

**Institutional Responses to Reduce Inequalities in College Outcomes:  
Remedial and Developmental Courses in Higher Education**

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## **I. INTRODUCTION**

Academic preparation is an important predictor of success in college. Numerous studies link the types of courses students take in high school to their performance in higher education. For example, Adelman (1999) provides a detailed study of college access and degree completion among a cohort of students who were in the tenth grade in 1980. He finds that a student's academic background, defined by measures of academic content and performance in secondary school such as high school curriculum intensity, class rank and GPA, are the most critical factors in determining college enrollment and success. However, the preparation students have when entering college often is below what is required and varies greatly by background. Adelman finds that students differ significantly in the types of courses they take and how well they perform by background. In a recent update, Adelman (2006) finds curriculum to be even more compelling in terms of its role in degree completion. In another study, Greene and Foster (2003) found that only 32 percent of students leave high school at least minimally prepared for college. The proportion is much smaller for Black and Hispanic students (20 and 16 percent, respectively).<sup>1</sup> There are also significant gaps in test scores by race and income (Jencks and Phillips, 1998). Therefore, while academic preparation is a problem for many students entering college, it is a problem that especially affects low-income and minority students.

One solution to inadequate academic preparation among colleges and universities has been to place students in remedial courses. Also called developmental or basic skills courses, these classes are designed to address the deficiencies and prepare student for subsequent college success.<sup>2</sup> This practice has been around as early as the 17<sup>th</sup> century when Harvard College assigned tutors to under-prepared students studying Latin (IHEP, 1998). However, during the

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<sup>1</sup> Greene and Foster (2003) define being minimally "college ready" as: (i) graduating from high school, (ii) having taken four years of English, three years of math, and two years of science, social science, and foreign language, and (iii) demonstrating basic literacy skills by scoring at least 265 on the reading NAEP.

<sup>2</sup> In this paper, we will refer to all types of below-college-level courses as remedial. This also includes "basic-skills training" and "nontraditional coursework," other names for developmental courses. We acknowledge that different areas of the country and stakeholders may have other preferable names.

20<sup>th</sup> century, the increased demand for higher education by students from all backgrounds accelerated the need for remediation in higher education. Moreover, given the correlation between income and educational inequality and the need for remediation, remediation has become a popular policy tool aiming to reduce inequalities. By 1995, 81 percent of public four-year colleges and 100 percent of two-year colleges offered remediation (NCES, 1996).

In 2001, colleges required nearly one-third of first-year students to take remedial courses in reading, writing, or mathematics (NCES, 2003). Moreover, there is some evidence that the proportion of students in need of college remediation has been growing. According to the NCES (1997), 39 percent of colleges surveyed reported that remedial enrollments had increased during the last five years. In Ohio, while only 17.8 percent of recent higher graduates enrolled in math remediation in 1988, the proportion had risen to 30 percent by 2004 ([www.empt.org](http://www.empt.org) accessed November 9, 2003, Ohio Board of Regents 2005). This growth has been principally located at community and technical colleges (Secondary and Higher Education Remediation Advisory Commission, 1997).

While the use of remedial courses by postsecondary institutions is widespread, little is known about the effectiveness of such interventions. It appears that states and colleges know little about whether their remediation programs are successful along any dimension. According to the Southern Regional Education Board, few states have exit standards for remedial courses. (Crowe, 1998). Moreover, a study of 116 two-year and four-year colleges found only a small percentage performed any systematic evaluation of their programs (Weissman, Rulakowski, and Jumisko, 1997). On one hand, the courses may help under-prepared students gain the skills necessary to excel in college. On the other hand, by increasing the number of requirements, extending the time to degree, and effectively restricting the majors available to students (due to the inability to enroll in advanced coursework until remedial courses are completed,) remediation may negatively impact college outcomes such as persistence and long-term labor market returns.

Moreover, it is not obvious what level of proficiency is required for college success and how this differs by subject area. According to Phipps (1998), “Conjecture and criticism has filled the void created by the lack of basic information.”

At an estimated annual cost in the billions (Breneman and Haarlow, 1997), the debate about the merits of investing in remediation has intensified in recent years. There are many questions about whether remediation is worthwhile: Do the courses help students succeed in college? What is the best way to perform remediation? Could the courses be offered in more limited, less expensive ways? States are currently confronting these questions by considering ways to limit remediation, shift its location, or pass on the costs of the courses to students or high school districts. However, they do so with little information on the students who need remediation and the effects of the courses on their outcomes. This chapter attempts to address this hole in the literature by examining the role of remediation in higher education.

### ***The Context of the Study***

While this chapter reviews information on remediation nationwide, the empirical analysis focuses on students attending public colleges and universities in Ohio. Using a unique database of college students maintained by the Ohio Board of Regents (OBR), we provide a detailed picture of remediation in the fifth largest public higher education system in the country. With longitudinal information from college transcripts, applications, and standardized tests, the analysis tracks Ohio students who began at a public college in fall 1998 over the course of six years.<sup>3</sup> Although this paper focuses on remediation in Ohio, the results are important and should also have external validity. Ohio's college enrollment and remediation rates are similar to national patterns. The percentages of Ohio public school students who graduate from high school and enter college the following fall are near the national averages (Mortenson, 2002), and

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<sup>3</sup> Four Ohio colleges without clear records on which courses were considered remedial during the 1998-99 school year are excluded (Kent State University, University of Cincinnati, Hocking Technical College, and Lima Technical College).

while 27 percent of first-time freshmen enrolled in remedial math nationally in 1995 (NCES, 1996), 29 percent did so in the state.

Ohio is an exemplary case for studying remediation because it is confronting many of the questions and concerns surrounding the debate on remediation. The magnitude of the number of students involved and the costs of remediation have parents, students, and policymakers in Ohio concerned about the value of the programs (Sternberg and Thomas, 2002). Another compelling reason to study Ohio is that it plays a prominent role in higher education. The only states with greater numbers of students in public colleges are California, Texas, New York, and Illinois (NCES, 2000). Moreover, Ohio reflects the complete spectrum of communities, labor markets, and higher education options that exist across the nation. Ohio has a mixture of selective and nonselective four-year institutions as well as two-year community and technical colleges spread geographically across the state.

Table 1 provides summary statistics of the sample of Ohio students. As is typical in higher education, the sample is slightly more female (53.5 percent), and the percentage of the sample that is African-American is similar to national college proportions (Hispanic and Asian students are underrepresented). A little over half of the first-time students for the fall 1998 term are full-time while a quarter are taking less than six credits. The columns display mean statistics for the different types of institutions within the state. As expected, students at the selective four-year universities had a higher mean ACT score than those at other schools.<sup>4</sup> Students at the selective institutions also tend to be younger, white, and full-time. The two-year colleges instead serve older students, students of color, and part-time or less than part-time students. Students at the state and local community colleges as well as the technical colleges report their educational intent. Approximately 64 and 61 percent report wanting to advance to receive either an

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<sup>4</sup> The selective universities are defined as “competitive” institutions by Barron's Educational Guides (1997) and include Bowling Green State University, Miami University, Ohio State University, Ohio University, and Youngstown State University.

Associate or Bachelor degree, respectively. However, only 10 percent of students at the Technical colleges report intent to go onto a 4-year degree while 35 percent of students at a state or local community college plan to do continue for a bachelor's degree.

**Table 1: Public Higher Education in Ohio - First-time Undergraduate Students in Fall 1998**

	All Schools	Four-year Universities		Two-year Colleges		
		Selective Four-year Universities	Non-selective Four-year Universities	University Branch Campuses	Community Colleges	Technical Colleges
Age in 1998	21.78 (7.88)	18.55 (1.94)	21.20 (6.88)	21.76 (8.19)	24.23 (9.57)	26.34 (11.25)
Female	53.51	55.20	53.75	55.46	50.66	58.14
White	80.52	85.53	71.01	82.82	78.66	92.04
Black	10.33	6.06	16.43	2.53	13.86	4.88
Hispanic	1.89	1.88	1.79	0.59	2.49	0.63
Asian	1.57	2.57	1.55	0.49	1.18	0.47
Race Unknown	4.29	2.67	7.93	13.06	1.91	1.43
Ohio Resident	91.92	85.03	93.59	94.09	95.61	97.85
Full-time Fall 1998	54.73	82.38	56.46	53.17	30.75	25.55
Part-time Fall 1998	20.19	11.88	21.56	20.54	26.00	31.38
Less than Part-time	25.08	5.75	21.99	26.29	43.24	43.07
Four-year Degree Intent	---	---	---	---	35.24	10.22
Two-year Degree Intent	---	---	---	---	28.48	50.40
ACT Composite Score (maximum 36)	21.37 (4.36) [37,227]	23.31 (3.99) [16,103]	20.73 (4.31) [8,041]	19.77 (3.68) [4,204]	19.25 (3.79) [7,816]	18.61 (3.56) [1,063]
Observations	65,977	20,538	12,145	6,280	23,385	3,629

Source: Ohio Board of Regents, Higher Education Information (HEI) system. Four Ohio colleges without clear records on which courses were considered remedial during the 1998-99 school year are excluded (Kent State University, University of Cincinnati, Hocking Technical College, and Lima Technical College).

Notes: Standard deviations are shown in the parentheses. The complete sample is not used in calculating the means for full/part/less than part-time due to missing information for approximately seven percent of the sample. The number of observations used to calculate the mean ACT score (i.e. the number who took the exam) is shown in brackets. The selective universities are defined as “competitive” institutions by Barron's Educational Guides (1997). Full-time is defined as taking 12 or more credit hours during the first term (Fall 1998); part-time constitutes taking six to 11 credits, and less than part-time means students took less than 6 credits during the first term. Four-year degree intent means the student noted wanting to get a bachelor's degree or transfer to a four-year college.

One limitation of the data is that it does not include students who attended private colleges. However, public colleges educate a much larger share of students than the private

sector and are the places where the role of remediation is most significant. According to the NCES (2003), only 12 percent of students take remedial courses at private, four-year colleges, so the exclusion of these schools does not present a serious impediment in assessing the effects of remediation. Unfortunately, because we are unable to track students who transfer to private institutions or schools outside of Ohio, these students are indistinguishable in the data from students who drop out of college completely. However, this potential measurement error is likely to be very small since the percentage of students thought to transfer to such schools is a small fraction of the total number of observed dropouts.<sup>5</sup>

### ***The Organization of the Chapter***

This chapter reviews how remediation is offered, the characteristics of the students in remediation, and the impact of remedial courses on educational outcomes. It is organized as follows. The second section focuses on the supply side of remediation: the institutional policies and procedures concerning remediation delivery and placement. The third section discusses the demand side, the characteristics of students placed into remediation. The fourth section reviews research on the impact of remediation on student outcomes. Section five concludes with a discussion of the implications of the research for policy.

## **II. THE INSTITUTIONAL SIDE OF REMEDIATION**

### ***The Role of Policy in Remediation***

States and university systems often set the policies that govern where, how, and who pays for remediation at public institutions within their borders. In 1995, state policies or laws governed remedial offerings at one-third of institutions (NCES, 1996), and states have become

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<sup>5</sup> According to information from the Integrated Postsecondary Education Data System (IPEDS), approximately 700 Ohio students transfer to the non-Ohio schools each year (this assumes that transfer students are geographically representative of the incoming freshman classes of these schools). If we assume that *all* 700 transfer students had just finished their first year of college, then only 5 percent of observed dropouts are mislabeled.

even more involved in the questions surrounding remediation in recent years. Some states, such as Connecticut and Arizona, do not allow remedial education at public institutions (Breneman and Haarlow, 1998). Other state university systems have chosen to expel students with severe academic deficiencies. For example, during the fall of 2001, the California State University system “kicked out more than 2,200 students – nearly 7 percent of the freshman class – for failing to master basic English and math skills” (Trounson, 2002). Among the 22 percent of colleges that do not offer remediation, approximately 27 percent note having an institutional policy that prohibited the offering of remedial courses (NCES, 1996). Supporters of such measures suggest that remedial courses remove the incentive to adequately prepare for college while in high school. Additionally, they question the appropriateness of work below college level at a postsecondary institution. Among the institutions that did not offer remedial courses, nearly a quarter reported fielding the courses out to other institutions (NCES, 1996).

While most two-year public colleges were required to offer courses, 15 percent of public four-years in 1995 were discouraged from offering the courses and/or restricted in some way (NCES, 1996). At least eight states, including Florida and Illinois, restrict remediation to two-year institutions. Several other states have recently considered such policies along with state college systems. With 70 percent of entering freshman failing at least one of the three placement tests and nearly 20 percent of all students taking remedial basic-skills courses, the CUNY System joined this group during the late 1990s. After much debate and revision to the original proposal, the final decision was made in November 1999 to phase out most remedial education at the system’s four-year colleges beginning in 2000 (Hebel, 1999).

Focusing on the finances behind remediation, states such as Texas, Tennessee, and Utah, have imposed or are considering limits on the government funding of remedial coursework (ESC, 2003). Time limits were imposed on remediation at about one-quarter of institutions (NCES, 1996). For example, the California State University system imposes a one-year limit on

remedial work. Finally, several initiatives seek to pass on the costs of remediation on to students. For example, in Florida, the legislature elected to require college students to pay the full cost of their remedial course work, an expense estimated to be four times greater than the regular tuition rate (Ignash, 1997).

Many blame the increasing role of college remediation on the K-12 system. During the CUNY controversy, Rudolph Giuliani voiced the sentiment of numerous government officials when he said that the “university system currently devotes far too much money and effort to teaching skills that students should have learned in high school” (Schmidt, 1998). Therefore, some officials have targeted the secondary school system for funding the courses. For a short time, Minnesota allowed colleges to bill secondary schools for the cost of their graduates’ remedial classes, and several secondary school districts in Virginia “guarantee” their diplomas by paying the remedial expenses of their former students (Wheat, 1998). However, this type of action would not fully address the problem of remediation as only 64 percent of students earn a standard high school diploma, and many argue that high school graduation standards do not coincide with the competencies needed in college (McCabe, 2001).

### ***The Organization and Delivery of Remedial Education***

The purpose of remedial education in most college systems is to provide under-prepared students the skills necessary to complete and succeed in college. In addition, remediation may serve several institutional needs. First, it allows colleges to offer access to growing numbers of students. It also provides individual departments the ability to generate enrollment, particularly in English and Math departments. Moreover, by separating weaker students into remedial courses, remediation allows colleges to protect institutional selectivity, regulate entry to upper level courses, and maintain the research functions of the college. Finally, remediation may serve as a tool to integrate students into the school population (Soliday, 2002). The bulk of

remediation is provided by non-selective public institutions, the point of entry for 80 percent of four-year students and virtually all two-year students.

Within the state of Ohio, public colleges and universities are independent and autonomous. Therefore, as shown by a 1995 study by the Ohio Legislative Office of Education Oversight (LOEO), each is free to set their admissions, placement, and remediation policies.<sup>6</sup> With the exception of two campuses (Miami University and Central State University), all public colleges in Ohio offer remedial courses to entering freshmen.<sup>7</sup> However, most remedial students take their courses at the community colleges. For example, about 55 percent of traditionally-aged, first-time freshman at community colleges enroll in remedial courses (OBR, 2001). In addition to their traditional students, half of two-year colleges provide remedial or developmental courses to local business and industry (NCES, 1996). As noted above, the practice of focusing remediation at the community colleges is similar to the experience in other states, and recent developments suggest more systems are moving more towards this model. Even though four-year colleges in Ohio offer remediation, some require students to take remedial courses at their satellite campuses.

Nationally, institutional policy towards remedial courses varies. About 10 percent of higher educational institutions do not offer academic credit for remedial courses. All public colleges in Ohio offer credit for remedial courses, though at most schools, this credit does not count toward degree completion and only becomes a part of the student's record (LOEO, 1995). Campuses also vary in the extent to which they require versus suggest that under-prepared students enroll in remedial or developmental work (OBR, 2002).

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<sup>6</sup> Seven Ohio public institutions (University of Akron, Cleveland State University, Central State University, Shawnee State University, University of Toledo, Wright State University, and Youngstown State University) are subject to the state's "open admissions" law that requires high school graduates to be admitted to the public school of their choice with certain exceptions. Students who have completed a college prep curriculum are generally accepted unconditionally. The other public four-year colleges (Bowling Green State University, University of Cincinnati, Kent State University, Miami University, Ohio State University, and Ohio University) have selective admissions based on academic background (Ohio Board of Regents 2001).

<sup>7</sup> Miami University also sends students to satellite campuses for remediation.

Remedial courses are often the gateway for students to enroll in upper level courses. About two-thirds of campuses nationally restrict enrollment in some classes until remediation is complete (NCES, 1996). This is also the case in Ohio where, similar to national trends, most schools prohibit students from taking college-level courses in the same subject area until remediation is complete. Some go even farther by barring students from taking any college-level work while enrolled in remediation (LOEO, 1995).<sup>8</sup> This requirement may restrict students' class schedules, and to the extent that remediation affects the classes that students can take, it may also discourage students from focusing on certain majors. For example, some majors are extremely demanding in terms of required credit hours and have little leeway for students to enroll in non-required classes. A student in remediation may have to take one semester worth of preparatory classes before they start the major; however, given course scheduling, the student may fall a year behind. On the one hand, this rigidity may just increase the time to graduation; however, it also discourages certain majors. One college administrator, for instance, claimed that students needing remediation in their first year often “have no possibility of completing an engineering degree and must choose other majors” (Dodd 2002).

At some colleges, remedial courses are offered institution-wide while others have the courses housed in individual departments. Another option for institutions and states is to outsource the remediation. Kaplan Educational Centers and Sylvan Learning Systems are major providers of remediation (Phipps, 1998). An evaluation of the relative effectiveness of Sylvan in serving students of Howard Community College found results at least as equal to the rates of success for those enrolled in a traditional course (Copenhaver, Irvin, and Novak, 1996). In our review, we focus on identifying whether remedial policies affect students' educational outcomes. There may be other benefits in terms of earnings and career. All measurable benefits, however,

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<sup>8</sup>Over four-fifths of campuses nationally restrict enrollment in some college-level classes until remediation is complete, and most require those in need of remediation to participate in the courses (NCES, 2003).

should be contrasted with the cost of remedial programs. While we review what is known about the costs of remediation, the primary data used in our analysis unfortunately do not include cost information nor data on students' work outcomes. We leave it for future analyses to determine whether the remediation programs are cost-effective.

### ***The Remedial Placement Process***

Because the average college student attends a nonselective institution to which he or she is almost assured admission, the remediation placement exam taken when first arriving on campus has become the key academic gate-keeper to postsecondary study. As Kirst notes earlier in this volume, since admission is virtually certain, students' first hurdle is their placement test. Nationally, the most widely used placement exams are the Computerized Adaptive Placement Assessment and Support Systems (COMPASS) and the Assessment of Skills for Successful Entry and Transfer (ASSET), each published by the ACT, Inc. The tests consist of a variety of tests to measure students' skill level. For example, the Asset exam is a written exam with as many as 12 subsections, including in depth assessment of students' writing, numerical, and reading skills.<sup>9</sup> While most students are identified using placement exams in reading, writing, and mathematics, some schools also use standardized test scores and high school transcripts to make assignments. After taking the placement exam, colleges assign students to a specific math course, oftentimes a remedial course, based on their scores. Typically, administrators make these designations based on "hard" cutoffs – students scoring below a given threshold are assigned to a remedial course.

In Ohio, all colleges require entering freshman to take placement exams, but due to the autonomous nature of each institution, the instruments vary by institutions. Colleges use different combinations of ACT and SAT scores, sections of the ASSET test, and institutionally-

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<sup>9</sup> Complete information on both the Asset and Compass exams is available at <http://www.act.org>.

developed subject-area tests to determine remedial placement. While there are statewide standards in Ohio to distinguish between remedial and college-level work, institutions differ in how they interpret these standards at the campus level. For example, the cut-off scores used to determine placement differ among institutions, reflecting the varying interpretations of what comprises college-level coursework (LOEO, 1995). A survey performed by Raymond Walters Colleges on placement mechanisms found significant differences in the level of performance required to qualify for college-level writing courses at colleges around Ohio. The cut-off scores for placement into writing remediation varied from 17 to 20 for the ACT, 410 to 580 for the SAT, and 26 to 44 for the ASSET test (Secondary and Higher Education Remediation Advisory Commission, 1997). Therefore, a student who might be placed into college-level courses at some Ohio colleges would be put in remediation at others.

Institutional rules on placement into remediation might differ for several reasons. First, placement policies and rates vary due to differences in their student bodies. For example, Ohio State University (OSU) is one of the most selective schools in Ohio, and its remediation program differs from that of Cuyahoga Community College (CYCC), the largest community college in the state. Students at OSU typically have higher test scores and more college preparation than students attending CYCC, and the demands of the curriculum at OSU are higher. However, even schools with similar student bodies vary in their remediation policies. This may partly be due to differences in the preferences of the administration likely to influence the role of remediation at a school. For example, the University of Toledo recently decided not to offer remediation courses due a change in the college leadership. Students requiring remediation are now referred to Owens Community College (Sheehan, 2002). The preferences of the departments responsible for remediation courses are also likely to be important in determining an institution's view of remediation. Some colleges in Ohio (e.g. University of Toledo, Case Western Reserve University) use different placement exams or give different weight to high school background

and preparation. The measurement error in the tests and the difference in weighting creates variation across similar students at different universities.

Another reason remediation may differ across colleges is due to costs. If the cost of remediation differs across schools, then colleges will vary in their placement policies. Particularly over time, as college budgets become more or less stringent, institutions may be more or less willing to spend money on remediation. Finally, the political economy of the surrounding area could explain differences in remediation. Local colleges and universities repeatedly report the percent of students requiring remediation. Since students living nearby are more likely to attend a given college, the college by necessity must develop a relationship with nearby secondary schools. A more expansive remediation policy might be an indictment of the quality of local education and there may be political pressure to require less formal remediation. While the political economy and secondary schools of the surrounding area might also be important in determining the role of remediation at a college, Bettinger and Long (2005) found that the characteristics of the local high schools and community were not related to the cutoffs for placement into remediation.

### ***The Cost of Remediation***

Breneman and Haarlow (1998) estimate that remediation costs \$1 billion a year, but this figure does not include private or proprietary colleges and most states surveyed had little data from which to give accurate assessments. When considering the costs, it is important to distinguish between recent high school graduates and nontraditional college students including adult learners and immigrants. While critics blame the K-12 system for the remediation of its recent graduates and suggest high schools should contribute to the costs associated with these students, most treat older students returning to higher education to upgrade their skills as a separate category.

In 2000, Ohio public colleges spent approximately \$15 million teaching 260,000 credit hours of high school-level courses to freshman; another \$8.4 million was spent on older students (OBR, 2001). These figures only take into account state subsidies as the state of Ohio offers instructional subsidies for courses granting academic credit. However, there are additional costs associated with items such as tuition expenditures, financial aid resources, and lost wages are not included in this estimate. The cost of remediation for the 20,000 freshman in the state amounted to an additional \$15 million in tuition.

According to the Arkansas Department of Higher Education (1998), remedial education is less costly than or approximately the same as core academic programs. An analysis of expenditure data in 1996-97 found that the direct and indirect costs per FTE were \$7,381 for remediation at four-year colleges and \$6,709 at two-year colleges.<sup>10</sup> In comparison, the cost of core programs ranged from \$7,919 to \$12,369 at the four-year colleges and \$6,163 to \$8,235 at the two-year colleges. The two primary reasons for the cost differences are class size and faculty compensation. For example, large courses taught by adjuncts are far less expensive than small seminars taught by full professors. Additionally, the use of equipment and technology can affect the cost of providing a course (Phipps, 1998).

In the CUNY system during 1996-97, a study conducted by Price Waterhouse found that colleges spent \$124 million on remediation. This constituted 23 and five percent of expenditures at two-year and four-year colleges, respectively. Further analysis suggests that the cost of remediation courses was approximately one-third less than the cost of other academic courses. At community colleges, schools spent \$4,660 per full-time equivalent (FTE) student for remediation courses in comparison to \$7,079 per FTE for all other academic programs. The courses were more expensive at four-year institutions: \$6,350 per FTE was spent on remediation

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<sup>10</sup> Because these figures include indirect costs such as libraries, registration, and plant maintenance, they should not be used to determine the savings associated with eliminating remediation.

in comparison to \$9,754 overall. Two-thirds of the costs for remediation were covered by tuition and student aid with city and state funding providing for the rest (CUNY, 1999).

The social costs of not offering remediation, however, are likely to be much higher than the institutional costs of the programs. While long-term solutions may rely on changes in K-12 and reforms that better link high school and college, several present and short-term concerns must be considered. Unskilled individuals have expenses associated with them such as unemployment costs, government dependency, crime, and incarceration. Moreover, the increasing demands of the economy in terms of skill encourage the nation to find an effective way to train its workers. As noted in a *Time* magazine article, eliminating remediation in higher education could “effectively end the American experiment with mass postsecondary education” (Cloud, 2002).

### **III. THE STUDENT SIDE OF REMEDIATION**

In this section, we review what is known about the students placed into remediation. We review the research literature as well as examine data from the public higher education system in Ohio. The results highlight how the backgrounds and level of academic preparation differs for students who participate in the courses versus those who avoid remediation.

#### ***Participation in Remedial Education***

The first major group of students in remedial education is under-prepared recent high school graduates, many of whom exit secondary school without grade-level competency or the proper preparation for college-level material. In Ohio, 37 percent of first-year students under the age of 19 fit into this category having graduated from high school without a college-prep curriculum (OBR, 2002). In addition, a substantial number of adult students enroll in developmental courses. Many of these workers were displaced by structural shifts in the labor

market and seek developmental courses to acquire the skills necessary for re-employment. Others are often recent immigrants or welfare recipients. Nationally, about 27 percent of remedial students were over the age of 30 (IHEP, 1998).

In Ohio during fall 1998, approximately 36 percent of first-time freshman were placed in remediation. As shown by Table 2, nearly 30 percent were placed in remedial math while 20 percent were in remedial English. While the numbers in math remediation were greater, participation in English remediation may be more serious as some evidence suggests that the seriousness of academic deficiencies differs by subject. McCabe (2000) asserts that reading remediation puts students at a greater disadvantage than math remediation.

**Table 2: Remediation in Ohio Public Higher Education**

	All Schools	Four-year Universities		Two-year Colleges		
		Selective Four-year Universities	Non-selective Four-year Universities	University Branch Campuses	Community Colleges	Technical Colleges
In Math or English Remediation	36.18%	14.25%	34.65%	43.90%	52.20%	48.83%
In Remedial Math	29.70%	11.07%	25.29%	36.89%	45.64%	34.75%
In Remedial English	20.08%	5.72%	21.27%	19.17%	29.69%	36.98%
Observations	65,977	20,538	12,145	6,280	23,385	3,629

Source: Ohio Board of Regents, Higher Education Information (HEI) system.

Notes: Standard deviations are shown in the parentheses. The credits completed are totals up to the spring 2002 term (four years). Credits earned at colleges with the quarter system have been converted to semester hours. The selective universities are defined as “competitive” institutions by Barron's Educational Guides (1997) and include Bowling Green State University, Miami University, Ohio State University, Ohio University, and Youngstown State University.

The proportion in remediation differs considerably by type of institution. Remediation rates are highest at the two-year colleges. Over half of first-time freshman took at least one remedial course during the fall 1998 term at the state and local community colleges. In contrast, only 14 percent of students at selective colleges took remedial math or English. This variation is at least partly explained by differences in the student bodies of the schools.

***The Backgrounds of Remedial Students***

To provide a detailed picture of the students in remediation by background, Table 3 gives the mean characteristics of students in and out of different types of remediation. At the four-year colleges, female students are overrepresented in math remediation and underrepresented in English remediation. Additionally, Black and Hispanic students are more likely to be found in remediation, particularly in both courses. Similar trends are also found at the two-year colleges. Full-time students and those seeking a four-year degree are also less likely to be in remediation than part-time or less than part-time students or those seeking a two-year degree.

**Table 3: Placement in and out of Remediation by Background (means)**

	Four-year Colleges				Two-year Colleges			
	None	Math Remed.	English Remed.	Math & English	None	Math Remed.	English Remed.	Math & English
Age in 1998	19.47 (4.70)	19.71 (4.49)	19.41 (4.10)	20.15 (4.63)	26.39 (11.44)	21.82 (6.89)	21.72 (6.93)	21.43 (6.11)
Female	54.41	62.87	44.74	52.87	48.52	59.34	48.87	55.55
White	83.52	75.60	68.90	54.19	83.21	86.03	80.43	70.30
Black	6.43	16.05	20.25	35.09	6.60	7.81	12.40	22.97
Hispanic	1.73	2.52	1.29	2.79	1.34	2.04	2.46	3.03
Asian	2.42	0.98	2.52	0.96	0.95	0.98	1.17	0.96
Ohio Resident	86.74	92.95	92.90	94.92	93.25	97.65	97.79	98.09
Full-time Fall 1998	79.34	55.00	58.80	36.11	31.49	42.40	38.02	34.35
Part-time Fall 1998	11.82	28.57	22.84	31.89	19.37	30.37	27.60	33.90
Less than Part-time	8.84	16.43	18.36	32.00	49.14	27.23	34.37	31.76
Four-year Degree Intent	---	---	---	---	40.11	55.20	43.32	45.32
Two-year Degree Intent	---	---	---	---	18.74	28.90	36.76	33.94
Observations	25,549	3,377	1,788	1,969	16,559	7,245	2,484	7,006

Source: Ohio Board of Regents, Higher Education Information (HEI) system.

Notes: Standard deviations are shown in the parentheses. The complete sample is not used in calculating the means for full/part/less than part-time due to missing information for approximately seven percent of the sample. Full-time is defined as taking 12 or more credit hours during the first term (Fall 1998); part-time constitutes taking six to 11 credits, and less than part-time means students took less than 6 credits during the first term. Four-year degree intent means the student noted wanting to get a bachelor's degree or transfer to a four-year college. Students at university branch campuses (two-year institutions) are assumed as having four-year degree intent.

Table 4 provides another perspective on which types of students end up in remediation. For each group as defined in the first column, the percentages denote the proportion of that group that was placed in math or English remediation. For example, 37 percent of students age 18 to 20 were in remediation while 46 percent of those ages 21 to 23 took the courses. At most of the institutions, remediation is concentrated among younger students (except for at the university branch campuses and selective four-year universities). Remediation is also more likely among female than male students at the community and technical colleges. In terms of race, remedial placement is more likely for Black and Hispanic students though one-third and one-quarter of white and Asian students, respectively, are also in the courses. Part-time students are the most likely to be in remediation.

**Table 4: Percentage of Group Placed in Remediation**

	All Schools	Four-year Universities		Two-year Colleges		
		Selective Four-year Universities	Non-selective Four-year Universities	University Branch Campuses	Community Colleges	Technical Colleges
Age 18-20	37.12	13.78	37.31	48.20	66.36	60.78
Age 21-23	45.70	35.08	28.21	55.66	51.39	55.30
Age 24+	31.69	40.53	26.19	27.61	32.29	37.54
Male	34.23	14.23	33.13	43.01	46.92	46.94
Female	37.87	14.26	35.95	44.62	57.34	50.19
White	33.90	12.91	29.96	47.97	49.29	47.75
Black	59.84	35.37	57.89	65.41	69.78	66.67
Hispanic	46.79	18.60	41.74	72.97	65.35	56.52
Asian	25.41	6.45	33.51	29.03	52.17	82.35
Full-time Fall 1998	27.30	10.41	26.77	42.98	62.16	52.29
Part-time Fall 1998	53.15	29.90	48.66	64.50	60.39	67.75
Less than Part-time	38.55	33.70	42.14	29.68	40.56	34.31
Four-year Degree Intent	---	---	---	---	64.20	54.72
Two-year Degree Intent	---	---	---	---	64.38	60.03

Source: Ohio Board of Regents, Higher Education Information (HEI) system.

Notes: The figures reflect the percentage of that group that was placed in remediation at that type of institution. The selective universities are defined as “competitive” institutions by Barron's Educational Guides (1997) and include Bowling Green State University, Miami University, Ohio State University, Ohio University, and Youngstown State University. Full-time is defined as taking 12 or more credit hours during the first term (Fall 1998); part-time constitutes taking six to 11 credits, and less than part-time means students took less than 6 credits during the first term. Four-year degree intent means the student noted wanting to get a bachelor's degree or transfer to a four-year college.

Table 5 examines the relationship between family income and being placed in college remediation. Information on family income is derived from a survey of a large subset of Ohio students. One must be cautious in interpreting the results as children often do not fully know their parents' income. However, students were given a choice of various income ranges and asked to choose the appropriate category; this likely reduces inaccurate responses as students are probably not off the correct answer by more than one category. The higher the categories represent higher incomes. Similar to Table 4, the percentages shown in Table 5 denote the proportion of each group that was placed in or out of remedial courses. As expected, placement into remediation declines as family income increases. This is likely related to differences in high school quality by income.

**Table 5: Percentage of the Income Group Placed in Remediation**

Financial Background Category	No Remediation	Placed into Remediation	Observations
Less than \$18,000	50.23	49.77	2,196
\$18,000 to \$24,000	55.58	44.42	2,008
\$24,000 to \$30,000	62.24	37.76	2,227
\$30,000 to \$36,000	64.19	35.81	2,642
\$36,000 to \$42,000	65.24	34.76	3,245
\$42,000 to \$50,000	67.05	32.95	4,136
\$50,000 to \$60,000	69.68	30.32	4,697
\$60,000 to \$80,000	72.31	27.69	5,597
\$80,000 to \$100,000	78.90	21.10	2,957
More than \$100,000	82.06	17.94	2,743
<b>Total Sample</b>	<b>68.09</b>	<b>31.91</b>	<b>32,448</b>

Source: Ohio Board of Regents, Higher Education Information (HEI) system. Data from ACT, Inc.

### ***Academic Preparation and the Need for Remediation***

Past research has found that the need for remediation in college is closely tied to the high school course of study of a student. A 2002 study by the Ohio Board of Regents found that students who had completed an academic core curriculum in high school were half as likely to need remediation in college when compared to students without this core. Hoyt and Sorensen (1999) found a similar pattern when examining the need for remediation at Utah Valley State College. Interestingly, the Ohio Board of Regents records that 36 percent of first-year students age 19 or younger attending any public Ohio campus graduated from high school without a college prep curriculum. This is exactly the same proportion of students who enrolled in at least one remedial course in their first year of college (OBR 2001). As Kirst notes earlier in this volume, graduation from high school does not ensure a student has completed a curriculum that would be enough for easy entry into college.

Table 6 examines how the level of high school preparation and achievement differs by remedial placement. Most students in Ohio take the ACT exam and the proportion is highest at the four-year colleges. Our data includes the highest score received by the student and his or her most recent responses to the ACT survey, which includes self-reported information on high school preparation and performance. As expected, the mean ACT scores of students are higher among those not placed into remediation. For instance, at selective four-year universities, students not in remediation had an average score of 24 while those in the courses scored 19 on average.

In terms of math remediation, we find that students not in remediation had higher grades in high school math and took more semesters of the subject. This is similar to the results found by OBR and Hoyt and Sorensen. Likewise, the mean math ACT scores are also higher for non-

remediated students. Similar patterns can be found for those students in English remediation. Indeed, academic preparation seems to play an important role in the need for remediation.

**Table 6: Remedial Placement compared to Academic Preparation and Achievement**

	Selective Four-year Colleges		Non-selective Four-year Colleges		Two-year University Branches		Community Colleges	
	None	Remed.	None	Remed.	None	Remed.	None	Remed.
Took ACT	78.20	79.67	67.10	64.52	65.29	69.06	29.13	37.35
ACT Overall Score (36 max)	24.03 (3.67)	19.03 (3.01)	22.29 (4.08)	17.69 (2.90)	21.22 (3.63)	18.02 (2.90)	21.17 (3.89)	17.88 (3.06)
<b><i>Placement into Math Remediation</i></b>								
Average HS Math GPA	3.35 (0.61)	2.65 (0.70)	3.10 (0.75)	2.48 (0.78)	3.03 (0.75)	2.51 (0.79)	2.92 (0.76)	2.46 (0.78)
# Semesters of Math in HS	7.70 (0.80)	7.04 (1.24)	7.48 (1.04)	6.95 (1.37)	7.31 (1.15)	6.89 (1.42)	7.20 (1.22)	6.84 (1.39)
ACT Math Score (36 max)	24.03 (4.28)	18.27 (2.92)	22.09 (4.66)	17.39 (3.00)	21.04 (4.02)	17.46 (2.81)	20.77 (4.16)	17.51 (2.90)
<b><i>Placement into English Remediation</i></b>								
Average HS English GPA	34.61 (5.23)	29.68 (6.30)	32.15 (6.51)	27.74 (6.35)	31.80 (6.30)	28.32 (6.57)	30.51 (6.88)	27.39 (6.65)
# Semesters of English in HS	7.91 (0.53)	7.82 (0.73)	7.87 (0.64)	7.74 (0.92)	7.82 (0.70)	7.72 (0.90)	7.81 (0.74)	7.70 (0.92)
ACT English Score (36 max)	23.51 (4.22)	18.42 (3.97)	21.55 (4.61)	16.73 (3.78)	20.47 (4.46)	17.09 (3.87)	20.35 (4.63)	16.90 (4.01)
ACT Reading Score (36 max)	24.47 (5.12)	19.41 (4.74)	22.68 (5.36)	17.80 (4.46)	21.51 (5.17)	18.36 (4.62)	21.63 (5.39)	18.09 (4.68)
Observations	13,773	2,331	5,326	2,715	2,300	1,904	3,256	4,559

Source: Ohio Board of Regents, Higher Education Information (HEI) system.

Notes: Standard deviations are shown in the parentheses. The number of observations is the number who took the ACT at that institution (not the full sample number). The selective universities are defined as “competitive” institutions by Barron's Educational Guides (1997) and include Bowling Green State University, Miami University, Ohio State University, Ohio University, and Youngstown State University.

However, many students who had successfully completed upper level math courses still required remedial math or needed to repeat subjects in college. In Ohio, 25 percent of those with a known core high school curriculum still required remediation in either math or English (OBR, 2002). Therefore, while course selection problems in high school contribute to the need for remediation, these courses may not be enough. Some suggest high school courses are not

rigorous enough. Additionally, high school courses often do not teach the competencies necessary in college. Venezia, Kirst, and Antonio (2003) detail how differences between what high schools expect and what colleges demand undermine student access and success in postsecondary institutions. This research suggests that straightforward high school preparation is not sufficient to curb the need for remediation.

As illustrated in this section, substantial numbers of college students participate in remediation. Often these students have less academic preparation than their non-remediated counterparts, but there are other differences in background, enrollment intensity, and institutional choice that also distinguish students in remediation. The next section addresses whether remediation helps these students to be successful in college in terms of subsequent course performance and degree completion. Additionally, we discuss why determining the causal effects of remediation is difficult and one possible empirical strategy to deal with the inherent biases surrounding this issue.

#### **IV. THE EFFECTS OF REMEDIATION ON STUDENT OUTCOMES**

##### ***Why is it difficult to identify the effects of Remediation?***

Despite the growing debate on remediation and the thousands of under-prepared students who enter the nation's higher education institutions each year, little sound research exists on the causal effects of remediation on student outcomes. One major problem is a lack of good data. Most states and colleges do not have exit standards for remedial courses and so they do not collect performance information on their students. A 1991 internal report by the Ohio Board of Regents found that "very few institutions conduct consistent follow-up studies of students completing developmental programs or track the students to completion of their educational goals" (Legislative Office of Education Oversight, 1995). Other studies also document the lack

of systematic evaluations of remedial programs (Crowe, 1998; Weissman, Bulakowski, and Jumisko, 1997). There are also no current benchmarks by which to judge the success of higher education's remediation efforts (Ohio Board of Regents, 2001).

Studies that have been able to overcome the information barrier often focus on one particular institution. Researchers have simply compared students in remediation to those not in the courses. Because the data used are often proprietary, the results are often not published nor easy to obtain. One exception is a large-scale study released by NCES in 1996. It suggests that freshmen enrolled in remedial classes are less likely to persist into their second year of college. However, given the differences in preparation outlined above, it is not surprising that it along with similar studies that fail to control for characteristics related to ability find remedial students less likely to succeed. Lower-ability, less-prepared students are more likely to be placed in remediation. Even in the absence of remediation, they are less likely to persist and complete a degree. Therefore, one must develop a way to separate the effects of lower preparation and ability from the effects of a remedial course.

Issues of selection, or the fact that students who are placed in remedial courses differ from those who are not placed into remediation, are major concerns when examining the effects of remediation. These differences, such as gaps in student preparation, make direct comparisons between students in and out of remediation inaccurate. The first major concern is ability bias and differences in achievement by placement status. Most studies, such as the NCES report, fail to account for student ability in models that examine the effects of remediation such as whether students in remedial courses are less likely to graduate. However, controlling for ability by using conventional measures such test scores, GPAs, or the years a student has taken certain subjects is probably not sufficient due to the difficulty of measuring true ability or preparation. A second concern is college choice. Enrollment in a particular college may be an outcome reflecting both student ability and preferences about remediation. Because of the relationship between student

ability and college choice, it may be hard to distinguish between students' choices of college and their ability. For example, a student wishing to avoid remediation might choose a college with a very low placement cutoff. As a result, to establish the causal effects of remediation, one must develop strategies to overcome these biases.

Thus far, few have developed satisfactory methodologies to do so. Two reviews of the literature on remedial and developmental education found the bulk of studies to be “methodologically weak” with almost two-thirds reflecting “serious methodological flaws” (O’Hear and MacDonald, 1995; Boylan and Saxon, 1999). While little is known about the causal impact of remediation, the literature highlights factors that might matter in the success of a remediation program. These factors include clearly specified goals and objects, a high degree of structure, the provision of counseling and tutoring components, and the use of a variety of approaches and methods in instruction (O’Hear and MacDonald, 1995). However, far more work is needed to compare the relative effectiveness of different models of delivery.

Another concern of the past research is that most studies often do not track students for long and so do not have information on outcomes such as degree completion. Those datasets that have longer term data do not allow researchers to account for the possible movement of students across colleges. Therefore, researchers may be incorrectly labeling transfer students as dropouts.

### ***Is Remediation Likely to be Helpful or Harmful?***

Before reviewing evidence on the effects of remediation, we first consider what theory predicts about the effects of remediation. Remedial classes are designed to address academic deficiencies and prepare students for subsequent college success. By teaching students the material they have not yet mastered, the courses may help under-prepared students gain skills necessary to excel in college. In comparison, students with similar concerns who are not in

remediation may never gain a sufficient academic foundation. Without the structure and diagnostic elements of a remediation program, under-prepared students may struggle to have their needs addressed or directly face their academic problems. Remedial courses may also provide a safe environment in which students receive other kinds of support as they transition from high school to college. These additional benefits of remediation may include instructors who are especially attentive to developmental needs, tutoring services, and support from peers in similar situations.

However, there are several reasons why remedial courses may in fact have the opposite effect. For instance, by increasing the number of requirements and extending the time to degree, remediation may lower the likelihood of degree completion. The literature also suggests that the stigma associated with remediation may also negatively impact student. Previous research in education suggests that stigmas attached to under-prepared students is real and can be harmful to students (Basic Skills Agency 1997, MacDonald 1987), and being placed into remediation may produce a “Scarlet Letter” effect as perceived by other students and faculty. In this way, remediation could exact a psychological burden that negatively affects outcomes. If remedial students feel that their colleges are singling them out as poor performers, this may discourage additional effort.

Remedial courses may also be filled with negative peer effects. Recent work in economics (e.g. Sacerdote, 2000; Zimmerman, 2003; Hoxby, 2000) suggests that students who interact with peers who are higher achievers than themselves tend to improve. For example, Sacerdote (2000) found that having a roommate with higher standardized test scores appears to positively effect a student's college achievement. Similar to paring students into dorm rooms, remediation will group certain types of students together. By grouping lower-ability students in remedial courses, colleges may be producing negative peer effects amongst those students. In

contrast, similar students not placed into remediation could benefit from positive peers effects by interacting with higher-ability students in non-remedial classes.

### ***A Simple Comparison of Outcomes by Remedial Placement***

Table 7 displays the course-taking patterns of students in and out of remediation who began in at Ohio public colleges and universities fall 1998 until spring 2004 (six years). Some of the credits earned may be from campuses other than the campus a student first attended. First, students not placed in remediation completed more credit hours than students in the remedial courses (this foreshadows the results of the following table). Nearly half of the credits taken by these students were in courses that lead to a baccalaureate degree and another 42 percent were in general courses which may lead to some sort of certificate but did not fulfill requirements for graduation at four-year campuses. At the two-year colleges most of the courses qualified for general or technical course credit. In contrast, students in remediation took up to one-third of their courses in remedial subjects. The highest percentage was for students at two-year colleges who placed into math and English remediation. Meanwhile, students at four-year colleges may take only one course in remedial math.

**Table 7: College Course-taking Behavior over Six Years**

	Four-year Universities				Two-year Colleges			
	None	Math Remed.	English Remed.	Math & English	None	Math Remed.	English Remed.	Math & English
Total Credit Hours	104.80 (50.71)	78.90 (52.41)	72.09 (54.35)	57.15 (48.63)	37.74 (46.6)	51.39 (46.18)	41.14 (42.49)	38.72 (39.05)
Remedial Courses: Total Credit Hours	---	2.75 (2.76)	3.32 (2.83)	6.15 (5.13)	---	3.14 (3.22)	3.03 (3.35)	7.09 (6.18)
Proportion of Credits in Remedial Courses	---	0.06	0.10	0.21	---	0.13	0.16	0.33
Baccalaureate Courses: Total Credit Hours	57.43 (37.12)	35.24 (35.60)	32.48 (35.92)	20.60 (29.53)	9.46 (22.84)	10.97 (22.15)	6.50 (17.94)	4.44 (13.43)
Proportion of Credits in Baccalaureate Courses	0.49	0.33	0.33	0.23	0.13	0.12	0.08	0.06
General Courses: Total Credit Hours	38.84 (19.33)	35.52 (21.03)	31.15 (21.98)	25.58 (20.85)	16.80 (22.05)	27.05 (23.49)	18.66 (20.26)	17.79 (20.09)
Proportion of Credits in General Courses	0.42	0.53	0.49	0.48	0.41	0.56	0.46	0.42
Technical Courses: Total Credit Hours	1.94 (7.36)	3.75 (9.90)	4.02 (9.71)	4.35 (10.33)	10.29 (16.04)	9.40 (15.65)	12.62 (18.33)	9.19 (15.78)
Proportion of Credits in Technical Courses	0.03	0.06	0.07	0.08	0.44	0.19	0.30	0.20
Observations	25,419	3,373	1,788	1,967	16,559	7,245	2,484	7,006

Source: Ohio Board of Regents, Higher Education Information (HEI) system.

Notes: Standard deviations are shown in the parentheses. The number of observations is the number who took the ACT at that institution (not the full sample number). The selective universities are defined as “competitive” institutions by Barron’s Educational Guides (1997) and include Bowling Green State University, Miami University, Ohio State University, Ohio University, and Youngstown State University.

Table 8 displays the outcomes of students after four and six years. The simple comparison of the outcomes of students placed into remediation and those who are not suggests that remedial students had worse educational outcomes. Within four years, 61 percent of students at four-year colleges earned a bachelor's degree while only 13 percent of those who were in math and English remediation did so. The difference is not as great when looking at degree completion over six years. This is likely due to the fact that remediation lengthens the time to degree so that four years is no longer feasible. Similar patterns can be found among two-

year college students with two-year or four-year degree intent. Interestingly, slightly more remediated students completed a college certificate than those who did not need remediation, but this is most likely due to differences in the types of students that completed certificates in comparison to degrees.

**Table 8: Remedial Placement and College Educational Outcomes**

	Four-year Colleges				Two-year Colleges (with degree intent)			
	None	Math Remed.	English Remed.	Math & English	None	Math Remed.	English Remed.	Math & English
<b><i>After Four years (up to Spring 2002)</i></b>								
Completed Bachelor's Degree	60.55	31.57	27.40	12.75	13.16	9.37	5.93	2.97
Completed Associate Degree	3.89	4.62	4.98	4.47	21.61	18.28	19.91	12.59
Completed Certificate	0.97	0.68	0.50	0.25	1.77	1.51	2.26	1.89
<b><i>After Six years (up to Spring 2004)</i></b>								
Completed Bachelor's Degree	64.73	36.27	33.05	18.99	16.08	12.56	7.64	4.47
Completed Associate Degree	4.25	5.36	5.87	5.18	22.62	19.84	20.86	14.21
Completed Certificate	1.02	0.77	0.50	0.36	1.84	1.61	2.36	2.11
Transferred Up during period	2.01	2.70	3.02	2.54	22.41	19.86	15.18	10.75
Stopped Out and Did Not Return	26.18	45.95	49.89	60.65	58.10	60.61	65.16	70.97
Stopped Out Term 1	4.47	4.42	5.98	5.29	19.76	9.67	16.24	11.04
Stopped Out Term 2	4.99	8.18	11.19	11.08	11.20	12.10	15.43	16.37
Stopped Out Year 2	5.00	8.75	10.01	13.47	9.03	13.05	11.41	14.96
Stopped Out Year 3	3.55	7.14	7.27	9.71	6.00	8.37	7.59	10.48
Stopped Out Year 4	3.39	7.59	5.87	8.29	4.94	7.01	6.33	7.26
Transferred Down during period	13.82	24.58	20.08	27.05	4.25	4.96	4.07	3.35
Observations	25,444	3,373	1,788	1,967	9,744	6,093	1,989	5,553

Source: Ohio Board of Regents, Higher Education Information (HEI) system.

Notes: The sample of students at two-year colleges had degree intent (Associate or Bachelor degree). Stopping out means the student did not return to *any* institution within the Ohio public higher education system during the entire period. Transferring up is defined for nonselective, four-year colleges as a transfer to a selective university, for university branches as a transfer to a selective or non-selective four-year college, and for community colleges as a transfer to any four-year institution. Transferring Down is the opposite motion in the hierarchy of institutions.

As the mirror image of degree completion, students who needed remediation were more likely to stop out of college before completing their studies. Due to the system wide nature of the data, students who transfer to other Ohio public colleges are not counted as stop outs. At the four-year colleges, differences in the likelihood of stopping out arise during the second term meaning that students in remediation are less likely to return to college their sophomore year. At the two-year colleges, the pattern of stopping out appears almost immediately during the first term. Overall, there is a huge difference in the likelihood of stopping out by remedial status while the differences are not as great at the two-year colleges. As noted before, these tables do not provide evidence of the causal effects of remediation due to important differences in the underlying samples. The next section briefly discusses papers that attempt address this issue of bias including other research we have completed (Bettinger and Long, 2005).

### ***Estimates of the Causal Effects of Remediation***

Little analysis has been done on the causal impact of remedial courses on students. Aiken, West, *et. al.* (1998) provides a rare example by evaluating the impact of a one-semester remedial English course at a large university. Because their main intent is to compare different kinds of research designs, they estimate the results using a randomized experiment, nonequivalent control group design, and regression discontinuity. The results using each method are similar and suggest that the remedial writing courses did not improve students' skills beyond that of the standard freshman composition course. However, this study exemplifies the limitations of most of the research on remediation. The paper is based on only one institution and has a very small sample size (375 students). Therefore, it is unclear whether the results are representative for larger groups of students or institutions. Additionally, the Aiken, West, *et. al.* (1998) analysis only compares students in remediation to those taking college-level courses in the same subject. The paper does not comment on situations where students could be taking

courses in other subjects (i.e. their intended major) and avoiding remediation. A third limitation of the study is that students are only followed for one year. To truly understand the impact of remediation, longer term outcomes are needed. However, even if Aiken, West, *et. al.* could follow the students additional years, they would probably not be able to distinguish between students who dropout of college completely and those who transfer to another school, and this would lead to measurement error in the outcomes.

In other work using data from the Ohio Board of Regents (Bettinger and Long, 2005), we provide much more information on the causal impact of remedial courses. The analysis is likely to be much more representative of remediation in general because it includes 45 colleges and thousands of students. The dataset tracks students over six years throughout the entire Ohio public higher education system, and so the paper gives a sense of the longer term outcomes related to remediation without as much concern about incorrectly categorizing transfer students as dropouts.

In comparison to the rest of this chapter, Bettinger and Long (2005) focus on only a subset of the sample of Ohio public college students who entered during the fall 1998 term: traditional-age college undergraduates who attended full-time, took the ACT, and signified the intent to complete a degree on their college application.<sup>11</sup> The demographics and outcomes of this selected group are shown in Table 9. Nearly the entire group is from Ohio and relatively few are Black, Hispanic, or Asian; over half are female. This group has higher mean ACT scores, but significant numbers still need remediation. There are also gaps in degree completion by experience with remediation. Similar to the patterns shown in Table 8, a simple comparison

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<sup>11</sup> These restrictions are necessary because the methodology of Bettinger and Long (2005) requires preparation and achievement information from the ACT survey. Furthermore, so that degree completion is a relevant indicator of success, students needed to signify in some way wanting a get a degree and being able to complete it in reasonable time (beginning college full-time).

of the outcomes among this sample of students by remedial status suggests remediation has a negative effect.

**Table 9: Traditional-aged, full-time students with Degree Intent** (selected sample for further analysis)

	Four-year Universities		Two-year Colleges		
	Selective Four-year Universities	Non-selective Four-year Universities	University Branch Campuses	Community Colleges	
<b><i>Demographic Characteristics and Achievement</i></b>					
Age in 1998	18.35 (0.49)	18.44 (0.56)	18.42 (0.54)	18.47 (0.58)	
Female	57.98	55.07	57.13	57.68	
Black	4.28	9.61	1.29	5.86	
Hispanic	1.53	1.26	0.48	1.56	
Asian	2.51	1.63	0.55	1.24	
Ohio Resident	99.86	99.96	99.96	100.00	
ACT Composite Score (maximum 36)	23.66 (3.86)	21.65 (4.28)	20.23 (3.60)	19.53 (3.62)	
<b><i>Experience with Remediation</i></b>					
In Remedial Math	8.31	17.15	33.16	54.69	
In Remedial English	4.28	15.47	16.51	29.35	
<b><i>Educational Outcomes after Four Years</i></b>					
Completed Bachelor Degree	No Remediation	77.78	57.12	43.28	16.45
	In Remediation	54.75	32.27	27.63	10.87
Completed Associate Degree	No Remediation	2.01	5.86	32.51	47.58
	In Remediation	3.96	5.82	20.68	31.65
Stopped Out	No Remediation	10.35	20.68	25.45	33.74
	In Remediation	21.53	33.31	36.23	44.88
Observations	13,326	4,841	2,708	2,814	

Source: Ohio Board of Regents, Higher Education Information (HEI) system. The sample is restricted to traditional-aged (18-20 years old), full-time students with degree intent who were first-time freshmen in fall 1998. Additionally, to be included in the sample, students must have taken the ACT and had valid zip code information. Notes: Standard deviations are shown in the parentheses. Stopping out means the student did not return to *any* institution within the Ohio public higher education system during the entire period. Technical colleges are excluded.

As noted in an earlier section, each institution in Ohio is permitted to set its own remedial placement policies, and so two similar students who attend different colleges may have different experiences with remediation. Which college a student attends is largely dictated by proximity (most students in Ohio attend a college within 30 miles of their home), and so the likelihood of

being placed in remediation is influenced by the distance of the student's home to colleges with stringent versus lax remediation policies. Bettinger and Long (2005) document this pattern and compare similar students who placed in or out of remediation due to this institutional variation. Because the paper focuses on students for whom the probability of remediation differs according to the college they attend, the results do not reflect the impact of remediation on students with severe academic deficiencies.

Bettinger and Long (2005) provide estimates that paint a sharply different picture of the impact of remedial courses. Once using a more relevant control group by comparing similar students who are placed in and out of remediation because of the institutional policies of their colleges, remediation appears to decrease the likelihood of stopping out of college. The estimates suggest that students in math or English remediation are nearly 10 percent less likely to stop out over six years. This is in comparison to similar students in terms of background, preparation, and performance who did not take remedial courses. Remediated students are also more likely to complete a bachelor's degree. For example, students in Math remediation are nearly 10 percent more likely than similar students to complete a college degree in four years. English remediation is estimated to have an even larger effect as students were found to be 17 percent more likely to graduate by Spring 2002 than similar students.

While Bettinger and Long (2005) provides estimates of the impact of remediation on students who are required to enroll in the courses, it is important to note that many students do not complete their remediation. In the Ohio data, 64 and 69 percent of students complete all of the math and English remediation courses, respectively, in which they enroll. Table 10 displays how the likelihood of completing remediation differs according to the amount of remediation attempted. The cells in gray highlight the percentage of students who complete 100 percent of the remedial courses they attempt. In general, the percentage who complete all of the courses

falls as the number of credits increase. Less than a quarter of students who are required to take approximately three courses (nine credits) complete their remediation.

**Table 10: The Number of Remedial Credits Attempted and Completed**

Number of Remedial Credits Completed	Number of Remedial Credits Attempted								
	1	2	3	4	5	6	7	8	9
<b>Math Remediation</b>									
0	100.0	28.16	34.57	38.34	18.66	22.84	21.99	16.2	19.5
1	0.0	0	0	0	0	0	0	0	0
2		71.84	0	1.84	23.33	2.5	2.63	7.85	5.35
3			65.43	0	0.52	28.85	26.5	1.96	18.24
4				59.83	0	0.44	15.6	17.79	2.83
5					57.49	0	3.01	7.8	0.94
6						45.37	0	2.83	29.25
7							30.26	0	0
8								45.57	0
9									23.9
<b>English Remediation</b>									
0	37.78	22.3	24.32	30.63	25.39	26.31	13.79	17.86	18.25
1	62.22	0	0.11	0.73	0	0	1.72	0.08	0
2		77.7	0.11	3.14	11.29	0.64	13.79	5.74	1.59
3			75.45	0.58	0.52	8.56	24.14	0.56	22.22
4				64.92	0	0.54	13.79	11.88	5.56
5					62.81	0	8.62	11.24	0
6						63.95	0	0.56	25.4
7							24.14	0	1.59
8								52.07	0.79
9									24.6

Source: Ohio Board of Regents, Higher Education Information (HEI) system.

Student who do not complete their courses do not necessarily receive the full “treatment” of remediation. The results described above from Bettinger and Long (2005) therefore concern the “intention to treat” students with remediation. Little is known about the “treatment on the treated” impact of remediation. Because completion of the remedial courses is not likely to be random, estimating the “treatment on the treated” has additional selection issues that must be addressed before causal results can be estimated.

## **V. CONCLUSIONS AND POLICY RECOMMENDATIONS**

In summary, remediation is widespread and an important part of American higher education. Postsecondary institutions invest significant resources in the courses to address the academic deficiencies of entering students. While little research has been done to establish the causal impact of remedial programs, other research we have done suggests that institutions can play a significant positive role in addressing inequities in preparation. However, further research is needed to more fully understand the effects of remediation, especially for students who are extremely under-prepared for college-level work. Additionally, it may be the case that certain types of instruction and supports are more beneficial than others. Research is needed to identify which programs and practices are the most effective.

Additional research on how to maximize the benefits of remediation is imperative as the cost of not offering the courses appears to be expensive. Individuals with less education are more burdensome on the economy in terms of higher probabilities of unemployment, welfare dependency, and incarceration. Moreover, the increasing demands of the economy in terms of skill encourage the country to find an effective way to train its workers. With persistent concerns about the abilities of high school graduates, higher education must find ways to address the needs of under-prepared students.

### ***Implications for Policy***

States are currently considering a number of policies related to remediation. For instance, some policymakers have argued that community colleges should be the principal provider of remedial courses, and so they are reducing remediation at four-year universities or limiting the number of courses students can take at these institutions. Given the dearth of information available on the effects of remediation and the lack of a set of best practices on how to deliver remediation, these reforms should be approached with caution. The research of

Bettinger and Long (2005) certainly suggests that remediation improves student outcomes. Additionally, given the large numbers of students who need remediation, exclusionary admissions policies are likely to have widespread effects on many parts of higher education and long term labor market quality. Community colleges are also often strapped for funding and may not have the resources to provide effective remedial programs.

It is also important to note that the need for remediation is rooted in the K-12 system, and so reform efforts may be better served by focusing on this level of education. As noted above, students often do not take the appropriate courses, and investments in guidance counseling could have profound effects. In urban school districts, counselors are sometimes responsible for over 700 students, and so students may not be adequately served. However, even students who take an academic core in high school sometimes still need remediation. As suggested by Venezia, Kirst, and Antonio (2003), high schools need to find out more about the expectations of colleges.

One promising policy that combines efforts to improve student advising while conveying the expectations of higher education is early placement testing. Several states, such as Ohio, Kentucky, Oklahoma, and North Carolina, have begun to use the remediation placement exam ordinarily given to college freshman on students who are still in grade 10 or 11. The results of the test are then shared with the students and their parents as a way to inform all parties of the competencies that still need to be mastered. With their teachers and counselors, students can then determine what courses they need to take while still in high school in order to avoid college remediation. As long as students graduate high school under-prepared, remediation will continue to be pervasive. Therefore, efforts should focus on policies that could lower the need for remediation while still helping those who are no longer in high school gain the skills that will help them succeed in higher education.

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