2002) note dramatic changes in special education policy and practice in the 25 years after the passage of Public Law 94-142, now known as the Individuals with Disabilities Education Act (IDEA). They report that increased access to public education, inclusion in general education classrooms, participation in standardized testing, and high school graduation rates are among the "good news" stories for students with disabilities. Others cite factors particularly relevant to transition-age youth with disabilities that include amendments to IDEA and to vocational education and employment legislation that have shaped state-level transition policies, increased funding for vocational services for students with disabilities, removed obstacles to employment, and required states to

[7] NLTS methods and postschool findings are summarized in Blackorby and Wagner (1996).

[8] Although the populations represented in NLTS and NLTS2 are youth who were receiving special education services, for convenience, the broader phrase "youth with disabilities" is used to describe them in this report.

[9] Additional information on the NLTS2 design and data collection instruments, and on reports available from the study can be found at http://www.nlts2.org.

monitor and report on the status of youth with disabilities after exiting high school (Lehman, et al. 2002; National Council on Disability 2000). It is timely to consider the changes in the characteristics, experiences, and outcomes of transition-age youth with disabilities that have been contemporaneous with the demographic, social, economic, and education policy changes in our country in the years between NLTS and NLTS2.

In addition to NLTS staff, many researchers documented the early post-high school outcomes of youth with disabilities in the NLTS era (e.g., Edgar, Levine, and Maddox 1986; Mithaug, Horiuchi, and Fanning 1985; Hasazi, Gordon, and Roe 1985; Sittlington and Frank 1990; Zigmond and Thornton 1985). Now, however, federal regulations (20 U.S.C. 1416(a)(3)(B) (IDEA)) require state departments of education to collect data on the employment and postsecondary education experiences of their exiters from special education within a year of leaving high school. Thus, post-high school outcomes are being reported regularly by state departments of education for their own populations of high school exiters (e.g., Kansas State Department of Education n.d.; Ohio Department of Education 2010; Rabren and Johnson 2010; Wisconsin Department of Public Instruction 2010). However, only NLTS and NLTS2 permit comparisons across time of the characteristics, experiences, and outcomes of nationally representative samples of youth with disabilities.

Previous reports comparing the school experiences of youth who were represented in NLTS with those represented in NLTS2 illuminate the extent and ways in which youth with disabilities, special education, and student outcomes differed between the time periods covered by the two studies (Wagner, Cameto, and Newman 2003; Wagner, Newman, and Cameto 2004; Wagner et al. 2005). Focusing on differences in students' school programs, for example, comparative analyses included in these reports revealed that more students with disabilities represented in NLTS2 than in NLTS took academic courses, including mathematics, science, social studies, and a foreign language, as a foundation for pursuing postsecondary education. Moreover, more students represented in NLTS2 than NLTS were receiving their instruction in regular high schools, and those students in NLTS2 who took academic courses were more likely to do so in general education classrooms than were the students in NLTS who took academic courses. Compared with NLTS, more teachers of general education classes in NLTS2 received a variety of supports to help them meet the needs of students with disabilities in their classes. In addition, students in NLTS2 were more likely than those in NLTS to receive a range of related and support services, including speech/language therapy and vocational and mental health services. Regarding students' academic performance, when assessed in NLTS2, students' grades also were higher relative to NLTS and a larger proportion were at the appropriate grade level for their age, indicating fewer had repeated a grade.

A previous report also asked whether differences in the early post-high school experiences and performance of young adults with disabilities represented in NLTS and NLTS2 were apparent (Wagner et al. 2005). That report examined differences in outcomes in the postsecondary education, employment, engagement in either postsecondary education or employment, and household circumstances for youth represented in NLTS and NLTS2 who had been out of high school up to 2 years, using data from the first wave of NLTS data collection (1987) and from the second wave of NLTS2 data collection (2003), when youth were ages 15 through 19.

Fortunately, a subsequent wave of NLTS and of NLTS2 data together enable an examination of differences in outcomes when more experience in the post-high school world could be reflected in the outcomes of youth with disabilities. This report focuses on the subset of youth represented in NLTS and NLTS2 who had been out of high school up to 4 years, a time in which youth begin the transition to adult roles that continues for most youth for many years (Settersten, Furstenberg, and Rumbaut 2005).[10] Information reported here about these youth is drawn from the second and last wave of parent and youth interviews/surveys conducted about NLTS youth in 1990 (referred to as cohort 1) and the third wave of parent interviews and youth interviews/surveys conducted for NLTS2 youth in 2005 (referred to as cohort 2). Analyses include the age group[11] of out-of-high school youth that was common to the studies at those time points: youth ages 18 through 21. Specifically, this report addresses the following questions:

- *What cohort differences and similarities are apparent between youth with disabilities out of high school up to 4 years who are represented in NLTS and in NLTS2 in the domains of postsecondary education, employment, engagement in either postsecondary education or employment, household circumstances (i.e., residential independence, marital status, and financial independence), and community integration (i.e., community participation and criminal justice system involvement)?* These domains mirror the purpose of IDEA: to "prepare them [children with disabilities] for future education, employment, and independent living" (20 U.S.C. 1400(d)(1)(A) (IDEA)).
- *How do cohort differences in the post-high school outcomes of youth with disabilities compare with those of youth in the general population?* Reports from NLTS and NLTS2 have compared findings for youth with disabilities with youth in the general population to the extent data permit, revealing significant differences on many factors, yet some similarities (see, for example, Newman et al. 2009; Wagner et al. 1991). It is a natural extension of that research agenda to examine cohort similarities and differences over time.
- *Do youth with disabilities who differ in their primary disability, gender, race/ethnicity,[12] household income, high school completion status, or years since leaving high school have different patterns of differences and similarities when youth represented in NLTS and NLTS2 are compared?* These subgroups are examined because research findings generated from both studies have demonstrated that youth with disabilities who differ in these ways have markedly different experiences and outcomes (see, for example, Blackorby and Wagner 1996; Newman et al. 2009; Wagner et al. 1991; Wagner, Newman, Cameto, Levine, and Marder 2003).

[10] The comparison of post-high school outcomes that includes youth with the greatest post-high school experience is between NLTS and NLTS2, when youth were out of high school up to 4 years (i.e., wave 2 of NLTS and wave 3 of NLTS2). Although NLTS2 has five waves of data that follow youth until they were out of high school up to 8 years, NLTS did not collect additional data beyond wave 2.

[11] Age was based on birthdates provided by parents during interviews; the date of the NLTS2 Wave 3 interview was used to determine youth age in 2005, and the date of the NLTS Wave 2 interview was used to determine youth age in 1990.

[12] Findings are reported for White, African American, and Hispanic youth; other racial/ethnic categories of youth are too small in most cases to report findings for them separately.

Several post-high school outcomes are addressed both in the current and the earlier report (Wagner et al. 2005) on this subject, such as rates of postsecondary education enrollment and employment. However, with more youth with disabilities being out of high school in the later waves of data reported here, current analyses extend beyond those examined earlier. For example, chapter 2 not only examines cohort differences in enrolling in different kinds of postsecondary schools, it also examines the focus of the students' school programs and whether youth had completed their postsecondary education program by earning a degree, certificate, or license. Similarly, current analyses of employment outcomes (chapter 3) address several aspects of employment (e.g., duration, receipt of benefits, youths' perceptions of their job) that could not be addressed with the smaller samples of out-of-high school youth in earlier waves of data collection.

Overview of NLTS and NLTS2

NLTS2 is a 10-year-long study of the characteristics, experiences, and outcomes of a nationally representative sample of youth with disabilities who were 13 to 16 years old and receiving special education services in grade 7 or above on December 1, 2000. In comparison, NLTS was a 6-year long study of youth with disabilities who were in grade 7 or above and ages 13 through 21 in the 1985–86 school year.

Findings from both studies are intended to generalize to youth with disabilities nationally and to youth in each of the federal special education disability categories in use for students in the NLTS or NLTS2 age range at the time of each study. NLTS2 was designed to collect data on sample members from multiple sources in five waves, beginning in 2001 and ending in 2009. NLTS also collected data from multiple sources, however, in two rather than five waves, beginning in 1985 and ending in 1990.

Key features of the two studies are summarized in table 1. Details of the NLTS and NLTS2 design, sample, and analysis procedures are presented in appendix A.

The NLTS and the NLTS2 samples both were constructed in two stages. In both studies, the district sample was stratified to increase the precision of estimates, to ensure that low-frequency types of districts (e.g., large urban districts) were adequately represented in the sample, to improve comparisons with the findings of other research, and to make the studies responsive to concerns voiced in policy debate (e.g., differential effects of federal policies in particular regions, districts of different sizes). Three stratifying variables were used, including region, size (student enrollment), and community wealth.

A stratified random sample of school districts was selected from the universe of approximately 14,000 for NLTS and 12,000 for NLTS2, which served students receiving special education in at least one grade from 7th through 12th grades. These districts were invited to participate in the study, with the intention of recruiting approximately 300 districts in NLTS and 500 districts in NLTS2. In order for the studies to be nationally representative of youth with disabilities who attended the most common types of publicly-supported schools, all known state-supported "special schools"—i.e., those that served primarily students with hearing and visual impairments and multiple disabilities (80 in NLTS and 77 in NLTS2)—were invited to participate in the studies.

Table 1. Key features of NLTS and NLTS2

NLTS (referred to as cohort 1)	NLTS2 (referred to as cohort 2)
Study Duration	
• 1984 through 1993	• 2001 through 2010
Sample Members	
• Youth receiving special education, ages 13 through 21 in the 1983-84 school year. The oldest youth for whom data were collected were age 27 in Wave 2 (1990) and had been out of secondary school up to 5 years.	• Youth ages 13 through 16 and receiving special education in grade 7 or above in December 2000. The oldest youth were 26 when the last data were collected in 2009.
Population to Which Findings Generalize	
• Youth with disabilities as a whole nationally and youth in each federal special education disability category individually.	• Youth with disabilities as a whole nationally and youth in each federal special education disability category individually.
Data Sources	
• Wave 1: Parents (telephone interviews); school record abstracts (information abstracted by school personnel from students' high school records); principals (school background survey). • Wave 2: Parents (telephone interviews); youth (telephone interviews); school staff best able to describe students' overall school program (school program survey); principals (school background survey); students' high school transcripts.	• Wave 1: Parents (telephone interviews, mail survey); youth (direct assessment of academic abilities, youth in-person interview on attitudes toward school); teachers (general education teacher survey); school staff best able to describe students' overall school program (student's school program survey); principals (school characteristics survey); students' high school transcripts. • Wave 2: Parents (telephone interviews); youth (telephone interviews, mail survey, direct assessment of academic abilities, youth in-person interview on attitudes toward school); teachers (general education teacher survey); school staff best able to describe students' overall school program (student's school program survey); students' high school transcripts. • Waves 3 and 4: Parents (telephone interviews); youth (telephone interviews, mail survey); students' high school transcripts. • Wave 5: Parents (telephone interviews); youth (telephone interviews, mail survey).
Years of Data Collection	
• Wave 1 parent interviews/mail survey, 1987 • Wave 1 school data collection, 1985–86 or 1986–87 school year • Wave 2, parent/youth interviews, 1990	• Wave 1 parent interviews/mail survey, 2001 • Wave 1 school data collection and direct assessments of youth, 2001–2002 school year • Wave 2 parent/youth interviews and mail survey, 2003 • Wave 2 school data collection and direct assessments of youth, 2003–2004 school year • Wave 3, parent interview, youth interview/survey, 2005 • Wave 4, parent/youth interviews and mail survey, 2007 • Wave 5 parent/youth interviews and mail survey, 2009 • High school transcript collection, 2002–2009

The goal was to select from these districts and special schools a target sample of about 10,500 students in NLTS and 12,000 students in NLTS2. Extensive efforts to obtain consent to participate from eligible districts and the known universe of special schools resulted in 303 school districts and 22 special schools agreeing to participate in NLTS, and 501 school districts and 38 special schools agreeing to participate in NLTS2. Analyses of the NLTS2 district sample revealed that it closely resembled the universe of districts from which it was drawn on the sample's stratifying variables and on selected variables from the U. S. Department of Education's Office of Civil Rights database on the universe of school districts. Participating school districts and special schools provided rosters of students receiving special education services in the designated age range, from which the student samples were selected.

The rosters of all students in the NLTS and NLTS2 age range who were receiving special education services from each district and special school were stratified by primary disability category, as reported by the districts. Students then were selected randomly from each disability category. Sampling fractions were calculated that would produce enough students in each category so that, in the final study years, findings would generalize to most categories individually with an acceptable level of precision, accounting for attrition and for response rates to the parent/youth interviews. A total of approximately 10,370 students were selected and eligible to participate in NLTS, and 11,270 students were selected and eligible to participate in NLTS2.

Data Sources for Youth With Disabilities

Multiple data sources were used in this report to describe the differences in post-high school experiences of youth with disabilities. As noted earlier, the primary NLTS source was the Wave 2 parent/youth telephone interview and mail survey, conducted in 1990. For NLTS2, the primary source was the Wave 3 parent/youth telephone interview and mail survey, conducted in 2005.[13] In addition, constructed variables that describe the experiences of youth with disabilities since leaving high school incorporated data from the NLTS Wave 1 parent interview (conducted in 1987) and the NLTS2 Wave 2 parent/youth telephone interview and mail survey (conducted in 2003) for youth with disabilities who were out of high school in 1987 or 2003. School district rosters in both studies and the NLTS2 Wave 1 parent interview or mail survey also provided a small amount of data used in this report. NLTS and NLTS2 data sources are described briefly below and discussed in greater detail in appendix A.[14]

The data for out-of-high school youth with disabilities, the focus of this report, were obtained for approximately 2,580 NLTS sample members with responses to the NLTS Wave 2 survey and 2,620 NLTS2 sample members with responses to the NLTS2 Wave 3 survey, who

[13] NLTS2 instruments are available at www.nlts2.org.

[14] Because the data reported here come primarily from telephone interviews or mailed surveys that were requested by respondents during a telephone contact, no prior consent was required; respondents were free to indicate their consent by continuing with the interview or to decline and hang up. Interviewers provided respondents with the following information:
"This interview is voluntary. Everything you say will be kept completely confidential and you may choose not to answer any question that I ask you. Nothing you say will ever be reported individually about you, [YOUTH if parent was respondent], or your family, and no information you give will be shared with [YOUTH'S/YOUR] school. If you have any questions or concerns about the study, I can give you a toll-free number to call.

Table 2. NLTS and NLTS2 data sources for post-high school experiences of youth with disabilities included in this report

Source	Number	Percent of eligible youth
NLTS		
Total number of sample members with responses to Wave 2 survey, known to be out of secondary school at the time of the Wave 2 data collection	2,580	100.0
Number with Wave 2 survey data coming from:		
Youth telephone interview	2,150	83.3
Youth mail questionnaire	30	1.2
Parent telephone interview	270	10.5
Parent mail questionnaire	130	5.0
Number with data coming from Wave 1 parent telephone interview	2,580	100.0
Number with data coming from school and school district student rosters	2,580	100.0
NLTS2		
Total number of sample members with responses to Wave 3 survey, known to be out of secondary school at the time of the Wave 3 data collection	2,620	100.0
Number with Wave 3 survey data coming from:		
Youth telephone interview	1,600	61.1
Youth mail questionnaire	220	8.4
Parent telephone interview	800	30.5
Number with Wave 2 survey data coming from:		
Youth telephone interview	800	30.5
Youth mail questionnaire	70	2.7
Parent telephone interview	270	10.3
Number with data coming from Wave 1 parent interview	2,620	100.0
Number with data coming from school and school district student rosters	2,620	100.0

were known to be out of high school at the time of the NLTS Wave 2 or NLTS2 Wave 3 data collection (table 2).

For both studies, information on the outcomes of out-of-high-school youth with disabilities come from youth themselves in the majority of cases (see table 1), usually from the youth telephone interview. These respondents were youth with disabilities who were reported by parents to be able to answer questions for themselves by telephone. Youth with disabilities who were reported to be able to answer questions for themselves, but not by telephone (e.g., youth with hearing impairments) were sent a mail questionnaire with a subset of items from the telephone survey.[15] For youth with disabilities who were reported by parents not to be able to answer questions for themselves (e.g., youth with significant cognitive impairments), interviews were attempted with parents. In NLTS, parents who could not be reached by phone were mailed a questionnaire with a subset of items from the telephone interview; no parent mail survey was conducted in Wave 3 of NLTS2. Thus there are four sources of NLTS data for Wave 2 of NLTS and three sources for Wave 3 of NLTS2. Data from these sources were combined for the analyses reported here and subsetted to include only data for out-of-high school youth, aged 18 and older.

[15] Only a subset of items was included in the mail survey because the full set of items was considered too lengthy to be feasible for a mail questionnaire format.

NLTS Data

The NLTS instruments that provided information for this report included the following.

Wave 2 youth telephone interview. All wave 2 data collection began with an effort to contact parents of sample members by telephone. NLTS sample members eligible for a Wave 2 youth telephone interview included those (1) for whom working telephone numbers or addresses were available so that their parents could be reached by phone (a total of approximately 8,660 youth with disabilities), (2) who were not in the disability categories of deafness, multiply handicapped, deaf/blind, autism, or moderately, severely, or profoundly mentally retarded, and (3) who were not institutionalized (these latter two categories of youth with disabilities were not expected to be able to respond to a telephone interview independently).[16] For youth with disabilities who met the eligibility criteria, an initial telephone contact was made with parents of sample members, who completed items intended only for parent respondents. Then parents were asked whether the young adult son/daughter with disabilities was able to respond to questions about his/her experiences by telephone for him/herself, as noted above.[17] If parents responded affirmatively, interviewers asked to speak with the youth or asked for contact information to reach the youth in order to complete the youth portion of the interview. Telephone interviews were completed with approximately 2,150 out-of-high school youth with disabilities.

Wave 2 youth mail survey. Two categories of youth with disabilities were mailed questionnaires with a subset of items from the telephone interview: (1) youth whose parent indicated they would be able to respond to questions about their experiences themselves by telephone, but who could not be reached by phone, and (2) youth with hearing impairments. Overall, approximately 980 of the total of 2,580 youth with disabilities whose parents were contacted were mailed questionnaires. Questionnaires were returned by approximately 350 youth with disabilities (a 36 percent response rate), 30 of whom were out of high school; these are included in the sample that generated the findings reported in this document.

Wave 2 parent/guardian interview. In addition to sample members who completed a telephone interview or mail survey, parents completed a telephone interview for approximately 3,304 sample members who did not respond for themselves, either because they were considered unable to do so or because those who were reported able to respond could not be reached or refused to respond. In the latter case, parents were contacted to complete a subset of interview items. A total of approximately 270 youth with disabilities for whom parents were the sole respondents were out of secondary school and are included in the sample that forms the basis of this report.

Wave 2 parent/guardian mail survey. A questionnaire was mailed to parents for whom there were no valid telephone numbers on file or who, upon refusing to complete the telephone interview, stated they would complete a mail survey. The mail questionnaire included items related to key outcome variables, such as school enrollment status and residential information.

[16] See appendix A for more information on sample eligibility.

[17] At the end of parent part 1 of the NLTS phone interview, parents were asked, "My next questions are about jobs (YOUTH NAME) may have had, schools (he/she) may have gone to, and about (his/her) feelings about (him/herself) and (his/her) life. The questions are similar to those I've been asking you, where (he/she) will be asked to answer using scales, like "very well," "pretty well," "not very well," or "not at all well." The interview would probably last about 20 to 30 minutes. Do you think that (YOUTH'S NAME) would be able to accurately answer these kinds of questions over the telephone?"

Questionnaires were mailed to approximately 2,960 parents and were returned by approximately 540 parents, an 18 percent response rate. Approximately 130 mail questionnaire respondents were parents of out-of-high school youth with disabilities; their responses are included as part of the sample that generated the findings reported in this document.

Wave 1 parent/guardian interview. The initial wave of NLTS data collection involved parent telephone interviews. Data for two demographic items (youth's gender and race/ethnicity) were drawn from these Wave 1 interviews for the subset of out-of-high school youth with disabilities, which are included in the basis of this report. In addition, approximately 310 youth with disabilities were already out of high school in Wave 1. Four variables[18] that were created for this report indicate whether a youth had had a particular experience "since high school." Eighty-eight percent of out-of-high school respondents (approximately 2,270 youth with disabilities) had left high school since the Wave 1 data collection; thus, Wave 2 data were all that were required to generate values for these variables for them. However, for those already out of high school in Wave 1, data from both Waves 1 and 2 were needed to generate values for variables measuring experiences "since high school." The Wave 1 parent telephone interview produced data for approximately 310 youth with disabilities included in the subsample that forms the basis of this report.

School and school district student rosters. NLTS information about the primary disability category of sample members came from rosters of students in the NLTS age range receiving special education services in the 1985–86 school year under the auspices of participating school districts and state-supported special schools.

NLTS2 Data

The NLTS2 instruments that provided information for this report include the following:

Wave 3 youth telephone interview. NLTS2 sample members eligible for a Wave 3 youth telephone interview included those (1) for whom working telephone numbers or addresses for youth or their parents were available so that they could be reached by phone (a total of approximately 7,990 youth with disabilities) and (2) whose parents or guardians (referred to here as parents) had reported in the Wave 2 parent telephone interview (if interviewed at that time) or the Wave 3 parent interview (if interviewed in Wave 3 for the first time) that the youth could answer questions about his or her experiences by phone (approximately 3,070 youth with disabilities).[19] Wave 3 interview attempts were made directly with youth who were reported in Wave 2 to be able to participate in a telephone interview without attempts being made to contact parents in advance. For youth with disabilities whose parents were not interviewed in Wave 2 and, therefore, whose ability to participate in a telephone interview or mail survey was unknown, parent interviews were attempted first. Similar to NLTS, after making the initial telephone contact with the parents of sample members and completing items intended only for parent respondents, parents were asked whether their adolescent children with disabilities were able to respond to questions about their experiences by telephone for themselves. Parents who responded affirmatively and whose sample children were younger than age 18 then were asked to

[18] The four variables that focused on youth's experiences "since high school" included postsecondary school enrollment status, postsecondary school completion status, parenting status, and arrests.

[19] See appendix A for more information on sample eligibility.

grant permission for their children to be interviewed and told the kinds of questions that would be asked.[20] Parents of youth with disabilities ages 18 or older were informed of the kinds of questions that would be asked of the youth, but permission was not requested because the youth were no longer minors. Interviewers obtained contact information for these youth and attempted to complete telephone interviews with them. Telephone interviews were completed with approximately 2,810 youth with disabilities, 92 percent of the approximately 3,070 youth with disabilities who were eligible.[21] Approximately 1,600 respondents to the Wave 3 youth telephone interview were out-of-high school youth with disabilities.

Wave 3 youth mail survey. If parent respondents to the Wave 2 or Wave 3 telephone interview indicated that youth were not able to respond to questions about their experiences for themselves by telephone, interviewers asked whether youth would be able to complete a mail questionnaire. Parents of approximately 740 Wave 3-eligible youth with disabilities responded affirmatively, making their children eligible for a mail survey.[22] Mailing addresses were obtained for those sample members, and questionnaires were sent to the youth. Questionnaires were tailored to the circumstances of individual youth. For example, if a parent indicated in the telephone interview that a youth was employed, the questionnaire for that youth contained a section on employment experiences, which was not included in questionnaires for youth reported not to be employed. Questionnaires were returned by approximately 480 youth with disabilities, 65 percent of the approximately 740 youth with disabilities who were eligible. Approximately 220 mail questionnaire respondents were out-of-high school youth with disabilities; these are included as part of the sample that generated the findings reported in this document.

Wave 3 parent/guardian interview. In addition to sample members who completed a telephone interview or mail survey, parents completed a telephone interview for approximately 1,560 sample members who did not respond for themselves, either because they were reported to be unable to do so or because those who were reported as able to respond could not be reached or refused to respond. In the latter cases, parents were contacted to complete a subset of interview items that experience demonstrated could readily be answered by many parents (e.g., whether a youth was employed or enrolled in postsecondary education). A total of approximately 800 youth

[20] Parents were told that interview questions would pertain to "school or work and social activities, as well as a few questions about things like…." For youth younger than 18, the sentence was completed with "[his/her] attitudes and experiences, like ever having been arrested." For youth age 18 or older, the sentence was completed with "[his/her] attitudes and experiences, including smoking, drinking, and ever having been arrested"; items related to these kinds of risk behaviors were asked only of youth age 18 or older. A total of 164 parents reported that their children could respond to the telephone interview but did not give permission for their children to be interviewed (4 percent of those reportedly able to respond); the interview then continued with the parents and obtained additional information on subjects such as employment and postsecondary education. The parent continuation interview did not include any items addressed in this report; hence, these children are not represented in the findings presented here. Analyses of the disability category distribution and demographic factors of youth who were able to respond and given permission to do so and those who were not permitted to be interviewed revealed no significant or sizable differences between the two groups.

[21] If a youth could not be reached by phone or did not return a mailed questionnaire, an attempt was made to recontact the parent and complete the second part of the telephone interview with the parent, which included only items readily answerable by many parents about their adolescent and young adult children with disabilities.

[22] Permission for youth to be sent a mail questionnaire was not asked of parents because that questionnaire did not contain items considered potentially sensitive and because parents' providing a mailing address for the questionnaire was considered to be permission to send it.

with disabilities for whom parents were the sole respondents were out of secondary school, and these are included in the sample that forms the basis of this report. Out-of-high school youth with disabilities whose parents responded for them did not differ significantly in their disability category, age identified as having a disability, or functional abilities.

Wave 2 parent/guardian and youth interview/survey. As mentioned previously, four variables that were created for this report indicate whether a youth with a disability had had a particular experience "since high school." Fifty-one percent of out-of-high school respondents (approximately 1,140 youth) had left high school since the Wave 2 data collection; thus, only Wave 3 data were required to generate values for these variables for them. However, the remainder of the out-of-high school respondents (approximately 1,100 youth with disabilities) were already out of high school in Wave 2. Thus, data from both Waves 2 and 3 needed to be taken into account to generate values for variables measuring experiences "since high school." Wave 2 data also were used to determine whether sample members had completed high school or left without completing and the year in which they left. Wave 2 data collection mirrored procedures followed for Wave 3. The Wave 2 youth telephone interview produced data for approximately 800 youth with disabilities included in the sample that forms the basis of this report, the mail questionnaire generated data for approximately 70 youth with disabilities, and parent interviews provided data for approximately 270 youth with disabilities, for a total of approximately 1,140 sample members.

Wave 1 parent/guardian interview/survey. The initial wave of NLTS2 data collection involved parent telephone interviews and a mail survey of parents who could not be reached by telephone. Data for two demographic items (youth's gender and race/ethnicity) were drawn from these Wave 1 sources for the subset of out-of-high school youth with disabilities, which are included in the basis of this report.

School and school district student rosters. Information about the primary disability category of NLTS2 sample members came from rosters of students in the NLTS2 age range receiving special education services in the 2000–2001 school year under the auspices of participating school districts and state-supported special schools. Additionally, data on the racial/ethnic background of sample members were taken from this source when they were included on rosters. In the absence of roster data on youth's racial/ethnic background, data were taken from the Wave 1 parent interview or mail survey.[23]

[23] Student rosters provided race/ethnicity data for 97 percent of the sample.

Data Source for Comparisons With Youth in the General Population

When similar data items were available, comparisons were made between youth with disabilities and the same-age youth in the general population.[24] Comparison data were taken from the Current Population Survey (CPS), 1990 and 2005. The CPS is a monthly survey of 50,000 households conducted by the Bureau of the Census for the Bureau of Labor Statistics. The nationally representative sample included in this monthly survey was selected to represent the civilian noninstitutional population in the United States. Comparison data for this report were taken from the October, 1990, and October, 2005, data collections for youth who were 18 to 21 years old and out of high school. Calculations were made from public use data available at http://www.census.gov/cps/, using the Data Ferret Web tool. [25] Readers should be aware that the population of youth with disabilities in this age range differs from the general population of youth in ways other than disability status (e.g., the population of youth with disabilities is 63 percent male; see appendix B for further description of the populations represented in NLTS and NLTS2).

Analytic Adjustments to Increase the Comparability of Study Samples

NLTS and NLTS2 have many design features that enable comparisons between them; however, differences exist between the two studies that have required analytic adjustments for comparisons to be valid, particularly related to age, disability category, and household income.

Age

One important difference between NLTS and NLTS2 were the age ranges for youth with disabilities included in the two studies. At the time of the NLTS Wave 2 parent/youth interviews/surveys, youth were 18 through 26 years old, whereas at the time of the NLTS2 Wave 3 parent/youth interview/surveys, NLTS2 youth were ages 17 through 21. To improve comparability of the studies, youth of similar ages, 18 through 21, were selected from each sample. The two samples then were weighted to have the same distribution of these age groups: 15 percent were 18 years old, 30 percent were 19, 38 percent were 20, and 17 percent were 21 years old.

[24] Youth with disabilities are included in the general population comparison sample because excluding them would require using self-reported disability data, which frequently are not an accurate indicator of disability, resulting in both over- and underestimations of disability. For example, a large proportion of self-identified disabilities in postsecondary youth were visual impairments because of confusion by students who wear glasses. In addition, NLTS2 findings indicated that less than one-third (32 percent) of youth with disabilities who were identified by their secondary school as having a disability considered themselves to have a disability by the time they were age 17 or older.

[25] For most CPS items only the variable name and description were available, rather than the full item wording. In addition, some of the CPS variables were combined to make them equivalent to NLTS/NLTS2 items. For these reasons, the CPS survey questions will not be presented in the report chapters.

Disability Category

Another difference between the study samples that has been accommodated through analytic adjustments to enhance comparability involves the system of disability classification in use at the time each of the studies were conducted. In both studies, information about the nature of youths' disabilities came from rosters of all students in the age ranges included in the studies and receiving special education services in the 1985–86 or 2000–01 school years under the auspices of participating local education agencies (LEAs) and state-supported special schools. Each student was assigned to a disability category on the basis of the primary disability designated by the student's school or district. In 2001 the federal disability categories specified for students differed from those in 1986:

- There were categories in 2001 that were not in use in 1986, specifically the categories of autism and traumatic brain injury.
- The categories of deaf and hard of hearing in 1986 were included in the one disability category of hearing impairment in 2001.

Because students with autism were included in the other health impairment category in 1986, comparisons for this report required that the NLTS2 youth with autism (approximately 180 youth) be included in the other health impairment category[26] as well.

Youth in the 2001 traumatic brain injury category were assigned to a disability category compatible with the disability categories in effect in 1986, based on disability information provided by parents during the telephone interview. Traumatic brain injuries can affect varied areas, such as communication, physical, or learning abilities, depending upon the structures of the brain that had been damaged. Parents of youth with traumatic brain injuries usually described the functional disabilities experienced by their child, rather than, or in addition to using the term, "traumatic brain injury," when they were asked about their child's disability during the parent interview. This parent data provided the basis for recoding the 2001 traumatic brain injury category into the 1986 disability categories. Most youth in the 2001 traumatic brain injury category were included in the orthopedic (approximately 50 youth), learning disability (approximately 25 youth), or other health impairment (approximately 20 youth) categories. They also were placed in the multiple disability (approximately 5 youth), visual impairment (approximately 5 youth), speech/language impairment (approximately 5 youth), hearing impairment (1 youth), or mental retardation (1 youth) categories.

In addition, the two NLTS categories of deaf (approximately 310 youth) and hard of hearing (approximately 320 youth) were combined to be comparable to the single NLTS2 category of hearing impairment. In both cohorts, students with deaf-blindness were included in the multiple impairments category because there were too few to report separately (approximately 10 youth in NLTS and 30 youth in NLTS2).

[26] Although in 1986 this category was referred to solely as "other health impairment," in this report the combined 1986/2001 category will be referred to as the "other health impairment and autism" category.

Household Income

Classifying the income of parents' households in NLTS and NLTS2 relied exclusively on information provided during the parent interview/surveys. NLTS income data were reported in six broad categories, e.g., "under $12,000" or "$25,000 to less than $38,000." NLTS2 income data were reported in 16 categories, increasing in $5,000 increments, e.g., "$10,001 to $15,000," or "30,001 to $35,000." Because income was reported in categories instead of specific amounts, it was not possible to adjust NLTS income for inflation to make them equivalent to 2005 dollars, the preferred approach for comparing income groups over time. As an alternative, three income categories were created—lowest, middle, and highest—each of which encompassed similar proportions of the income distribution in the two studies. Thus, the comparisons reported indicate how various outcomes differed for the designated lowest income group in NLTS relative to the designated lowest income group in NLTS2. Ideally, the three groups each would contain approximately one-third of the income distribution in each study. However, the limited number of response categories used in NLTS and the fact that the distribution was heavily skewed to the few lowest income categories precluded forming groups that fairly evenly divided the full income distribution. The grouping strategy that created the most closely equivalent groups across the two students assigned 52 percent of the NLTS sample to the lowest income category, 31 percent to the middle category, and 17 percent to the highest category. In NLTS2, the percentages are 48 percent, 34 percent, and 18 percent, respectively. Thus, the categories indicate income relative to other youth in each study, not a fixed income amount.

Youth Included in the Report

The youth with disabilities who are the focus of this report represent only the subset of youth with disabilities who received special education services in secondary school in the 1985–86 or 2000–01 school years, not the entire populations. The full population to which the NLTS sample generalizes is a cohort of youth who were 13 to 21 years old and received special education services in grade 7 or above as of December 1, 1985. The full population to which the NLTS2 sample generalizes is a cohort of youth who were 13 to 16 years old and received special education services in grade 7 or above as of December 1, 2000. Weights for analyses reported in this document were calculated so that all youth with disabilities who were out of secondary school and for whom a telephone interview or mail survey was completed or for whom parents responded to the second part of the parent interview generalize to all youth with disabilities who were out of high school. Weights were computed adjusting for various youth and school characteristics used as stratifying or poststratifying variables. (See appendix A for additional information related to sample weighting.)

Analysis Approaches

Analyses reported in this document involve simple descriptive statistics (e.g., percentages, means), bivariate relationships (i.e., cross-tabulations), and correlations. All statistics were weighted to be representative of a larger population of students (as discussed earlier). These analysis approaches excluded cases with missing values; no imputation of missing values was conducted.

Statistical tests examining differences between independent subgroups or between responses to different items given by the same group that involve categorical variables with more than two

possible response categories were conducted by treating each of the possible response categories as separate dichotomous items. For example, each of the three possible response categories to a question regarding liking a job ("very much," "fairly well," and "not much or not at all") was treated as a separate dichotomous item. The percentages of youth with disabilities who gave each response were then compared across disability or demographic groups or across different questionnaire/interview items. This approach, rather than using scale scores (e.g., the average response for a disability group on a 3-point scale created by assigning values of 1 through 3 to the response categories), was adopted for two reasons: the proper scaling for the response categories was not apparent, and it was felt that reporting differences in percentages responding in each of the response categories would be more meaningful and easier for readers to interpret than reporting differences in mean values.

Rather than test for differences between all independent subgroups (e.g., youth in different disability categories) simultaneously (e.g., using a k x 2 chi-square test of homogeneity of distribution, where k is the number of disability groups), the statistical significance of differences between selected pairs of independent subgroups was tested. This approach was followed because the intent was to identify significant differences between specific groups (e.g., youth with learning disabilities are significantly more likely than those with mental retardation to report that they are cared for "a lot" by parents), rather than to identify a more general "disability effect" (e.g., the observed distribution across disability categories differs significantly from what would be expected from the marginal distributions) for the variable of interest.

The test statistic used to compare Bernoullian-distributed responses (i.e., responses that can be allocated into one of two categories and coded as 0 or 1) for two independent subgroups is analogous to a chi-square test for equality of distribution (Conover 1971) and approximately follows a chi-square distribution with one degree of freedom. However, because the test statistic itself is more similar in form to the square of a two-sample t statistic with unequal variances[27] (Satterthwaite 1946) and because a chi-square distribution with one degree of freedom is the same as an F distribution with one degree of freedom in the numerator and infinite degrees of

[27] In the case of unweighted data, two percentages are usually compared by using nonparametric statistics, such as the Fisher exact test. In the case of NLTS2, the data were weighted, and the usual nonparametric tests would yield significance levels that are too small, because the NLTS2 effective sample size is less than the nominal sample size. Instead, to test for the equality between the mean values of the responses to a single survey item in two disjoint subpopulations, we began by computing a ratio where the numerator was the difference of the sample means for those subpopulations. (In the case of Bernoulli variables, each mean was a weighted percentage.) The denominator for the ratio was the estimated standard error of the numerator, where the standard errors were adjusted to take into account clustering, stratification, and unequal weights. This test statistic is essentially equivalent to a two-sample t test for independent samples (Welch 1947) with design effect adjustments. The adjustment to the variances were determined in a design effect study that compared traditionally calculated variances with those calculated using 32 balanced repeated replicate weights. Sample sizes (and consequently degrees of freedom) for Student t types of ratios were typically reasonably large (i.e., never fewer than 30 in each group), so the ratio follows, by the Central Limit Theorem (Wilks 1962), an approximate normal distribution. For a two-tailed test, the test statistic is the square of the ratio, which then follows an approximate chi-square distribution with one degree of freedom. Because a chi-square distribution with one degree of freedom is the same as an F distribution with one degree of freedom in the numerator and an infinite number of degrees in the denominator, the test statistic approximately follows an F (1, infinity) distribution. Since the application of adjustments from the design effect study tended to slightly overestimate the standard errors from balanced repeated replicates, even with the use of infinite degrees of freedom, rather than 31 degrees of freedom, the end result was a slight overestimation of the p values.

freedom in the denominator (Johnson and Kotz 1970), this statistic can be considered the same as an *F* value; it also can be considered "chi-squared."

Technical Notes

Readers should remember the following issues when interpreting the findings in this report:

- **Purpose of the report.** The purpose of this report is descriptive; as nonexperimental studies, NLTS and NLTS2 do not provide data that can be used to address causal questions. No attempt is made to attribute cohort differences in the factors explored in this report to differences in the populations of youth (see appendix B for documentation of cohort similarities and differences) or to any other factors. Further, no attempt is made to "validate" respondents' reports with information on their understanding of the survey items or with third-party information on their experiences (e.g., from employers or postsecondary education institutions). In addition, the report does not attempt to explain why parents or youth responded as they did or why responses differ for youth in different subgroups (e.g., disability categories).
- **Subgroups reported.** In each chapter, the descriptive findings are reported for the full sample of youth with disabilities; those findings are heavily influenced by information provided by youth with learning disabilities, who constitute 62 percent of the weighted NLTS sample and 64 percent of the weighted NLTS2 sample (see appendix B). Youth with emotional disturbances, mental retardation, other health impairments, and speech/language impairments constitute 11 percent, 17 percent, 1 percent, and 4 percent of the weighted NLTS sample, respectively and 12 percent, 11 percent, 6 percent, and 4 percent of the weighted NLTS2 sample, respectively. The other seven categories together make up less than 5 percent of the weighted sample in both studies. Findings then are reported separately for youth in each federal special education disability category (as described earlier). Comparisons also were conducted between groups of youth with disabilities who differed in school-leaving status, years since leaving high school, gender, race/ethnicity, and household income. These bivariate analyses should not be interpreted as implying that a factor on which subgroups are differentiated (e.g., disability category) has a causal relationship with the differences reported. Further, readers should be aware that demographic factors (e.g., race/ethnicity and household income) were correlated among youth with disabilities, as well as being distributed differently across disability categories (e.g., youth in the category of mental retardation are disproportionately likely to be African American, and those in the other health impairment category were disproportionately likely to be White, relative to the general population; see appendix B for percentage of youth in both studies, within each disability category, by demographic characteristics).[28] The complex interactions and relationships among subgroups relative to the other variables included in this report (e.g., postsecondary enrollment status) have not been explored.

[28] See Wagner et al. (1991) and Wagner et al. (2003) for relationships of demographic factors and disability categories for the full NLTS and NLTS2 samples.

- **Categorizing students by primary disability.** Information about the nature of students' disabilities came from rosters of all students in the NLTS and NLTS2 age ranges receiving special education services in the 1983–84 or 2000–01 school year (respectively) under the auspices of participating LEAs and state-supported special schools. In analyses in this report, each student is assigned to a disability category on the basis of the primary disability designated by the student's school or district. Although there are federal guidelines in making category assignments, criteria and methods for assigning students to categories vary from state to state and even between districts within states, with the potential for substantial variation in the nature and severity of disabilities included in the categories. Therefore, NLTS and NLTS2 data should not be interpreted as describing students who truly had a particular disability, but rather as describing students who were categorized as having that primary disability.
- **Differences between NLTS and NLTS2 samples in descriptive subgroups.** As described earlier in this chapter, differences exist between NLTS and NLTS2 that required analytic adjustments to age, disability category, and household income, for comparisons between the studies to be valid. After these adjustments had been made, differences remained between the NLTS and NLTS2 samples in two of the subgroups included in this report: the other health impairment/autism disability category and the high school completion status variable (see appendix B table B-1). Consistent with the increasing number of students identified with autism (Volkmar et al. 2004), the NLTS2 sample included significantly more youth in the other health impairment/autism category than the NLTS sample (6 percent vs. 1 percent, $p < .01$). In addition, as presented in previous reports comparing the experiences of youth with disabilities in NLTS with those in NLTS2,[29] youth in NLTS2 were more likely to have completed high school than those in NLTS (85 percent vs. 70 percent, $p < .001$).
- **Differences between NLTS and NLTS2 in item wording.** Extensive efforts were made to ensure the comparability of the two studies and that the wording of most NLTS and NLTS2 survey items are identical. A few items have minor wording differences, which may account for different responses. Survey items are included as chapter footnotes and wording differences are described there.
- **Findings are weighted.** NLTS and NLTS2 were designed to provide a national picture of the characteristics, experiences, and achievements of youth with disabilities in the studies' age ranges as they transition to young adulthood. Therefore, all the statistics presented in this report are weighted estimates of the national population of students receiving special education in the studies' age groups and of each disability category individually who satisfied the studies' eligibility requirements (i.e., who were out of high school).
- **Standard errors.** For each mean and percentage in this report, a standard error is presented that indicates the precision of the estimate. For example, a variable with a weighted estimated value of 50 percent and a standard error of 2.00 means that the value for the total population, if it had been measured, would lie between 46 percent and 54 percent, with 95 percent confidence (i.e., within plus or minus 1.96 x 2, or

[29] See Wagner, Newman, and Cameto (2004)

3.92 percentage points of 50 percent). Thus, smaller standard errors allow for greater confidence to be placed in the estimate, whereas larger ones require caution.

- **Combined youth self-report and parent-report data.** If an NLTS Wave 2 or NLTS2 Wave 3 youth interview/survey was completed, youth's responses to these items were used in this report. In both studies, if a youth interview/survey could not be completed for an eligible youth or if a youth was reported by parents not to be able to participate in an interview/survey, parent responses were used. For the subsample of out-of-high school youth with disabilities included in this report, the youth interview/survey was the source of data for post-high school outcomes for 84 percent of NLTS youth and for 70 percent of NLTS2 youth, and the parent interview was the source for 16 percent of NLTS youth and 30 percent of NLTS2 youth who did not have a youth interview. Combining data across respondents raises the question of whether parent and youth responses would concur—i.e., would the same findings result if parents' responses were reported instead of youth's responses. When both parents and youth were asked whether the youth belonged to an organized community group, currently worked for pay, worked for pay in the past 2 years, and the wages currently employed youth with disabilities earned per hour, their responses agreed from 70 percent to 91 percent of the time in NLTS and from 69 percent to 80 percent of the time in NLTS (analyses presented in appendix A).
- **Small samples.** Although NLTS and NLTS2 data are weighted to represent the population, the size of standard errors is influenced heavily by the actual number of youth in a given group (e.g., a disability category). In fact, findings are not reported separately for groups that do not include at least 30 sample members because groups with very small samples have comparatively large standard errors. Therefore, readers should be cautious in interpreting results for groups with small sample sizes and large standard errors.
- **Significant differences.** A large number of statistical analyses were conducted and are presented in this report. Because no explicit adjustments were made for multiple comparisons, the likelihood of finding at least one statistically significant difference when no difference exists (i.e., "false positives" or type I errors) in the population is substantially larger than the type I error for each individual analysis. To partially compensate for the number of analyses that were conducted, we have used a relatively conservative p value of $< .01$ in identifying significant differences. The text mentions only differences reaching that level of significance. If no level of significance is reported, the group differences described do not attain the $p < .01$ level. Readers also are cautioned that the meaningfulness of differences reported here cannot be inferred from their statistical significance.

Organization of the Report

This report is organized to provide information on differences between NLTS and NLTS2 in post-high school outcomes for youth with disabilities. Chapter 2 describes the differences in youth's postsecondary education enrollment overall and in 2- and 4-year colleges and vocational or trade schools specifically; features of their educational experience, such as their primary focus of coursework and their postsecondary school completion goals and completion rates. Chapter 3

considers differences in the current employment status of out-of-high school youth with disabilities. Differences in characteristics of youth's current or most recent job and job search experiences also are described. Chapter 4 addresses differences in the extent to which youth with disabilities were productively engaged in school or work at the time of the interview.

Differences in the household circumstances of youth with disabilities are considered in chapter 5, including the extent to which they were living away from home, the prevalence of marriage and parenting, and aspects of their financial independence. The final chapter focuses on differences in the social and community involvement of youth with disabilities, including their community participation in both positive and negative ways, such as participation in organized groups and volunteer activities, and involvement with the criminal justice system.

This report documents the extent and direction of differences for post-high school youth with disabilities as a whole and for key subgroups. Findings are presented for youth in the nine federal special education disability categories that were in use in both 1987 and 2001, when NLTS and NLTS2 samples were selected. Differences also are described for youth with disabilities who varied in their school-completion status, their length of time since leaving high school, gender, their parents' household income, and their racial/ethnic category.

Appendix A provides details of the NLTS and NLTS2 design, sample, measures, and analysis approaches. Appendix B presents data on the characteristics of youth with disabilities included in the out-of-high school samples of both studies.