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Wanted: A National Teacher Supply Policy for Education: The Right Way to Meet The "Highly Qualified Teacher" Challenge

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Abstract

Teacher quality is now the focus of unprecedented policy analysis. To achieve its goals, the No Child Left Behind Act (NCLB) requires a "highly qualified teacher" in all classrooms. The concern with teacher quality has been driven by a growing recognition, fueled by accumulating research evidence, of how critical teachers are to student learning. To acquire and retain high-quality teachers in our Nation's classrooms will require substantial policy change at many levels. There exists longstanding precedent and strong justification for Washington to create a major education manpower program. Qualified teachers are a critical national resource that requires federal investment and cross-state coordination as well as other state and local action. NCLB provides a standard for equitable access to teacher quality that is both reasonable and feasible. Achieving this goal will require a new vision of the teacher

labor market and the framing of a national teacher supply policy. States and local districts have vital roles to play in ensuring a supply of highly qualified teachers; however, they must be supported by appropriate national programs. These programs should be modeled on U.S. medical manpower efforts, which have long supplied doctors to high-need communities and eased shortages in specific health fields. We argue that teacher supply policy should attract well-prepared teachers to districts that sorely need them while relieving shortages in fields like special education, math and the physical sciences. We study the mal-distribution of teachers and examine its causes. We describe examples of both states and local school districts that have fashioned successful strategies for strengthening their teaching forces. Unfortunately, highly successful state and local program to meet the demand for qualified teachers are the exception rather than the rule. They stand out amid widespread use of under-prepared teachers and untrained aides, mainly for disadvantaged children in schools that suffer from poor working conditions, inadequate pay and high teacher turnover. The federal government has a critical role to play in enhancing the supply of qualified teachers targeted to high-need fields and locations, improving retention of qualified teachers, especially in hard-to-staff schools, and in creating a national labor market by removing interstate barriers to mobility. (Note 0).

Recent policy developments have drawn unprecedented attention to issues of teacher quality. To achieve its goals for improved school outcomes, the No Child Left Behind Act (NCLB) requires a “highly qualified teacher” in all classrooms, as well as better-prepared paraprofessionals and public reporting of staff qualifications. The concern with teacher quality has been driven by a growing recognition, fueled by accumulating research evidence, of how critical teachers are to student learning. In this, policymakers have been catching up with parents, who have long believed that teachers matter most. (Note 1)

To turn the NCLB mandate into a reality, however, the nation will have to overcome serious labor market obstacles. For one, inequalities in school funding—along with widely differing student needs and education costs—produce large differentials in staff salaries and working conditions that affect the supply of teachers to different schools. For another, teacher labor markets, although starting to change, have been resolutely local. In many states, most teachers still teach in schools near where they grew up or went to college (Boyd et al, 2003). These factors, together with other labor market conditions, have meant that some schools traditionally have been “hard to staff.” The hardest-hit schools chiefly serve poor, minority and low-achieving children—the same children whose learning must increase significantly if the central NCLB goal of closing the achievement gap between advantaged and disadvantaged pupils is to be accomplished. To get and keep high-quality teachers in these children’s classrooms will require substantial policy change at all levels.

While more extensive federal roles in curriculum, testing and school choice are hotly contested, there is longstanding precedent and strong justification for Washington to create a major education manpower program. As in other key professions such as medicine, where the national government has long provided vital support for training and distributing doctors in shortage areas, the ability of schools to attract and retain well-trained teachers is often a function of forces beyond their boundaries. But without well-qualified teachers for schools with the neediest students, it will be impossible for them to make the progress on achievement in reading and mathematics that NCLB demands.

In that case, we would continue the historic pattern of failed federal education programs, in which low-income, disabled, language minority and other vulnerable students are taught by the least qualified teachers and untrained aides, rather than the skilled practitioners envisioned by the Elementary and Secondary Education Act and other national laws. The very purpose of these multibillion-dollar programs—to ensure equal education opportunity for the disadvantaged—has long been undermined by local inability or unwillingness to provide teachers capable of meeting the pupils' needs.

As the importance of well-qualified teachers for student achievement has become increasingly clear, this source of inequality has become more and more difficult to justify or ignore. On both equity and adequacy grounds, qualified teachers comprise a critical national resource that requires federal investment and cross-state coordination as well as other state and local action. No Child Left Behind provides a standard for equitable access to teacher quality that is both reasonable and feasible. Meeting this goal, however, calls for a new vision of the teacher labor market and development of a national teacher supply policy.

Understanding the Problems

To make headway on this agenda, it is essential to alter popular misunderstandings about teacher issues. For example:

- **The hiring of unqualified teachers is generally a result of distributional inequities, rather than overall shortages of qualified individuals.** Contrary to what some believe, the United States does not face an overall shortage of qualified teachers. While some schools **have dozens of qualified applicants for each position**, others—mostly those with poor and minority pupils—suffer from shortfalls, a mismatch that stems from an array of factors. They range from disparities in pay and working conditions, interstate barriers to teacher mobility and inadequate recruitment incentives to bureaucratic hiring systems that discourage qualified applicants, transfer policies that can slow hiring and allocate staff inequitably, and financial incentives to hire cheaper, less qualified teachers.
- **Retaining teachers is a far larger problem than training new ones—and a key to solving teacher “shortages.”** In the years ahead, the chief problem will not be producing more new teachers, as many seem to believe. The main problem is an exodus of new teachers from the profession, with more than 30% leaving within five years. This, too, chiefly hurts low-income schools,

which suffer from turnover rates as much as 50% higher than affluent schools (Ingersoll, 2001, p. 516). Such churning, which results in a constant influx of inexperienced teachers, is caused largely by insufficient preparation and support of new teachers, poor working conditions and uncompetitive salaries.

- **While the nation actually produces far more new teachers than it needs, some specific teaching fields do experience shortages.** These include teachers for children with disabilities and those with limited English proficiency as well as teachers of mathematics and physical science, two of the three subjects in which NCLB mandates student exams. Increasing supply in the few fields with shortfalls requires both targeted recruitment and helping preparatory institutions expand programs to meet select national needs.

To address these problems, we need to recognize that while teacher supply and demand historically have been local affairs, states and districts alone have been unable to solve these problems. Teacher issues increasingly are national in origin and consequences. While we should be mindful of the vital roles and prerogatives of states and localities, they need to be supported by appropriate national programs. These programs, we argue, should be modeled in good measure on U.S. medical manpower efforts, which have long supplied doctors to high-need communities and eased shortages in specific health fields. Similarly, teacher supply policy should help induce well-prepared teachers into districts that sorely need them—and enable them to succeed and stay there—while relieving shortages in fields like special education, math and physical science. It also should help stem departures of new teachers, which cost the nation billions of dollars a year. Indeed, the cost of the new programs could be entirely sustained by savings incurred by reducing teacher turnover.

The Alternative: Lowering Teacher Standards

The alternative to such policies is to lower standards for teacher knowledge and skills, through either continued emergency hiring or “quick-fix” programs that send people into difficult classrooms with little training in how to teach or deal with children. This has been the usual answer to teacher shortages, with unhappy results over the better part of a century. There are, fortunately, a growing number of new and rigorous alternate-certification programs based on careful selection, purposeful preparation, and intensive mentoring and practice teaching that are successful in preparing mid-career recruits from other fields. There is evidence that graduates of such programs feel confident about their teaching, are viewed as successful with children, and intend to stay in teaching (e.g. National Commission on Teaching and America’s Future [NCTAF], 1996, p. 93; Miller, McKenna, & McKenna, 1998; Darling-Hammond, Kirby, & Hudson, 1989). We endorse these approaches.

However, we believe the evidence is clear that shortcut versions—those providing little training and meager support for new teachers—fail to prepare teachers to succeed or to stay, thus adding to the revolving door of ill-prepared individuals who cycle through the classrooms of disadvantaged schools, wasting district resources and valuable learning time for their students. Unfortunately, as some states develop plans to implement NCLB, they are including entrants into these programs (even before they have completed their modest training) in their definitions of “highly

qualified” teachers.

The evidence to date provides cause for concern about this approach. For example, alternate-route teachers whose training lasts just weeks before they take over classes quit the field at high rates. Recent studies have documented such outcomes for recruits from the Massachusetts MINT program, nearly half of whom had left teaching within three years (Fowler, 2002) and the Teach for America program, an average of 80% of whom had left their teaching jobs in Houston, Texas, after two years (Raymond, Fletcher, & Luque, 2001). Analyses of national data show that individuals who enter teaching without student teaching (which these programs generally omit) leave teaching at rates twice as high as those who have had such practice teaching (Henke et al., 2000; NCTAF, 2003). Those who enter teaching without preparation in key areas such as instructional methods, child development and learning theory also leave at rates at least double those who have had such training (NCTAF, 2003, p. 84).

It is not hard to fathom why such teachers swiftly disappear. A former investment banking analyst, for example, tells of the “grim” circumstances she faced in a New York City elementary school, scarcely trained, unsupported, and realizing that “a strong academic background and years in an office are not preparation for teaching.” Enthusiasm does not compensate for inexperience, she found, and teacher turnover is “so high that a school’s ‘veteran’ teachers have frequently been around only three years, which makes it hard for new teachers to find experienced mentors.” She quit after a year, part of the problem, not the solution. (Mehlman, 2002).

Despite this, the push to lower teacher standards, especially through quick-fix programs or back-door entry paths that skirt preparation, has strong adherents. These include some with influence in the U.S. Department of Education, as evidenced by the Secretary of Education’s report to Congress on teacher quality. Called *Meeting the Highly Qualified Teachers Challenge* (U.S. Department of Education, 2002), the report is highly critical of teacher education, viewing certification requirements (Note 2) as a “broken system” and urging that attendance at schools of education, coursework in education and student teaching become “optional” (p. 19). By contrast, it regards alternate-route programs—especially those that eliminate most education coursework, student teaching and “other bureaucratic hurdles”—as the model option, getting teachers into classrooms on what it calls a “fast-track” basis. The report’s prescription is for states to redefine teacher certification to stress content knowledge and verbal ability and to de-emphasize knowledge of how to instruct, assess, motivate or manage pupils.

The problem is not only that the report ignores and misrepresents research evidence, as has been documented in detail elsewhere. (Note 3) It is also that, together with other signals from Washington, it raises questions about how the Department of Education will enforce the requirement for all teachers to be highly qualified by the end of the 2005-2006 school year. “Highly qualified,” according to NCLB, means that all teachers “must be fully licensed or certified by the state and must not have had any certification or licensure requirements waived on an emergency, temporary, or provisional basis.” Teachers also must demonstrate subject matter competence (Title IX, Part A, Sec. 9101).

Now, however, the department appears to be signaling that states can comply in ways that dilute or undercut the law's standard. The statute permits "highly qualified" teachers to obtain full certification through traditional or alternative routes. However, the final regulations indicate that the department will accept state plans that designate as "highly qualified" those who have simply *enrolled* in alternative-certification programs, even if they have not completed them, demonstrated an ability to teach, or met the state's standards for a professional license. Such teachers may "assume the functions of a teacher" for up to three years without having received full certification and be considered "highly qualified." (Note 4) The department's comments on the final regulations make a point of noting that teachers in alternative routes to certification are to be considered an exception to the requirement that "highly qualified" teachers may not have had certification requirements "waived on an emergency, provisional, or temporary basis." (Note 5) The comments further suggest that "these alternative routes can also serve as models for the certification system as a whole." (Note 6)

Some states are proposing to meet NCLB requirements by lowering certification standards even further. For example, bills introduced in the 2002-2003 legislative sessions in Texas, Florida and California would allow candidates who have no preparation to teach to be certified so long as they have a bachelor's degree and pass a state test. In pressing for the Texas bill, (Note 7) the state comptroller argued that Texas should eliminate teacher education entirely from certification requirements, citing as her primary supporting evidence the Secretary of Education's report to Congress and speeches at a conference sponsored by the department (Strayhorn, 2003). The department, moreover, has signaled that it would welcome this further lowering of the bar on teacher standards.

Such interpretations of NCLB involve a sleight of hand on teacher qualifications. If certification requirements are redesigned to require less stringent standards than at present, meeting such standards will be an even poorer guarantee of teacher quality than what already exists. If some traditional teacher education programs have their flaws, essentially unregulated alternate-route programs lie almost completely beyond careful scrutiny. At this juncture in our history, encouraging the proliferation of untested alternatives raises the specter of a legally sanctioned, two-tiered staffing system. Schools that cannot afford competitive salaries, that cannot provide attractive working conditions, and that educate the most needy students will be staffed via untested alternate programs, while more advantaged schools will continue to recruit teachers with extended professional education. This certainly is not the intent of NCLB, but it could well be the result.

As we describe below, there is no research support for this approach. There *is* evidence, however, that it would reduce teacher effectiveness and contribute to teacher attrition. The chief victims would be the most vulnerable children in the hardest-to-staff schools, where underprepared teachers commonly work during their initial teaching years, before they meet licensing standards or leave the profession. This would extend the historic pattern of shortchanging disadvantaged students, even as evidence mounts that teacher quality is critical to student achievement. To cite just one of many studies, a 1991 analysis of 900 Texas school districts (Ferguson 1991) found that combined measures of teacher expertise—scores on a licensing examination, master's degrees and

experience—accounted for more of the interdistrict difference in students’ reading and mathematics achievement in grades 1 through 11 than any other factor, including students’ family income. The effects were so strong and the variations in teacher quality so great that after controlling for socioeconomic status, the large disparities in achievement between black and white students were almost entirely accounted for by differences in teacher qualifications.

On the central importance of teachers there is, in fact, little disagreement, even among advocates for eased entry requirements. For example, the Thomas B. Fordham Foundation states, “The research shows that great teachers are the most important ingredients in any school. Smart, caring teachers can help their students overcome background problems like poverty and limited English proficiency.” (Note 8) However, putting teachers with less preparation in classrooms for the neediest children will not provide equal opportunity or an adequate education. The far better strategy, we believe, is to craft a national teacher supply policy to ensure that well-prepared teachers are available to high-need districts, to produce more teachers in shortage fields, and to stem high teacher attrition rates. Even with such a system, of course, most decisions on teachers would remain the domain of state and local school officials, some of whom, as we shall see, have made important strides toward filling their classrooms with high-quality teachers—in part by doing exactly the opposite of what advocates for shortcuts recommend.

A Compelling State Interest

Those urging few certification requirements want to shift more decisions away from the states and to the local level. But states have a compelling interest in setting meaningful teacher standards. Murnane and colleagues (1991) note, for example, that traditional economic assumptions about consumer competence, priorities, knowledge, and information do not always hold with respect to teacher hiring, that “...some local districts (the purchasers of teachers’ services) are underfunded, incompetent, or have priorities that the state finds unacceptable” (p. 94). If poor information were the only problem, then states could concentrate on requiring tests and other measures of the “right stuff,” however defined. Local districts could then select based on scores and other information. However, if some local districts are likely to hire teachers whom the state finds unacceptable, then simple information alone will not solve this problem. The consequences of poor choices are not only local:

States are concerned because equal opportunity is threatened when incompetent teachers are hired, and the costs of inadequate education are borne not only by the children themselves, but also by the larger society. Dimensions of these costs include a lower rate of economic growth, higher incidence of welfare, greater crime rates, and higher unemployment rates (p. 95).

Economist Henry Levin (1980) makes a similar point:

[T]he facts that we expect the schools to provide benefits to society that go beyond the sum of those conferred upon individual students, that it is difficult for many students and their parents to judge certain aspects of teacher proficiency, and that teachers cannot be instantaneously dismissed, mean that somehow the state must be concerned about the

quality of teaching. It cannot be left only to the individual judgments of students and their parents or the educational administrators who are vested with managing the schools in behalf of society. The purpose of certification of teachers and accreditation of the programs in which they received their training is to provide information on whether teachers possess the minimum proficiencies that are required from the teaching function (p. 7).

Without strong, meaningful, and well-enforced certification requirements, not only will districts lack important information about candidates, but parents also will lack important safeguards regarding those entrusted with their children. In addition, states will lack the policy tools needed to encourage improvements in training and to equalize access to the key educational resource of well-prepared teachers.

To demonstrate why combining a national teacher supply program with state and local reform is the wiser way to meet the “highly qualified” teacher challenge, we examine the evidence on five issues:

- The kinds of teacher preparation that make a difference for student achievement.
- The evidence on alternative routes to certification.
- The current workings of the teacher labor market.
- The factors influencing teacher distribution.
- The steps some states and districts have been taking to ensure teacher quality.

We then turn to the elements of a national teacher supply policy for education.

I. What Preparation Makes a Difference in Student Learning?

There is wide agreement on some teacher attributes that appear to be related to teacher effectiveness and student learning. For example, virtually everyone acknowledges the importance of teachers’ verbal ability and knowledge in the subjects taught. Those qualities, along with a liberal arts grounding, are at the heart of most state certification processes, which began requiring tests and coursework to assure competence in these areas in the early 1980s. These qualities are also central to the National Board for Professional Teaching Standards’ voluntary certification process and other efforts to strengthen teacher education and professional development. The fact that alternative-certification advocates focus intently on such skills can only be welcomed. The problem is that these advocates very nearly stop there, as if little else mattered. Common sense and research evidence, however, tell us otherwise.

The Importance of Knowing How to Teach

Research shows that beyond verbal skills, subject matter knowledge and academic ability, teachers’ professional knowledge and experience also make an important difference in student learning. Many other characteristics also matter for good teaching—enthusiasm, flexibility, perseverance, concern for children—and many specific teaching practices make a difference for learning (see e.g., Good & Brophy, 1995). The evidence suggests, in fact, that the strongest guarantee of

teacher effectiveness is a combination of *all* these elements. (For reviews, see Darling-Hammond, 2000a; Wilson, Floden, & Ferrini-Mundy, 2001). It is this combination that most licensure processes seek to encourage, through requirements for courses, tests, student teaching and the demonstration of specific proficiencies.

Much of the research debate about what factors matter is due to the fact that few large-scale databases allow a comprehensive set of high-quality measures to be examined at once. Estimates of the relationships between particular teacher characteristics and student learning vary from study to study, depending on what factors are examined and when and where the study was conducted. Moreover, many variables that reflect teacher quality are highly correlated with one another. For example, teachers' education levels typically are correlated with age, experience and general academic ability. Similarly, licensure status is often correlated with academic skills, content background, education training and experience.

Studies linking teacher scores on tests of academic ability to student achievement (e.g. Coleman, et al., 1966; Ferguson & Ladd, 1996; Hanushek, 1992, 1996) have led some analysts to suggest that general academic or verbal ability are the primary measurable predictors of teacher quality. However, these studies typically have lacked other measures of teachers' preparation (for discussions, see Murnane, 1983; Wayne & Youngs, in press). When studies have looked directly at teachers' knowledge of both subject matter and how to teach, they have found that knowing how to teach also has strong effects on student achievement. Indeed, such studies show that knowledge of teaching is as important as knowledge of content (Begle, 1979; Monk, 1994; Wenglinsky, 2000).

For example, based on national survey data for 2,829 students, Monk (1994) found, not surprisingly, that teachers' content preparation, as measured by coursework in the subject field, was often positively related to student achievement in math and science. But courses in such subjects as methods of teaching math or science also had a positive effect on student learning at each grade level in both fields. For math, in fact, these teaching-method courses sometimes had "more powerful effects than additional preparation in the content area" (p. 142). Monk concluded that "a good grasp of one's subject area is a necessary but not a sufficient condition for effective teaching" (p. 142).

Wenglinsky (2002) looked at how math and science achievement levels of more than 7,000 8th graders on the 1996 National Assessment of Educational Progress (NAEP) were related to measures of teaching quality, teacher characteristics and student social class background. He found that student achievement was influenced by both teacher content background (such as a major or minor in math or math education) *and* teacher education or professional development coursework, particularly in how to work with diverse student populations (including limited-English-proficient students and students with special needs). Measures of teaching practices, which had the strongest effects on achievement, were related to teachers' training: Students performed better when teachers provided hands-on learning opportunities and focused on higher-order thinking skills. These practices were, in turn, related to training they had received in developing thinking skills, developing laboratory skills and having students work with real-world problems. The

cumulative effect of the combined teacher quality measures, in fact, outweighed the effect of socioeconomic background on student achievement.

Teacher Certification and Student Learning

Since teacher certification or licensure has come in for criticism, we should look more closely at this factor. Although some analysts view licensure—or the teaching preparation that has typically been one of its major components—as unnecessary, the preponderance of evidence indicates that it, too, is associated with teacher effectiveness. Indeed, studies using national and state data sets have shown significant links between teacher education and licensure measures (including education coursework, credential status and scores on licensure tests) and student achievement. These relationships have been found at the level of the individual teacher (e.g., Goldhaber & Brewer, 2000; Hawk, Coble, & Swanson, 1985; Monk, 1994); the school (Betts, Reuben, & Danenberg, 2000; Fetler, 1999; Fuller, 1998, 2000; Goe, 2002); the school district (Ferguson, 1991; Strauss & Sawyer, 1986), and the state (Darling-Hammond, 2000a). The multi-level findings reinforce the inferences that might be drawn from any single study.

Goldhaber and Brewer (2000) concluded, for example, that the effects of teachers' certification on student achievement exceed those of a content major in the field, suggesting that what licensed teachers learn in the pedagogical portion of their training adds to what they gain from a strong subject matter background:

[We] find that the type (standard, emergency, etc.) of certification a teacher holds is an important determinant of student outcomes. In mathematics, we find the students of teachers who are either not certified in their subject...or hold a private school certification do less well than students whose teachers hold a standard, probationary, or emergency certification in math. *Roughly speaking, having a teacher with a standard certification in mathematics rather than a private school certification or a certification out of subject results in at least a 1.3 point increase in the mathematics test. This is equivalent to about 10% of the standard deviation on the 12th grade test, a little more than the impact of having a teacher with a BA and MA in mathematics* (emphasis added). Though the effects are not as strong in magnitude or statistical significance, the pattern of results in science mimics that in mathematics (p. 139).

In this study, beginning teachers on probationary certificates (those who were fully prepared and completing their initial 2- to 3- year probationary period) from states with more rigorous certification exam requirements had positive effects on student achievement, suggesting the value of recent reforms to strengthen certification. (Note 9)

Similarly, a number of studies from states with large numbers of underprepared teachers have found strong effects of certification on student achievement. California is a case in point. There, three recent school-level studies found significant negative relationships between the percentage of teachers on emergency permits and student scores on state exams (Betts, Rueben, & Dannenberg, 2000; Fetler, 1999; Goe, 2002). Similarly, Fuller (1998, 2000) found that students in Texas schools with smaller proportions of certified teachers were significantly less likely to pass the Texas Assessment of Academic Skills (TAAS),

after controlling for students' socioeconomic status and teacher experience.

This and other evidence suggests that it is a mistake to believe that one or two characteristics of teachers can explain their effects on student achievement. The message from the research is that multiple factors are involved and that teachers with a combination of attributes—knowing how to instruct, motivate, manage and assess diverse students, strong verbal ability, sound subject matter, and knowledge of effective methods for teaching that subject matter—hold the greatest promise for producing student learning. Those aspects of preparation that enable teachers to teach students with the greatest educational needs are, of course, most needed for teachers who will work with such children, a point that advocates of reduced standards for teachers in hard-to-staff schools (which serve these children) seem to miss. States and local districts should be pursuing fully prepared teachers, especially for the neediest students. They are the teachers whose training includes all of the attributes intended by the NCLB “highly qualified” definition.

II. The Evidence on Alternate Routes to Certification

The evidence on alternate-route programs is consistent with the research described above: In general, efforts that include a comprehensive program of education coursework and intensive mentoring have been found to produce more positive evaluations of candidate performance than models that forgo most of this coursework and supervised support.

Just as a quality distribution exists for conventional programs of teacher education, so there appears to be an even wider quality distribution for alternate programs (Darling-Hammond, Chung, & Frelow, 2002). At one end of the spectrum is a state alternative- certification program in New Hampshire that provides little structure or support. Candidates take “full responsibility for students prior to any preparation, and [have] three years to acquire 14 state- identified competencies through workshops or college courses” (Jelmsberg, 1996, p.61). A study found that these alternate-route teachers were rated significantly lower than traditional teachers on instructional skills and instructional planning by their principals, and they rated their own preparation significantly lower than did traditionally certified teachers.

Some programs impart more systematic training and support. In a 1992 study of Connecticut's alternative-certification program—whose two-year training model provided “a significantly longer period of training than in any other alternate- route program” at the time (Bliss, 1992, p. 52)—supervisors gave mixed reviews of recruits' performance. Weaknesses were noted in relation to other teachers in terms of classroom management, but some strengths were found in teaching skills. A study of the Los Angeles Teacher Trainee Program, another two-year training model, also produced mixed results: University-trained English teachers were rated as more skillful than alternate-route (intern) teachers, while the levels of skill appeared more comparable but lower overall for math teachers from both groups (Stoddart, 1992).

In California, the Commission on Teacher Credentialing has worked to overcome shortcomings found in many local internship programs (McKibbin, 1998). A recent study of California State University teacher education graduates, however, found that those who prepared to teach after having entered teaching through emergency

routes or internships felt less well prepared than those who had experienced a coherent program of pre-service preparation, and they also were perceived as less competent by their supervisors (California State University, 2002a; 2002b). A recent study by Stanford Research International echoed these concerns:

Principals reported that interns were less well prepared than fully credentialed recent hires in terms of their subject matter knowledge, their knowledge of instructional and assessment techniques, and their ability to teach basic skills to a diverse student population (Shields et al., 2001, p. 37).

The Dallas Schools' alternative-certification program provides summer training and then places recruits in mentored internships during the school year while they complete other coursework. In a study of this program, supervisors' perceptions of recruits were positive for the 54% who completed the intern year without dropping out or being held back due to "deficiencies" in one or more areas of performance (Lutz & Hutton, 1989). The study also reported data from an evaluation of the program by the Texas Education Agency (Mitchell, 1987), which surveyed principals, finding that:

The principals rated the [traditionally trained] beginning teachers as more knowledgeable than the AC interns on the eight program variables: reading, discipline management, classroom organization, planning, essential elements, ESL methodology, instructional techniques, and instructional models. The ratings of the AC interns on nine other areas of knowledge typically included in teacher preparation programs were slightly below average in seven areas compared with those of beginning teachers (Lutz & Hutton, 1989, p. 250).

Only two controlled studies of student achievement outcomes of alternate-route and traditionally trained teachers have been reported, again with mixed results. One, examining data from the Dallas program noted above, found that students of traditionally prepared teachers experienced significantly larger gains in language arts than those of alternate-route teachers (Gomez & Grobe, 1990). The other, using data from a well-designed program with strong pedagogical preparation and mentoring, found student outcomes comparable across the two groups (Miller, McKenna, & McKenna, 1998). This study focused on a university-sponsored program that provided 15 to 25 credit hours of coursework before interns entered classrooms. There they were intensively supervised and assisted by university personnel and school-based mentors while they completed additional coursework needed to meet full state licensure requirements. Because this design is so different from the many quick-entry, alternate-route programs, Miller, McKenna and McKenna (ibid) concluded that their studies

. . . provide no solace for those who believe that anyone with a bachelor's degree can be placed in a classroom and expect to be equally successful as those having completed traditional education programs . . . The three studies reported here support carefully constructed AC programs with extensive mentoring components, post-graduation training, regular in-service classes, and ongoing university supervision (p.174).

One other program often cited in reference to alternative certification is Teach for

America, although TFA is a recruiting program rather than an alternative-certification program. After controlling for teacher experience and school and classroom demographics, one study found that TFA recruits in Houston were about as effective as other inexperienced teachers in schools and classrooms serving high percentages of minority and low-income students, which is where most underqualified teachers in the district are placed (Raymond et al., 2001). In 1999-2000, the last year covered by the study sample, about 50% of Houston's new teachers were uncertified, and the researchers reported that 35% of new hires lacked even a bachelor's degree, so TFA teachers were compared to an extraordinarily ill-prepared group. Raymond and colleagues did not report how TFA teachers' outcomes compare to those of trained and certified teachers. However, a separate study in Arizona that examined this question found that students of TFA teachers did significantly less well than those of certified beginning teachers on math, reading and language arts tests (Laczko-Kerr & Berliner, 2002).

Ideally, we would like to know more about the effectiveness of different kinds of alternate-route programs. Although the research is not definitive (see Wilson, Floden, & Ferrini-Mundy, 2001 for one synthesis, SRI International, 2002, for another), most studies to date tend to support more extensive training over speeding recruits into classrooms with little preparation or support.

Given the evidence suggesting the importance of the preparation intended by NCLB, the question is whether it is possible for states to comply in the face of what appear to be substantial teacher shortages in some places? The evidence suggests that states can indeed comply—with targeted policies that better organize and more equitably distribute their own teaching force, supplemented with a national system that, among other things, works to correct the maldistribution of well-qualified teachers.

III. The Teacher Labor Market

To understand how teachers become so inequitably distributed, we need to examine how teacher supply and demand operate, what causes teacher attrition, and why there are teacher shortages in particular fields. We will then look at the chief causes of the inequitable distributions that are the target of No Child Left Behind.

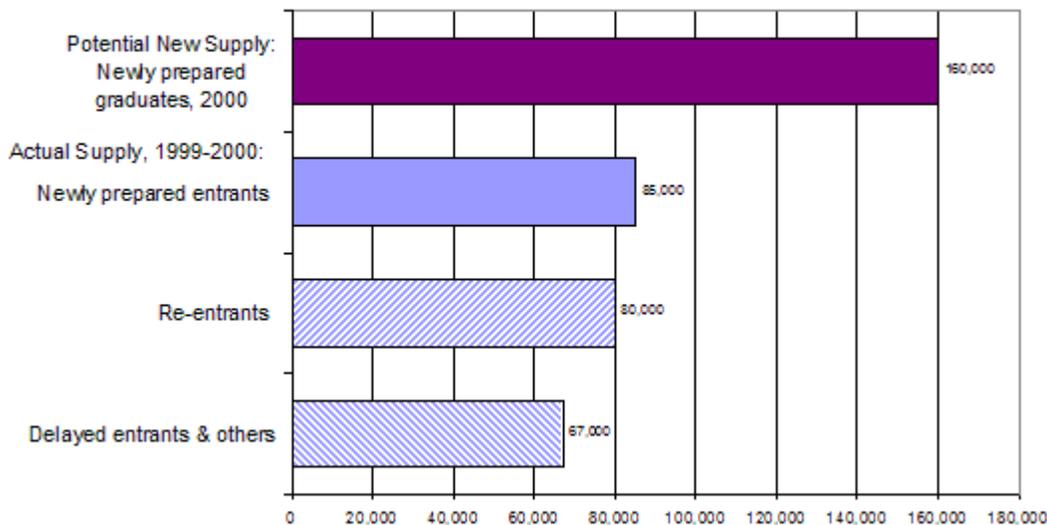
More Supply Than Demand. The nation currently is in the midst of a teacher hiring surge that began in the early 1990s. Annual demand recently has averaged about 230,000 teachers—demand that can easily be met with existing well-prepared teachers from our three main supply sources. Only one of these sources is newly prepared teachers, who generally constitute no more than half the teachers hired in a given year. (Note 10) In 1999, for example, when U.S. schools hired 232,000 teachers who had not taught the previous year, fewer than 40% (about 85,000) had graduated from college the year before. About 80,000 were from the second source—re-entrants from the reserve pool of former teachers (NCTAF, 2003). (Note 11) Of the remaining 67,000, most were from the third source—delayed entrants who had prepared to teach in college but who had taken time off to travel, study, work in another field or start a family. (Note 12)

In the aggregate, worries about preparing many more new teachers to meet

demand are misplaced. As a nation, we produce many more new teachers than the 100,000 or fewer that are needed annually. In 2000, for example, the 603 institutions counted in the AACTE/NCATE joint data system—representing about half of all teacher training institutions and about three-quarters of teachers in training—reported 123,000 individuals who completed programs that led to initial teaching certification. So the newly prepared pool that year was well above 160,000, (Note 13) before counting those who entered teaching through alternative pathways that were not university-based. (Note 14) (see Figure 1). Overall, according to the U.S. Census Bureau, more than 6 million people in the nation held a bachelor’s degree in education in 1993. This represented only a fraction of the credentialed teacher pool, since most teachers now enter teaching with a major in a disciplinary field plus a credential or master’s degree in education. So excluding the 2.5 million active teachers at that time, more than 4 million people were prepared to teach but were not doing so.

If we have no overall “shortage” of individuals prepared to teach, why are there so many unqualified teachers in some states and cities? What we do have is a maldistribution of teachers, with surpluses in some areas and shortfalls in others. In 2000, for example, there were surpluses of teachers in most fields in the Northwest, the Mid-Atlantic and much of the South but shortages in the far West, the Rocky Mountain States, and Alaska (American Association for Employment in Education, 2000). With slowed employment in other sectors of the economy during 2002 and teacher salary hikes in some places that had previously had hiring problems, newspapers across the country carried stories of shortages being resolved (see, e.g. Gormley, 2003; Zhao, 2002). In some growing areas, enrollment increases will likely continue to create hiring pressures, while enrollment declines promise to expand teacher surpluses elsewhere. By 2007, for example, enrollments are projected to climb by more than 20% in California and Nevada while shrinking in most parts of the Northeast and Midwest. But enrollment levels are not the central problem.

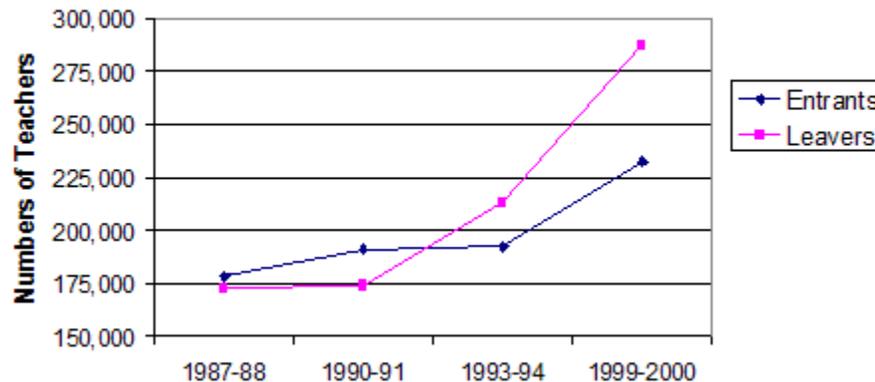
Figure 1 - Sources of Teacher Supply



The Exodus of Beginning Teachers. A much larger challenge than preparing new teachers is retaining existing teachers. Since the early 1990s, the annual outflow

from teaching has surpassed the annual influx by increasingly large margins, straining the nation's hiring systems. While schools hired 232,000 teachers in 1999, for example, 287,000 teachers left the profession that year (see Figure 2). Retirements make up a small part of this attrition. Only 14% of teachers who left in 1994-1995 listed retirement as their primary reason (Ingersoll, 2001). More than half left to take other jobs and/or because they were dissatisfied with teaching. Especially for hard-to- staff schools, the largest exodus is by newer teachers who are dissatisfied with working conditions or have had insufficient preparation for what they face in classrooms (Ingersoll, 2001; Henke, et al., 2000).

Figure 2 - Trends in Teacher Entry and Attrition, 1987-2000



Source: Adapted from Ingersoll (2001).

The early exodus of teachers from the profession has been a longstanding problem. Studies indicate that as many as 20% of new teachers may leave teaching after three years and that closer to 30% quit after five years. (Note 15) Departure rates for individual schools and districts run higher, as they include both “movers,” who leave one school or district for another, as well as “leavers,” who exit the profession temporarily or permanently. Together, movers and leavers particularly affect schools serving poor and minority students. Teacher turnover is 50% higher in high-poverty schools than in more affluent ones (Ingersoll, 2001, p. 516), and new teachers in urban districts exit or transfer at higher rates than suburban counterparts (Hanushek, Kain, & Rivkin, 1999). In addition, teachers quit schools serving low-performing students at much higher rates than they quit successful schools (Hanushek, Kain & Rivkin, 1999, p. 15). As a result, these schools are often staffed disproportionately with inexperienced as well as ill-prepared teachers.

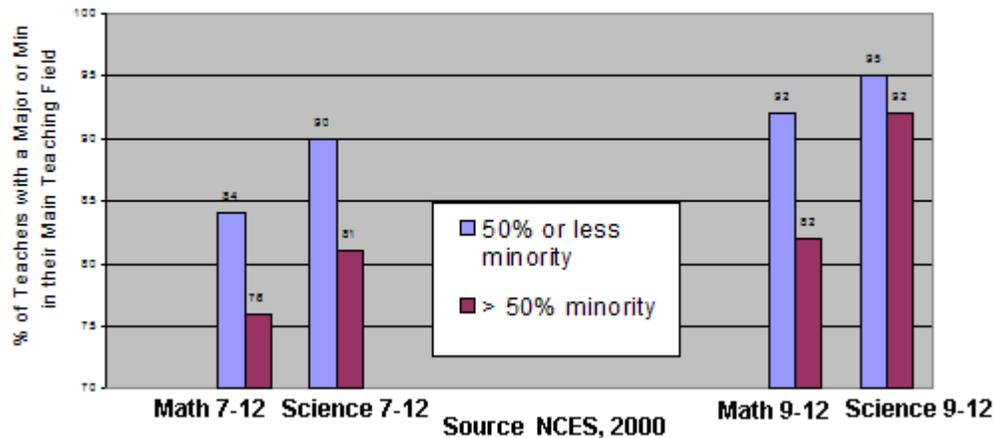
The costs of early departures from teaching are immense, as evidenced by a recent study in Texas that employed different models to estimate the costs of teacher turnover. Based on the state's current turnover rate of 15.5%, which includes more than 40% of beginning teachers quitting the field in their first three years, the study found that, “Texas is losing between \$329 million and \$2.1 billion per year, depending on the industry cost model that is used” (Benner, 2000, p. 2). This represents between \$8,000 and \$48,000 for each beginning teacher who leaves. The larger figure, truly a staggering number, stems from a model that includes separation costs, replacement or hiring costs, training costs, and learning-curve loss. Using even the lowest estimate for this one state, however, it is clear that early attrition from teaching costs the nation billions of dollars each year.

Such churn among novices also reduces overall education productivity, since teacher effectiveness rises sharply after the first few years in the classroom (Hanushek, Kain, & Rivkin, 1998; Kain & Singleton, 1996). It drains affected schools' financial and human resources. These schools, which typically can least afford it, must constantly pour money into recruitment and professional support for new teachers, many of them untrained, without reaping benefits from the investments. Other teachers, including the few who could serve as mentors, are stretched thin by the needs of their colleagues as well as their students (Shields et al., 2001). Scarce resources are wasted trying to re-teach the basics each year to teachers who arrive with few tools and leave before they become skilled (Carroll, Reichardt, & Guarino, 2000). Most important, the constant staff churn consigns a large share of children in high-turnover schools to a parade of relatively ineffective teachers.

Shortage Fields. While U.S. teacher supply is sufficient on the whole to meet demand, there are nonetheless longstanding shortages in particular fields. These result largely from more attractive earnings opportunities outside teaching. Mathematics and science teaching, for example, suffer larger wage disparities than those for English and social studies. Thus college graduates trained in mathematics and the sciences typically must forgo greater salaries in order to teach. Likewise, increased demand for special education and bilingual education teachers, and the skill sets that trained teachers in these fields possess, have produced shortfalls in many states and localities. (Note 16)

These shortages, again, particularly hurt disadvantaged students. This is not only because of pupils taught by unqualified special education and bilingual education teachers. It is also because less advantaged minority students disproportionately end up with unqualified teachers of science and math as well. In 1993-1994 only 8% of public school teachers in wealthier schools taught without a major or minor in their main academic assignment—compared with fully a third of teachers in high-poverty schools. Moreover, nearly 70% of those in poor, minority schools taught without at least a minor in their secondary field (National Center for Education Statistics, 1997). In 1998, the proportions of out-of-field math and science teachers, though somewhat lower, were still much higher in low-income, minority and urban schools (NCES, 2000) (see Figure 3).

Figure 3- Disparities in Access to Qualified Math and Science Teachers, 1998



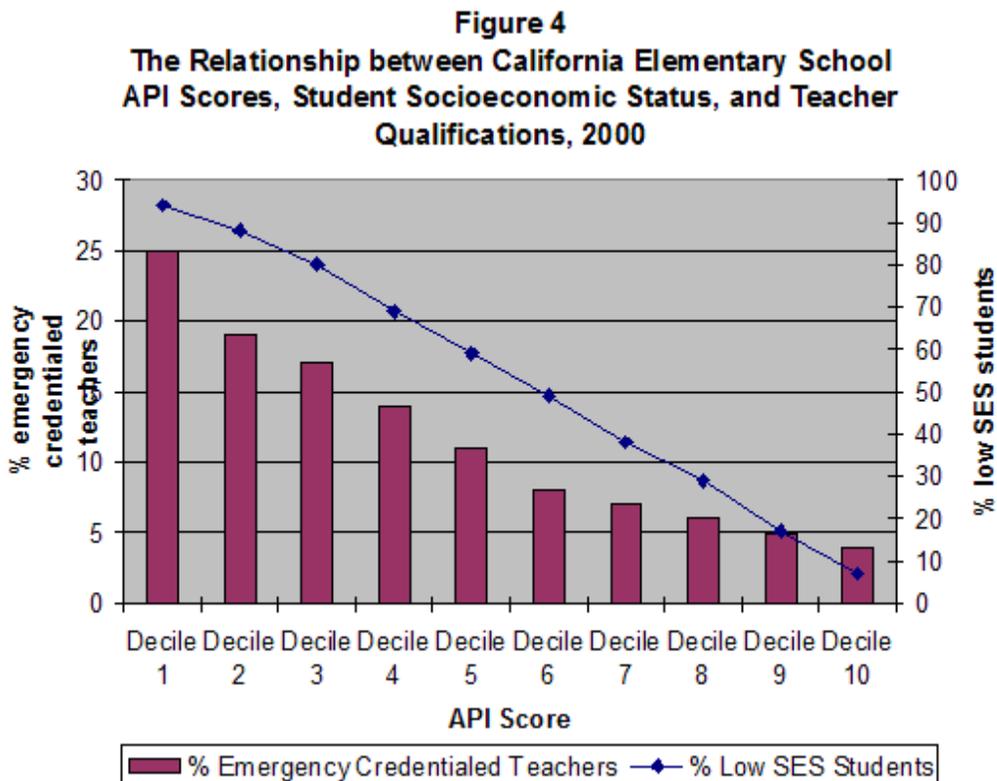
The Children Who Suffer Most. With all of these problems—whether the general maldistribution of teachers, the exodus of younger teachers from the profession, or shortages in special fields—the chief victims are disadvantaged students in big cities or poor rural areas. This heavily reflects the nation’s inequitable funding of education. In most states, the wealthiest districts have revenues and expenditures per pupil that are two or three times those of the poorest districts (Educational Testing Service, 1991; Kozol, 1991). Poor rural districts typically spend the least, and urban districts serving students with multiple needs spend much less than surrounding suburbs, where students and families have far fewer challenges. These inequities translate into differentials in salaries and working conditions—resources that greatly affect teacher labor markets.

A recent report from the Education Trust (2002) found that, in many states, the quartile of districts with the highest child poverty rates receives less state and local funding per pupil than the most affluent quartile. The study indicated that, nationwide, this disparity decreased slightly between 1997 and 2000, a somewhat hopeful sign. (Note 17) Nevertheless, the disparities persist, and their effects are amplified by the needs students bring to school. A recent large-scale study of young children found that children’s socioeconomic status (SES) is strongly related to cognitive skills at school entry. For example, the average cognitive scores of entering children in the highest SES group are 60% above the average scores of the lowest SES group (Lee & Burkham, 2002). As the study documents, low-SES children then begin kindergarten in systematically lower-quality schools than their more advantaged peers, no matter what measure of quality is used—qualified teachers, school resources, teacher attitudes, achievement or school conditions. From the outset of schooling, then, inequalities associated with family circumstances are multiplied by inequalities of education.

Those unequal opportunities then continue throughout the students’ educations. In almost every field, central city schools with the largest numbers of disadvantaged children are much more likely than other schools to report unfilled teacher vacancies (NCES, 1997, Table A8.11). These schools are also far more likely than others to fill vacancies with unqualified teachers. The funding inequalities also lead

to enlarged class sizes and lack of access to higher-level courses as well as to poorer teaching (Choy, et al., 1993).

California data provide a dramatic example of the maldistribution of qualified teachers and its effects. On the one hand, many California districts have little difficulty hiring qualified teachers. In 2000- 2001, for example, about 47% of districts (41% of schools) had fewer than 5% uncredentialed teachers, and about 25% hired no unqualified teachers at all (Shields, et al., 2001, p. 21-23). However, in another quarter of California schools, more than 20% of teachers were underqualified (i.e., lacking a preliminary or professional clear credential), and in some schools a majority of teachers lacked full certification. As Figure 4 shows, the presence of underqualified teachers is strongly related both to student socioeconomic status and to student achievement, with students who most need highly qualified teachers least likely to get them.



Across the nation, disparities in access to qualified teachers occur not only among districts but also among schools within districts. Among other things, recent studies show:

- Nonwhite, low-income and low-performing students, particularly in urban areas, are disproportionately taught by less qualified teachers (Hanushek, Kain, & Rivkin, 2001; Ingersoll, 2002; Jerald, 2002; Lankford, Loeb, & Wyckoff, 2002).
- Teachers most often transfer out of schools with poor, minority, and low-achieving students (Ingersoll, 2001; Lankford, Loeb, & Wyckoff, 2002; Hanushek, Kain, & Rivkin, 2001; Scafidi, Sjoquist, & Stinebrickner, 2002).
- School and district disparities in teacher qualifications persist over time and have worsened in the past 10 to 15 years as teacher demand and funding inequities both have increased (Jerald, 2002; Lankford, Loeb, & Wyckoff,

2002; NCES, 2002).

IV. What Factors Influence Teacher Distribution?

Researchers have examined what factors influence who teaches where and how long they stay. These include wages and benefits, “non-pecuniary” considerations such as working conditions and student characteristics, teacher preparation and district personnel policies (Lankford, Loeb, & Wyckoff, 2002, pp. 38-39). Disentangling these factors is essential to the evaluation of policy alternatives. If teachers generally prefer teaching white, middle-class, high-performing students, for example, that preference may be hard to influence. But if teachers object to working conditions that often attend teaching poor and minority children, those are potentially alterable. Many analysts (e.g., Ballou, 1996, Ballou & Podgursky, 1997; Wise, Darling-Hammond, & Berry, 1987) also contend that districts and schools often fail to hire the best candidates, at any given salary level, introducing inefficiencies into the labor market for teachers. So the joint preferences of individuals and organizations interact to determine who teaches and where they teach. A brief tour of this terrain suggests the kinds of policies needed.

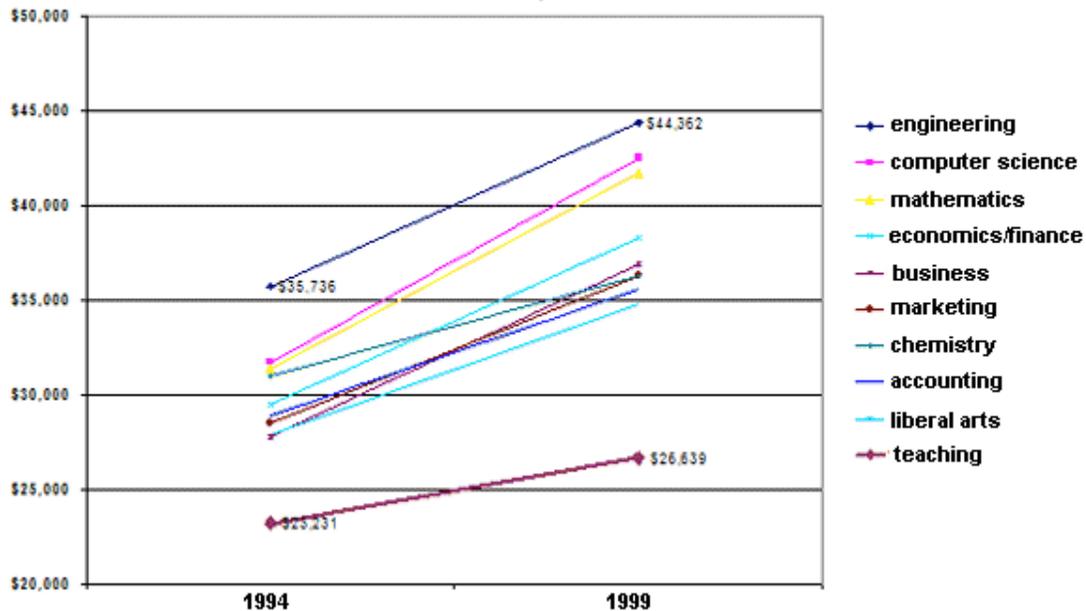
The Draw of Home. The first feature of note is the longstanding tendency for many teachers to seek positions close to where they grew up or, to a lesser extent, went to college. As Boyd and colleagues (2003) note: “The importance of distance in teachers’ preferences particularly challenges urban districts, which are net importers of teachers” (p.12). While teachers who grew up in cities often are inclined to teach in their hometowns, the number of urban recruits falls short of the number needed, requiring urban districts to seek teachers from elsewhere. If urban districts cannot offer compensating incentives, urban recruits are likely to be less qualified overall than those who teach in suburbs. The differential qualifications of teachers in disadvantaged urban schools appear to be at least as much a function of first-job placements as differential exits or transfers accounts. Geography, then, clearly plays a powerful role, a point to which we return in our policy recommendations.

Salaries. Even if teachers may be more altruistically motivated than many other workers, teaching must compete for talented college graduates in ways that include pay. On this score, although overall teacher demand can be met, there is reason for concern. Teacher pay not only is relatively low, but during the 1990s it also declined relative to other professional salaries (see Figure 5). Even after adjusting for the shorter work year in teaching, teachers earn 15% to 30% less than college graduates who enter other fields.

Today’s troubled economy is temporarily offsetting these trends because of the relative stability of teaching compared with such hard-hit sectors as high technology. Thus in the Silicon Valley area, the flow of technology workers into math and science teaching recently has swelled, and reports indicate that applications are up elsewhere as well (Hayasaki, 2003). The profession needs to maximize this temporary opportunity, ensuring that enough new entrants, especially from high-need fields, receive sufficient training and support to succeed, adding to the long-term supply of high-quality teachers. Otherwise, demand from career-switchers may increase pressure for fast-track training, creating teachers who may soon become part of the exodus from the profession. It is important to

recognize, moreover, that the economy's cycles are temporary, so before too long many career- switchers may return to more lucrative occupations if they do not find satisfying work in teaching. What happens with respect to school revenues, teacher salaries, and subsidies for decent training for these new entrants will determine whether schools can benefit from these trends.

**Figure 5 - Trends in Starting Salaries across Professions
United States, 1994-1999**



There is evidence that wages are at least as important to teachers in their decision to enter and quit the profession as they are to workers in other occupations (Baugh and Stone, 1982). Teachers are more likely to leave the field when they work in districts with lower pay and when their salaries are low compared to other wage opportunities (Brewer, 1996; Mont & Rees, 1996; Murnane, Singer & Willett, 1989; Theobald, 1990; Theobald & Gritz, 1996). These factors are strongest at the start of the teaching career (Hanushek, Kain & Rivkin, 1999; Gritz & Theobald, 1996) and for teachers in high- demand fields like math and science (Murnane and Olsen, 1990; Murnane, et al., 1991).

But do pay increases result in better educational results? To find out, some analysts have examined the relationship between changes in teacher salaries and student achievement. Based on a meta-analysis of about 60 production function studies, for example, Greenwald, Hedges and Laine (1996) found larger effects for student achievement associated with increased teacher salaries (as well as with teacher experience and education, which are rewarded in salary schedules) than for such other resources as reduced pupil-teacher ratios. Ferguson's (1991) analysis of student achievement in Texas also concluded that student gains were associated with the use of resources to purchase higher-quality teachers. In an analysis of hiring practices and salaries in California counties, Pogodzinski (2000) found that higher salaries appeared to attract better-prepared teachers. Finally, in a study looking across states from 1960 through 1990 and across districts in California from 1975 through 1995, Loeb and Page (2000) found that student educational attainment increased most in states and districts that increased teacher wages.

Studies confirm that salaries are widely disparate both within and across states—and that school systems serving large numbers of low-income and minority students often have lower salary levels than surrounding districts (Lankford, Loeb, & Wyckoff, 2002). Nationally, teachers in schools serving the largest concentrations of low-income students earn, at the top of the scale, salaries one-third less than those in higher-income schools (NCES, 1997), while they also face lower levels of resources, poorer working conditions, and the stresses of working with students and families who have an array of needs. Pogodzinski (2000) found that large differences in teachers' wages across schools districts within the same county are a significant factor in explaining the use of emergency permits and waivers.

Once teachers begin work, however, transfers to other schools often appear to be influenced only modestly by salaries and more by other factors (Loeb & Page, 2000). While one study found that teacher transfers tended to improve salary slightly (Hanushek, Kain, & Rivkin, 2001), another found that salary variation seemed to contribute little to teacher sorting among schools (Lankford, Loeb, & Wyckoff, 2002). We conclude, then, that teacher salaries are important in attracting individuals to teaching from the college-educated pool and in influencing early career behavior. They also have an effect on attrition. But other factors also matter to teachers' decisions about whether and where to continue teaching.

Working Conditions and Dissatisfaction. Surveys have long shown that working conditions play a large role in teacher decisions to change schools or leave the profession. Reasons for remaining in teaching or leaving are strongly associated with such matters as how teachers view administrative support, available education resources, teacher input into decisionmaking, and school climate (Darling-Hammond, 1997; Ingersoll, 2001, 2002). Moreover, there are large differences in the support teachers receive in affluent and poor schools. Teachers in more advantaged communities experience easier working conditions, including smaller class sizes and pupil loads, more materials and greater influence over school decisions (NCES, 1997, Table A 4.15). In 1994-1995, more than a quarter of all school leavers listed dissatisfaction with teaching as a reason for quitting, with those in high-poverty schools more than twice as likely to leave because of this than those in wealthier schools (Darling-Hammond, 1997).

A number of studies have found that teacher attrition appears related to student demographics, with teachers transferring out of high-minority and low-income schools (e.g., Carroll, Reichardt, & Guarino, 2000; Scafidi, Sjoquist, & Stinebrickner, 2002) or out of low-performing schools into better-performing ones (Hanushek, Kain, & Rivkin, 2001). Given the confluence of negative conditions in schools serving low-income and minority students, the question is whether these demographic variables can be disentangled from other non-pecuniary factors that are amenable to policy influences.

There is evidence that working conditions are an important independent cause of teacher attrition, beyond the student characteristics frequently associated with them. For example, a survey of California teachers (Harris, 2002) found that teachers in high-minority, low-income schools reported significantly worse working conditions, including poorer facilities, fewer textbooks and supplies, less administrative support and larger class sizes. Furthermore, the teachers were

significantly more likely to say that they planned to leave a school soon if working conditions were poor. The relationship between teachers' plans to leave and schools' demographic characteristics was much smaller.

A multivariate analysis of these California data found that turnover problems at the school level are, in fact, influenced by student characteristics, but that demographic variables become much less significant when working conditions and salaries are considered. Working conditions—ranging from large class sizes and facilities problems to multi-track, year-round schedules and faculty ratings of teaching conditions—proved to be the strongest predictors of turnover problems, along with salaries (Loeb, Darling-Hammond, & Luczak, forthcoming). We believe that such conditions constitute a primary target for policies aimed at retaining qualified teachers in high-need schools.

Finally, a new aspect of working conditions that affects teacher retention may be traced to unexpected consequences of the new accountability. In many states today, schools that fail to meet performance standards on state assessments are being targeted for special attention, often associated with new labels. Low-performing schools frequently are identified in the local press and may be subject to sanctions and interventions. Such targeting can be valuable in identifying schools that most need more help, but it can also stigmatize such schools, affecting staff morale and leading to a teacher exodus. Evidence of such effects is beginning to emerge. A Florida report described teachers leaving schools rated “D” or “F” in “droves” (DeVise, 1999). A North Carolina study found “failing” schools lagging behind others in their ability to attract more highly qualified teachers, a trend researchers attribute to the accountability system (Clotfelter et al., 2003). In the California study noted above, teachers rated more negatively than any other working condition the state tests they are required to administer. This was a component of the measure that significantly predicted turnover (Loeb, Darling-Hammond, & Luczak, 2003).

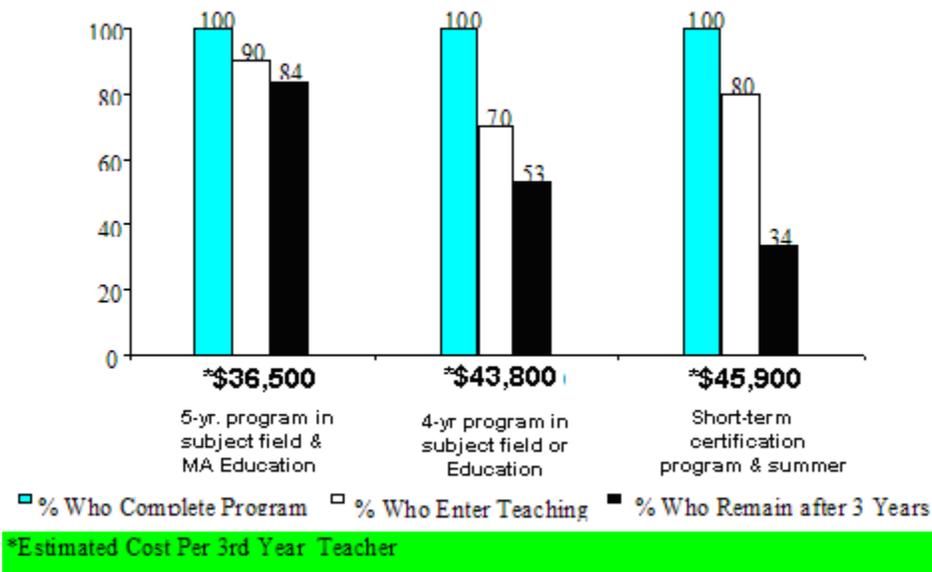
Teacher Preparation and Support. A factor often overlooked in economic analyses is the effect of preparation on teacher retention. A growing body of evidence indicates that attrition is unusually high for those with little initial preparation. A recent NCES study found, for example, that 49% of uncertified entrants left the profession within five years, more than triple the 14% of certified entrants who did so (Henke, et al., 2000). This report and an analysis of another NCES data base both showed attrition rates for new teachers who lacked student teaching at rates double those of those who had had student teaching (NCTAF, 2003).

In California, the state standards board has found that 35% to 40% of emergency permit teachers leave the profession within a year (Darling-Hammond, in press; Tyson, Hawley, & McKibbin, 2000, p. 3). National data from the Recent College Graduates Survey indicate that about two-thirds of novices who enter without teacher education (neither certified nor eligible for certification) leave teaching within their first year (Grey, et al., 1993). As noted previously, moreover, studies of entry paths to teaching that offer only a few weeks of training before assumption of full teaching responsibilities have also found high attrition rates.

Conversely, accumulating evidence indicates that better-prepared teachers stay

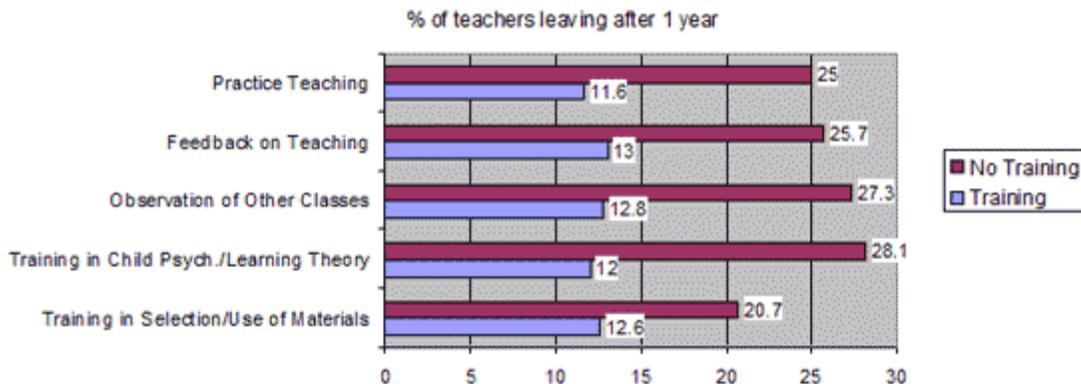
longer. For example, a longitudinal study of 11 institutions found that teachers who complete redesigned 5-year teacher education programs enter and stay in teaching at much higher rates than 4-year teacher education graduates from the same campuses (Andrew & Schwab, 1995). The 5-year programs allow a major in a disciplinary field, intensive training for teaching and long-term student teaching. In addition, both 4- and 5-year teacher education graduates enter and stay at higher rates than teachers hired through alternatives that offer only a few weeks of training before recruits are left on their own in classrooms (Darling-Hammond, 2000b). These differences are so large that, considering the costs to states, universities and school districts of preparing, recruiting, inducting and replacing teachers due to attrition, the cost of preparing a career teacher through a 5- year program is actually far less than that of preparing larger numbers, many of whom leave, through short-term routes (see Figure 6). Graduates of 5-year programs also report higher levels of satisfaction with their preparation and receive higher ratings from principals and colleagues.

Figure 6 Average Retention for Different Pathways into Teaching



Similarly, Schools and Staffing Survey (SASS) data for 1999-2000 show big differences in plans to stay in teaching between first-year teachers who felt well prepared and those who felt poorly prepared. On such items as preparation in planning lessons, using a range of instructional methods and assessing students, two-thirds of those reporting strong preparation intended to stay, compared to only one-third of those reporting weak preparation. The differentials hold true for actual attrition as well. Analyses of SASS Teacher Follow-up data show that new recruits who had training in such aspects of teaching as selecting instructional materials, child psychology and learning theory, who had practice teaching experience and who received feedback on their teaching left the profession at rates half as great as those who did not have such preparation (NCTAF, 2003) (see Figure 7). Similarly, a survey of 3,000 beginning teachers in New York City found that recruits who felt better prepared were more inclined to stay in teaching, to feel effective, and to say they would enter through the same program or pathway again. Graduates of teacher education programs felt significantly better prepared and more effective than those entering through alternative routes or with no training (Darling-Hammond, Chung, and Frelow, 2002).

Figure 7 - Teacher Preparation Reduces Attrition of 1st Year Teachers



The effects of strong initial preparation are likely to be enhanced by equally strong induction and mentoring in the early teaching years. School districts such as Cincinnati, Columbus and Toledo, Ohio, and Rochester, New York, have reduced beginning-teacher attrition rates by more than two-thirds by providing expert mentors with release time to coach beginners in their first year (NCTAF, 1996). These young teachers not only stay in the profession at higher rates, but they also become competent more quickly than those who learn by trial and error.

States increasingly are requiring induction programs, some with strong results. Unfortunately, quality can decline as programs expand. In an assessment of one of the oldest, California's Beginning Teacher Support and Assessment (BTSA) Program, for example, early pilots with carefully designed mentoring systems found rates of new-teacher retention exceeding 90% in the first two to three years on the job. However, as the program scaled up with more uneven implementation across the state, a later study reported that only 47% of BTSA participants had received classroom visits from their support provider at least monthly, and only 16% of novice teachers participating in other induction programs had received such visits. Often, districts provided orientation sessions and workshops rather than on-site mentoring, the most powerful component of induction programs (Shields, et al., 2001, p. 101). While state induction programs for beginning teachers rose from seven in 1996-97 to 33 in 2002, only 22 states fund the programs, and many do not require regular, on-site coaching (NCTAF, 2003). To reap the gains that well-designed programs have realized, state-mandated induction programs must include real support and follow-through.

Particularly in hard-to-staff schools, then, policies encouraging strong initial teacher education are warranted, along with strong induction and continuing support. Initial preparation cannot overcome poor working conditions and inadequate support, but it can launch teachers successfully, reducing the odds that they will leave teaching altogether.

Personnel Management. Finally, how districts and schools—within the constraints of state policies and collective bargaining agreements—recruit, hire, assign, support and manage transfers of teachers plays a large role in determining shortages. Studies in locales ranging from large cities to small rural districts make clear how local management preferences and practices shape who teaches in which schools—and how such preferences can systematically enhance or

undermine both efficiency and effectiveness.

Some states, for example, enforce redundant requirements for fully qualified and credentialed candidates from other states, making it difficult for them to enter the local teaching force. (Note 18) Additional barriers include late budget decisions by state and local government, teacher transfer provisions that push new hiring decisions into August or September, lack of pension portability across states and loss of salary credit for teachers who move. Nor does the list stop there. For example, most districts have salary caps for experienced candidates. As a result, some highly desirable teachers must take pay cuts if they want to teach in new schools where they have moved. Changing professions can look like a better option in those circumstances. Likewise, few districts reimburse travel and moving expenses, yet another barrier to mobility in the teacher labor market.

Atop all of this, many districts do not hire the best applicants because of inadequate information systems or antiquated and cumbersome procedures that discourage or lose candidates in seas of paperwork (Wise, Darling-Hammond, & Berry, 1987). For example, before its recent overhaul, the 62-step hiring process in Fairfax County, Virginia, mirrored those of many other large districts that attract a surplus of qualified applicants but cannot find an efficient way to hire them (NCTAF, 1996). A process that takes months and features long lines and delays can discourage all but the most persistent.

In districts with high demand relative to supply, late hiring and disorganized hiring processes can undermine the recruitment of qualified teachers. In one recent study, conducted in four states, researchers found that one-third of a sample of new, young teachers were hired after the school year had already started; only 23% had any sort of reduced load; 56% received no extra assistance; and 43% went through the entire first year with no observations from a mentor or more experienced teacher (HGSE, 2003, April). In another study, nearly 50% of newly hired California teachers were hired after August 1, and 25% were hired after the start of the school year (Shields, et al., 1999). Teachers in schools with large numbers of underprepared teachers were significantly less likely to report that they had been actively recruited or assisted in the hiring process and more likely to report that the hiring process had been slow and filled with obstacles (Shields, et al., 2001, p. 84). The California State Fiscal and Crisis Management Team reports hiring and screening procedures that are erratic and fraught with glitches, application processes that are not automated or well-coordinated, applicants and vacancies that are not tracked, and recruitment that is disorganized in districts that hire large numbers of underqualified teachers (Darling-Hammond, in press).

Various studies have uncovered still more reasons for district hiring of unqualified teachers. These include patronage, a desire to save money on salaries by hiring low-cost recruits over better-qualified ones, and beliefs that more qualified teachers are more likely to leave and less likely to take orders (Pflaum & Abramson, 1990; Schlechty, 1990; Wise, Darling-Hammond, & Berry, 1987). Testimony before the California Assembly Select Committee on Low Performing Schools (2001) pointed to the prevalence of such concerns:

[I]n some situations districts hire emergency permit holders because [they] can be paid less; need not initially be provided with benefits; cannot be placed on a tenure

track; can be dismissed easily; and need not be provided with systematic support and assistance... (p. 5).

Yet other influences on the assignment of teachers may operate at the school level. In schools serving advantaged families, parents will tolerate less mediocrity in teaching and are more likely to exert pressure to hire and retain well-qualified teachers. At the classroom level, some parents pressure administrators to obtain or avoid certain teachers for their children. Responding to such informal pressures may systematically alter the availability of effective teachers for students who lack vocal and knowledgeable parent advocates. Such informal, "micro-level" processes are likely to operate unless countervailing tendencies are present (see Bridges, 1990, Clotfelter, et al., 2003).

Finally, in many states collective bargaining agreements influence the effective deployment of teachers. In particular, contract provisions that regulate transfers among schools by seniority often mean that hard-to-staff schools systematically lose experienced teachers. Turnover in such schools is high, with a steady influx of young, inexperienced teachers who often are ill supported by mentor or induction programs. In some locales, progressive labor-management relations have resulted in bargaining agreements that create more equitable staffing patterns, but these are the exceptions.

Several critical points emerge from this thicket of issues. First, incentives that influence teacher entry and mobility often fail to support an equitable distribution of teachers across districts, schools and classrooms. Salaries and working conditions are unequal, and they fail to provide compensating inducements in support of hard-to-staff schools. Second, teacher preferences and school system behaviors influence teacher distribution. Many states and districts manage hiring inefficiently for reasons ranging from fiscal conditions to management procedures, contract provisions and parent pressures. Taken together, these factors create a maldistribution of teachers that is systemic in nature and that will require coordinated responses across the levels of government and education to solve. As we discuss in the next section, some locales have begun to develop policies and practices that make genuine headway on these problems. These and other exemplars suggest how policies can be developed that directly address the sources of longstanding disparities.

V. Lessons from State and District Experiences

In this section, we describe examples of both states and local school districts that have fashioned successful strategies for strengthening their teaching forces. These approaches inform our recommendations at the end of this paper.

A. State Approaches

Beginning in the 1980s, Connecticut and North Carolina enacted some of the nation's most ambitious efforts to improve teaching. On the heels of these efforts, these states, which serve sizable numbers of low-income and minority students, (Note 19) registered striking gains in overall student learning and narrowed achievement gaps between advantaged and disadvantaged pupils. During the 1990s, for example, North Carolina posted the largest student achievement gains

of any state in math and sizable advances in reading, putting it well above the national average in 4th grade reading and math, although it had entered the decade near the bottom of state rankings. Of all states during the 1990s, it was also the most successful in narrowing the minority-white achievement gap (National Education Goals Panel, 1999). In Connecticut, also following steep gains throughout the decade, 4th graders ranked first in the nation by 1998 in reading and math on the NAEP, despite increased poverty and language diversity among its public school students. Its minority-white achievement gap, too, narrowed notably. The proportion of Connecticut 8th graders scoring at or above proficient in reading was first in the nation. In the world, moreover, only top-ranked Singapore could outscore Connecticut students in science (Baron, 1999).

Among the reforms that contributed to such gains were the significant improvements in both states' teaching forces, including in inner cities and rural areas. How did they accomplish this? With ambitious teacher initiatives that introduced standards, incentives and professional learning for teachers, along with curriculum and assessment reforms for schools (Darling-Hammond, 2000a; Wilson, Darling-Hammond, & Berry, 2000).

Notably, neither state succeeded by relaxing teacher education or licensure. On the contrary, they strengthened both. For a teaching license, for example, Connecticut insisted on additional preparation at entry, meaning a major in the content area taught and more pedagogical training as well as learning to teach reading and special-needs pupils and passing basic skills and content tests before entry to teaching. The state also eliminated emergency licensing and toughened requirements for temporary licenses. Teachers must complete a master's degree and a rigorous performance assessment modeled on that of the National Board for Professional Teaching Standards to gain a professional license.

North Carolina likewise increased licensing requirements for teachers and principals (in the form of increased coursework in content and pedagogy as well as licensing tests), required schools of education to undertake professional accreditation through the National Council for Accreditation of Teacher Education (NCATE), invested in improvements in teacher education curriculum, and supported creation of professional development schools connected to schools of education. Both states also developed mentor programs for beginning teachers that extended assistance and assessment into the first year of teaching, and both introduced intensive professional development for veteran teachers. A recent study of North Carolina's reforms noted the strong quality of teachers in the state as a whole and in schools serving diverse student populations. The authors write:

Like the dog that did not bark in the night . . . what is most significant is what is absent. One does not see teachers without pedagogical training, teachers with inadequate content knowledge, or teachers whose own literacy and mathematical skills are poor.... (Asher, et al., forthcoming).

These efforts were successful because both states created strong labor market incentives linked to their teacher standards. Among measures they adopted:

- **Increased and Equalized Salaries, Tied to Standards.** Both states coupled major statewide increases in teacher salaries with improved pay equity across

districts. In Connecticut, for example, the average teacher salary climbed from \$29,437 in 1986 to \$47,823 in 1991, with the equalizing nature of the state aid making it possible for urban districts to compete for qualified teachers. Because Connecticut's state teacher salary assistance could be spent only for fully certified teachers, districts had greater incentives to recruit those who had met the high new standards, and individuals had greater incentives to meet these standards. North Carolina created standards-based incentives by adopting notable salary increases for teachers to pursue National Board Certification, so that North Carolina now has more teachers certified by the National Board than any other state.

- **Recruitment Drives and Incentives.** To attract bright young candidates, both states initiated programs to subsidize teacher education in return for teaching commitments. The highly selective North Carolina Teaching Fellows program, for example, paid all college costs, including an enhanced and fully funded teacher education program, for thousands of high-ability students in return for several years of teaching. After seven years, retention rates for these teachers exceeded 75%, with many of the remaining alumni holding public school leadership posts (NCTAF, 1996). Connecticut's service scholarships and forgivable loans similarly attracted high-quality candidates and provided incentives to teach in high-need schools and shortage fields, while the state also took steps to attract well-trained teachers from elsewhere. By 1990, nearly a third of its newly hired teachers had graduated from colleges rated "very selective" or better in the Barron's Index of College Majors, and 75% had undergraduate grade point averages of "B" or better (Connecticut State Board of Education, 1992, p. 3).
- **Support Systems.** Both states bolstered support systems that make a difference in stemming teacher turnover. North Carolina launched a mentoring program for new teachers that greatly increased their access to early career support (National Education Goals Panel Report, 1998). Connecticut provided trained mentors for all beginning teachers and student teachers as part of its staged licensing process. For existing teachers, North Carolina created professional development academies, a North Carolina Center for the Advancement of Teaching, and teacher development networks such as the National Writing Project and analogous institutes in mathematics. This was in addition to its incentives for National Board Certification. Connecticut, among other things, required continuing professional development, including a master's degree for a professional license.

Such teacher reforms began paying off early on. After Connecticut's \$300 million 1986 initiative, for instance, the higher salaries and improved pay equity, combined with the tougher preparation and licensing standards and an end to emergency hiring, swiftly raised teacher quality. An analysis found, in fact, that within three years, the state not only had eliminated teacher shortages, even in cities, but also had created surpluses (Connecticut State Department of Education, 1990). Even as demand increased, the pool of qualified applicants remained solid. A National Education Goals Panel report (Baron, 1999) found that in districts with sharply improved achievement, educators cited the high quality of teachers and administrators as a critical reason for their gains and noted that "when there is a teaching opening in a Connecticut elementary school, there are often several hundred applicants" (p. 28).

These teacher initiatives occurred alongside other education changes—increased investments in early childhood education and in public schools generally, as well as wide-ranging, standards-based reform—which also contributed to the states’ student achievement gains. There is little doubt, however, that higher-quality teachers supplied to all schools were substantial contributors to these other reforms as well as to the overall achievement increases. Both states sought to increase not only salaries and the quality of preparation for teachers, but also the incentive structure for distributing teachers to fields and locations. Both sharply reduced hiring of unlicensed and underprepared staff. Most notably, both held to the course of teacher improvement over a sustained period—more than 15 years in each case. They demonstrate what state policy in support of good teaching can accomplish.

B. District Approaches

District success stories reflect the importance of recruiting, inducting and supporting qualified teachers using policy tools available at the local level and leveraging state assistance. Following are just four examples of what urban districts in high-demand states have done.

New York City. New York City illustrates how a focus on recruiting qualified teachers, coupled with necessary salary increases, can have a large effect in a brief period. The city long had hired thousands of underprepared teachers, typically filling as many as half of its vacancies with uncertified applicants, many well after September. The state, however, pressured the city to hire qualified teachers and mandated that uncertified teachers could no longer teach in low-performing schools. This, plus awareness of pending NCLB requirements, led to the improvements. The district focused on more aggressive recruiting and hiring of qualified teachers and implemented a steep increase in salaries—averaging 16% overall and more than 20% for beginning teachers—to make them more competitive with surrounding suburban districts. With these policies, 2002-2003 vacancies were filled by July, and 90% of new hires were certified, up from 60% the year before. The remaining 10% were in programs that would lead to certification by the end of the school year (Hays & Gendar, 2002).

Community School District #2. Much earlier, New York City’s Community District #2 was an oasis widely heralded as a turnaround story, with a strategic emphasis on professional development for teachers and principals. But student achievement gains clearly relied on both a development *and* recruitment strategy (Elmore & Burney, 1999). In 1996, after a decade of reforms focused on strengthening teaching, this “majority minority” district—which serves large numbers of low-income and immigrant students—realized sharp achievement gains that ranked it 2nd in the city in reading and math.

Sweeping changes instituted by Superintendent Anthony Alvarado stressed continuing professional development for teachers and principals, coupled with a relentless concentration on instructional improvement. At the same time, Alvarado recognized the need for more talented and committed teachers and principals. Backed by the teachers’ union, he replaced nearly half the teacher workforce and two-thirds of principals over a period of years through a combination of retirements, pressure and inducements. Meanwhile, the central office carefully managed the

recruitment, hiring and placement of new teachers and principals. It ended the hiring of unprepared teachers and sought recruits from several leading teacher education programs in the city, forging partnerships for student teaching and professional development with these institutions as well. Similar programs for developing principals were launched. The district's growing reputation for quality also attracted other teachers. Salary changes were not within the district's purview. Its strategies, rather, involved recruiting aggressively, creating university partnerships to develop a pipeline of well-prepared teachers, and supporting teachers with strong mentoring and professional development.

New Haven, California. California success stories are particularly notable because that state in recent years has ranked first in the nation in the number of unqualified teachers. In this high-demand context, with state policies that were, until recently, relatively unsupportive (e.g., low expenditures, lack of reciprocity with other states, restricted teacher education options), some districts have nonetheless achieved significant staffing improvements. New Haven Unified School District, just south of Oakland in Union City, which enrolls 14,000 mostly low-income and minority students, is one that has succeeded while neighboring districts have not. New Haven combined high salaries, aggressive recruiting and close mentoring with a high-quality training program worked out with area universities. Although not a top-spending district, it invested its resources in teacher salaries and good teaching conditions. In 1998, for example, New Haven's salaries were more than 30% higher than nearby Oakland's, where large numbers of unqualified teachers were hired, even though New Haven's per-pupil spending was below Oakland's (Snyder, 2002).

Thus, over an extended period it built a well-prepared, highly committed and diverse teaching staff. For the 2001-2002 school year, 10 of its 11 schools had no uncredentialed teachers. The district averaged 0.1% uncredentialed teachers—while some neighboring districts averaged more than 20% (Futernick, 2001). New Haven uses advanced technology and a wide range of teacher supports to recruit from a national pool of exceptional teachers and to hire them quickly. The district was one of California's first to implement a Beginning Teacher Support and Assessment Program that assists teachers in their first two years in the classroom; all beginning teachers get help from a trained mentor, who is given release time for the purpose. In addition, New Haven collaborated with California State University- Hayward on the right kind of alternative-certification program, combining college coursework and an internship, including student teaching, conducted under the close supervision of university- and school-based educators. As a result of these initiatives, the district has a teacher surplus in the midst of general shortages (for details, see Snyder, 2002).

San Diego, California. Using similar strategies, San Diego City Schools recently overhauled its teacher recruitment and retention system, aggressively recruiting well-trained teachers, collaborating with universities on new training programs in high-need fields, and creating smooth pathways with local schools of education. It offers contracts to well-prepared teachers as early as possible (sometimes as much as a year in advance of hiring) and reaches out to teachers in other states. In addition, the district streamlined the hiring process, putting the entire system online, improving its capacity to manage hiring data, vacancy postings and interviews that had slowed the process and caused many candidates to give up and go elsewhere. In the fall of 2001, districts like San Francisco and Los Angeles hired hundreds of

uncredentialed teachers, and the state as a whole hired more than 50% of novices without full credentials. But San Diego filled almost all of its 1,081 vacancies with credentialed teachers, eliminating all but 11 of the hundreds of previously hired emergency permit teachers who had been assigned largely to high-minority, low-income schools. (Darling-Hammond, et al., 2002).

What State and Local Successes Tell Us

Taken together, these state and local cases demonstrate that determined, well-focused, and sustained efforts can make a difference in staffing even hard-to-staff schools, which in turn greatly increases the probability of student learning. These cases also make clear that schools can be staffed without lowering the bar on teacher standards by counting untrained novices as “highly qualified” or by encouraging states to dilute certification requirements. While it is important to broaden the sources of supply for teaching, it is also essential to safeguard the quality of that supply if the NCLB goals for children’s learning are to be achieved. This can be achieved by clarifying three aspects of the law:

- Teachers should be considered “fully certified” under NCLB’s definition of “highly qualified” when they have *completed* a traditional or alternative-route program.
- “Full certification” should continue to include content and pedagogical preparation.
- Standards should be adopted for acceptable alternate-route (and traditional) programs. One careful synthesis of teacher preparation research (Wilson, Floden, & Ferrini-Mundy, 2001, p. 30) suggests, for example, that the following components should be included in high- quality, alternate-certification programs (components that could be applied equally as well to traditional programs):
 - High entrance standards.
 - Intensive training in instruction, management, curriculum, assessment and how to work with diverse students.
 - Extensive mentoring and supervision by well-prepared teachers.
 - Frequent and substantial evaluation.
 - Guided practice in lesson planning and teaching, with benchmarks for competence prior to taking full responsibility as a teacher.
 - High exit standards tied to state standards for teaching.

Around such standards states and districts can improve teacher preparation, with Washington developing incentives to attend such programs, thereby boosting supply while encouraging the elimination of ineffective alternatives.

VI. The Need for a National Teacher Supply Policy

While we can learn a good deal from state and local successes, such cases are the exceptions to the rule. They stand out amid widespread use of underprepared teachers and untrained aides, mainly for disadvantaged children in schools that suffer from poor working conditions, inadequate pay and high teacher turnover. Thus while much that must be done lies at the state, district and even school level, the federal government has a critical role to play, focused on three goals:

- Enhancing the supply of qualified teachers targeted to high-need fields and locations.
- Improving retention of qualified teachers, especially in hard-to- staff schools.
- Creating a national labor market by removing interstate barriers to mobility.

This can be accomplished, we believe, by drawing in part on the federal experience with medical manpower programs. Since 1944, Washington has subsidized medical training and facilities to meet the needs of underserved populations, to fill shortages in particular fields and to increase diversity in the medical profession. (Note 20) The federal government also collects data to monitor and plan for medical manpower needs. This consistent commitment, on which we spend hundreds of millions of dollars annually, has contributed significantly to America's world-renowned system of medical training and care. Although the teacher labor market is also vital to the nation's future, federal efforts in this area have tended to be modest, fragmented and inconsistent over time. (Note 21) Washington has periodically adopted programs to enhance teacher supply, but these have not continued on the scale and with the targeting needed to address the problems noted. There has been little investment in developing a national system to monitor and adjust the teacher labor market. (Note 22) There have been scarce efforts to develop the capacity of training institutions to ensure teacher supplies in high-demand locales and fields. There has been no serious attempt to establish comprehensive federal-state partnerships like those created to meet specific health-field shortages. Thus we recommend a series of measures to create a federal teacher supply program that substantially addresses the problems we face. The general strategy is to supply grants to individuals and institutions, with funds concentrated where they are needed most, where they will create new institutional capacity, and where they will work to relieve the maldistribution of teaching talent.

Increasing Supply in Shortage Fields and Areas

While there have long been surpluses of candidates in elementary education, English, and social studies in most states, there are inadequate numbers of teachers trained in high-need areas like mathematics, physical science, special education, bilingual education and English as a Second Language (ESL). The nation requires targeted incentives to attract qualified teachers to schools and areas that historically have been undersupplied. A two-pronged approach seems warranted. First, Washington should consolidate all of its small-scale fellowship, scholarship, and loan forgiveness programs into a single, sustained program of service scholarships and forgivable loans that includes the following elements:

- Scholarships allocated both on the basis of academic merit and indicators of potential success in teaching, such as perseverance, capacity and commitment.
- Scholarships targeted in substantial part to areas of teaching shortage. Washington would allocate half the funds to national priorities, reserving the other half for states to establish their own priorities.
- Scholarships awarded in exchange for teaching in priority schools, defined on the basis of such criteria as poverty rates and the percentage of language minority students.
- Awards available for training at either the undergraduate or graduate level,

with scholarships forgiven over three to five years in exchange for teaching in high-need areas and fields. Because the chances of staying in teaching increase significantly after three years, calibrating the length of the service required with an inducement of sufficient size would be important to the initiative's success.

The federal government is the appropriate primary source of such programs for two reasons. First, the program can influence the flows of talent across areas of the country. Second, the budgetary implications are extremely modest for Washington relative to the states. This is an area where a relatively small federal outlay can go a long way—and actually save the nation sizable sums.

Assume, for example, that the country needs an annual influx of 40,000 new teachers supported by such scholarships (Note 24) and that each candidate would receive up to \$20,000 to cover tuition for undergraduate or graduate teacher preparation. (Note 25) Such a program, costing \$800 million a year, could meet most of the nation's teacher supply needs in a few years. Given that we currently lose billions of dollars each year due to early attrition from teaching—much of it a result of hiring underprepared teachers—this program would repay itself many times over if it induced recipients to remain in teaching even for several more years.

Such a program alone, however, would not be sufficient to attack the systemic nature of teacher shortages in urban and isolated rural schools. Recall that teacher labor markets are intensely local and that many young teachers have a strong preference to teach close to home, hurting some districts' efforts to attract qualified applicants. Urban and rural schools must either lure applicants from other areas, which is often difficult, or enhance the pool of college graduates who grew up in neighborhoods served by urban schools. This second prospect suggests a recruitment strategy that might underwrite the development of "grow your own" programs in urban and rural areas. (Note 26)

Grants are needed to build the capacity of teacher preparation programs within cities where the problems are most severe. These programs would need to meet three criteria: ensuring a high-quality teacher preparation experience, attracting local residents to the programs, and ensuring a pipeline from preparation to hiring.

Some cities have many higher education opportunities, but not all are affordable to local residents or have close ties with the district to facilitate an easy pathway from preparation to hiring. The value of many alternate-route programs is that they finance and prepare candidates explicitly for a given district; thus the district reaps the investment's benefits, and candidates know they will have a job. When these are high-quality programs with the components described earlier, the bargain is a good one. Some cities, like New York and San Diego, have created local university partnerships that include underwriting the preparation of candidates, with service in the city's schools required in exchange. Some of these universities enable candidates to engage in practice teaching in professional development schools that are particularly successful with urban and minority teachers, so that they learn effective practices rather than mere survival. And some programs target both local residents and longtime paraprofessionals already knowledgeable about and committed to their communities. The key is a combination of strong training

targeted at local talent and strong incentives for hiring and retention in the district.

Such opportunities could be encouraged by a new federal grant program, possibly with a state or local matching requirement, directed to urban universities and districts to create or expand programs that meet the standards for program quality that we have described and that support local candidates from preparation through hiring. Some funds could be used for program development or expansion, while others could provide subsidies to enable candidates to attend, with pledges for service in the district. Analogs are available in federal support for urban medical training models (see Appendix A). [from Idh: Note I use federal instead of Washington because Washington is a city or a state, NOT a level of government].

If we wanted these institution-building grants to operate in the 50 largest cities, with an average of two programs per city (calibrated to size and need), and if each developmental grant allocated \$1 million per program for each of five years, the annual cost would be \$100 million (with attendant administrative and evaluation costs adding marginally to this sum). This would add only modestly to the previously noted scholarship program and still keep total yearly expenses far below the noted savings. If we wanted to spread these costs over time, moreover, the programs could be phased in over, say, a decade.

The models that emerged might well be richly diverse, including new forms of professional development schools that emulate the teaching hospitals used to develop state-of-the-art medical practices. They might include new applications of distance technology, new forms of collaboration by the private and public sectors, and new kinds of partnerships among schools, districts and the multiple universities. This would make the investment worth its weight in gold, especially given the subsequent diffusion of successful models.

Improving Teacher Retention

In addition to incentives for entering teaching, improving teacher retention in high-need areas would be an essential goal of a federal teacher supply program for education. Growing evidence indicates that high turnover, particularly in the early years, is a major part of the problem for the system, especially in hard-to-staff schools. Washington could help stem such attrition by becoming engaged in several areas, starting with helping to ensure that teachers in such schools receive appropriate preparation and mentoring.

a. Preparation and Support. While quality local programs to prepare urban teachers would go a long way toward supplying schools, a great unfinished task in American education is to create conditions for better support of new teachers, encompassing hiring procedures, protected initial assignments, steady provision of mentor and other support, and improved evaluation to help novices. These matters have been neglected for too long, and they particularly harm hard-to-staff schools that need greater personnel stability if they are to create effective learning communities. The intervention point here clearly is induction, beginning with hiring and assignment practices, reduced teaching loads, close fits between qualifications and teaching duties, and the orchestration of support from experienced teachers and administrators. How might more effective induction practices be promoted?

State certification policy is one vehicle. As evidenced by such cases as Connecticut, states can establish conditions for effective induction through certification requirements established for new teachers. In addition to encouraging such innovations through the U.S. Department of Education's leadership activities, Washington could create a targeted, matching grant program aimed explicitly at supporting effective induction practices. Since many states and some districts have created induction programs, some resources already are focused on these needs. Relatively few programs, however, ensure that expert mentors in the same teaching field are made available for in-classroom support, the component of induction with the greatest effect on teacher retention and learning.

Part of such a program would supply grants to state agencies willing to develop statewide induction programs that would be integrated with their licensure and certification requirements. States might use such grants to fund universities, districts and other agencies to develop and test model induction programs, concentrating on support for new teachers in hard-to-staff schools. Another part of the program would distribute grants to high-need districts to support induction practices such as mentor cadres and related supports.

The annual costs would again be exceedingly modest. The grants to states might supply startup funds, with the pledge that states would continue effective programs and practices after that period. If individual state grants averaged \$500,000 annually for three years running and were phased in 10 states at a time, the total direct cost of this part would be \$75 million, allocated over seven years. The grants to local districts might allocate an average of \$250,000 a year for three years of startup funds, also with the requirement that districts continue effective practices. If 100 district grants were given to 20 districts a year and phased-in over time, the second part would total \$75 million, also spread over seven years. If Washington took on the role of evaluating and disseminating knowledge from these programs, the nation would benefit considerably from new policies and practices that receive hardy tests under a variety of conditions.

b. Pay and Working Conditions. These factors clearly are of great importance, as is evident from states and localities that have implemented successful policies directed at salaries, benefits and working conditions. Too many urban districts are doubly disadvantaged in the competition for teaching talent. They have difficult living and working conditions, and they offer salaries below those of nearby suburban districts. As noted, Connecticut provides an example of how a state dealt with these problems by both raising and equalizing salaries.

While issues of pay and working conditions are centrally the concerns of states and localities, Washington could encourage more states to address these issues by sponsoring research within and across states on the success of various strategies in different contexts. These might include systemic state strategies like Connecticut's and local experiments with compensation plans. Experiments with extra pay for teaching in hard-to-staff schools (sometimes known as "combat pay") generally have proven ineffective, but some states and districts are exploring further innovation with compensation and working conditions that bear watching. For example, some analysts have advocated advancement on teacher salary schedules based on indicators of performance in teaching, including National Board

Certification and other measures of merit or accomplishment. California implemented \$10,000 bonuses for National Board-certified teachers, increased to \$30,000 for such teachers who taught in low-performing schools. California also implemented its Teachers as a Priority Program, which sent resources to high-need schools to recruit and retain fully certified teachers through improving working conditions, adding mentors, reducing class sizes and providing hiring bonuses. Moreover, hard-to-staff districts might experiment with pay packages that include, for example, special housing, parking, or transportation allowances, additional medical and retirement benefits, or summer-based professional development opportunities for travel, workshops, institutes and other experiences.

In addition to sponsoring research, Washington might play a role in stimulating the development and testing of innovative compensation and support models explicitly designed to retain effective teachers in needy schools and districts. In this case, the Department of Education or other relevant agency would announce a national grant program that would support two phases of work, the first to develop innovative compensation plans, the second to evaluate trials of these models to determine their effectiveness. If 10 to 12 such grants were let, then studied over a significant period, the knowledge return could be substantial, leading to the adoption of new compensation practices in districts that historically have had difficulty retaining teachers. Once evaluation research had validated the worth of such models, there would be a basis for states and districts to invest in these models out of operating funds.

c. The Prospect of Success. Finally, teachers are more likely to stay in schools where they feel they can succeed. In this regard, research stresses the importance of professional supports and redesigned schools to build stronger teacher-student relationship that promote trust, motivation, commitment and collective efficacy (for one example, see Bryk & Schneider, 2002). These “soft” features of schools are alterable through more skillful management and organization, which could be supported through development of new administrative leadership programs and continued support of redesigned schools, such as those offered through the New American Schools development program and the Small Schools Act.

Teachers in difficult classrooms, however, are unlikely to be encouraged to stay by the perverse incentives that may be encouraged by NCLB. Under that law, schools are being branded as “in need of improvement”—widely viewed as a euphemism for “failing”—if all students and such subgroups as poor, minority and limited-English-proficient students do not all show adequate yearly progress on test scores. Schools stand to be reconstituted and states and districts stand to lose funds based on missing testing targets. The problem is not only that school scores are so volatile as to be useless as indicators of improvement (Linn & Haug, 2002) and that the targets adopted are likely to result in more than half the nation’s schools seen as failing over the next few years. The problem is also that the stigma is likely to make it even harder for such schools to recruit and retain highly qualified teachers. These labels and the accompanying pressure could chase teachers away from such schools even more persuasively than current conditions (Clotfelter et al., 2003; Figlio, 2001; DeVise, 1999; Tye and O’Brien, 2002).

If evidence mounts that schools face a teacher exodus because they are seen as failing or because of rising dismay at excessive accountability pressures,

countervailing measures may be necessary. In addition to amending NCLB to develop more sensible measures of progress, Washington, along with states and localities, may need to create other inducements to teach, and remain teaching, in such schools. Otherwise, even less-qualified individuals may end up instructing these students.

3. Facilitating a National Labor Market for Teachers

Finally, Washington can create the foundation of a national labor market for teachers, including the removal of unnecessary interstate barriers to teacher mobility. Because teacher supply and demand vary regionally, the country can only benefit if states with teacher surpluses in particular fields can be connected to states with corresponding shortages. Washington could work with states to accomplish three goals:

- Developing common licensing exams and interstate agreements about content and pedagogical coursework that would facilitate reciprocity and respond to the standard called for by NCLB.
- Creating a system of pension portability across the states.
- Providing labor market data and analyses for federal, state and local planning.

Several groups already are working on these agendas in ways that could be leveraged toward genuine changes. For example, the Interstate New Teacher Assessment and Support Consortium, sponsored by the Council of Chief State School Officers, has brought together more than 30 states to create licensing standards and new assessments for beginning teachers. The consensus they have forged could be the basis for an eventual national system. The organization of State Higher Education Executive Officers, along with the Education Commission of the States, has examined how to achieve teacher pension portability, and TIAA-CREF has developed such plans as well. A public/private partnership to stimulate the next steps in these plans could be extremely productive.

Finally, the long-standing federal role of keeping statistics and managing research is well suited to the job of creating a database and analytic agenda for monitoring teacher supply and demand. Such a system, which would inform all other policies, could document and project shortage areas and fields, determine priorities for federal, state and local recruitment incentives, and support plans for institutional investments where they are needed.

In making all of these recommendations, we are mindful of the federal deficits that are looming. However, these initiatives could be undertaken for less than 1% of the \$350 billion tax cut enacted in May 2003, and, in a matter of only a few years, they would build a strong teaching force that could last decades. We would stress again, moreover, that these proposals could save far more than they would cost. The savings would include the several billion dollars now wasted because of high teacher turnover as well as the costs of grade retention, summer schools and remedial programs required because too many children are poorly taught. This is to say nothing, moreover, of the broken lives and broader societal burdens that could be avoided with strong teachers in the schools that most need them. In the competition for educational investment, the evidence strongly points to the

centrality of teacher quality to educational improvement. That should be a centerpiece of the nation's education agenda. The benefits of this strategy, in terms of students' school success, employability and contributions to society, will, we believe, repay the costs many times over.

Notes

0. The research reported here was originally commissioned by the Education Commission of the States as part of its 10th Amendment Project. A version of the report can be found at

<http://www.ecs.org/clearinghouse/46/34/4634.doc>. The authors wish to acknowledge the assistance in preparing this report provided by Debbi Harris and Lisa Ray of Michigan State University, and Lisa Marie Carlson of Stanford University. The opinions expressed, however, are the authors alone.

- 1. A number of recent polls demonstrate that large majorities of parents and members of the general public (90%) believe that getting and supporting well-qualified teachers is the strategy most likely to improve schools; that such teachers should have knowledge of content, how children learn, and how to teach; and that salaries – and taxes – should be raised if necessary to get well-qualified teachers in all schools. See, for example, Educational Testing Service, 2002; *Recruiting New Teachers*, 1998.
- 2. In education, including in the NCLB legislation, “licensure” and “certification” often are used interchangeably. However, in most other professional fields, licensure refers to state requirements governing entry to a field, while certification denotes advanced standing based on standards set by a profession. For example, states grant physicians a license to practice medicine; professional boards grant certification in particular medical specialties. Similarly, the National Board for Professional Teaching Standards (NBPTS) certifies teachers who demonstrate “accomplished practice,” while states grant licenses to practice. Here, we conform to general usage, using “certification” and “licensure” as equivalent terms for the mandatory state requirements for entry to teaching.
- 3. See Darling-Hammond and Youngs (2002) for a review of the evidence on which the report's recommendations are based.
- 4. 34 CFR Part 200, Federal Register, Vol. 67, No. 231 (December 2, 2002), p. 71712. Downloaded on April 20, 2003 from <http://www.ed.gov/legislation/FedRegister/finrule/2002-4/120202a.html>.
- 5. 34 CFR Section 200.56, Federal Register, Vol. 67, No. 231 (December 2, 2002), p. 71765.
- 6. 34 CFR Section 200.56, Federal Register, Vol. 67, No. 231 (December 2, 2002), p. 71764.
- 7. HB 318. Downloaded on 5/3/03 from <http://www.capitol.state.tx.us/tlo/78R/billtext/HB00381.thm>.
- 8. See *Teacher Quality, Introduction*, Thomas B. Fordham Foundation Website, <http://www.edexcellence.net/topics/teachers.html>.
- 9. Some opponents of teacher certification have misconstrued one finding of this study to argue against teacher education requirements. Because students of a small number of science teachers with temporary or emergency certification (24 of 3,469 teachers in the sample) did no worse than students

of certified teachers, these opponents have termed teacher certification unnecessary (see e.g. Strayhorn, 2003). However, these teachers, like those with standard certification, were found to be more effective than uncertified teachers. Another analysis of these data (Darling-Hammond, Berry, & Thoreson, 2001) showed that most of the science teachers in the sample with temporary or emergency certificates had many years of experience and subject matter and education training comparable to that of certified teachers. Their backgrounds and teaching contexts suggested that many were previously certified, out-of-state entrants working on a temporary credential while becoming certified in a new state. Others were certified in math or another sub-field of science. It is not surprising, then, that their students did about as well as those of certified teachers with similar qualifications. Only a third of the NELS sample teachers on temporary/emergency licenses were new entrants to teaching with little education training. The students of this sub-sample had smaller achievement gains than those of the more experienced, traditionally trained teachers in an analysis of covariance that controlled for pre-test scores, content degrees and experience.

- **10.** A decade ago, only a quarter to a third of newly hired teachers were “newly minted.” This proportion has increased with growing demand, reaching as many as half of new hires in the late 1990s. In a few high-demand states like California, the proportion has reached 60 percent, but this is unusual.
- **11.** Various studies of teacher supply have found that about 20% to 30% of teachers who have left the classroom eventually return to teaching in the same state (Beaudin, 1993; Massachusetts Institute for Social and Economic Research, 1987; Murnane et al., 1991). Some leave to teach in another state, although most studies have not had data sets to track these individuals. The likelihood that those who have left teaching will re-enter depends heavily on salary levels and work conditions (Beaudin, 1993; 1995).
- **12.** Boe (1998) and colleagues have found that, nationally, delayed entrants comprise about a third of new entrants to teaching annually, which in this case would be about 50,000.
- **13.** Between 1983 and 1999, annual graduates with a bachelor’s or master’s degree in education jumped from 134,870 to 234,408. However, this does not translate directly into new teacher supply, since bachelor’s degrees in education now represent fewer than half of newly prepared teachers. Most now receive a degree in a disciplinary field and a second major, minor or master’s in education. While a growing share of teachers are trained in master’s programs, many master’s degrees are gained after teachers have already completed initial preparation.
- **14.** Because a large majority of alternative programs are run by or in collaboration with universities, their graduates are counted in university totals. Estimates of alternative-certification programs vary, depending on classification, but by 1999, 40 states and the District of Columbia had 117 state-authorized programs (Feistritzer & Chester, 2000). In addition, the American Association of Colleges for Teacher Education (1996) cataloged 328 alternative programs run by colleges and universities.
- **15.** Researchers using longitudinal data from the 1993-94 Baccalaureate and Beyond survey find a 4-year attrition rate of about 20% for those who entered teaching directly after college (Henke, et al., 2000). Ingersoll (2001) extrapolates from cross-sectional data on teacher attrition (from the 1999-2000 Schools and Staffing Surveys) to estimate a 5-year attrition rate

for beginning teachers of 46%, including private school teachers. However, the 5-year attrition rate for public school teachers is only about 38%. Furthermore, some individuals who left teaching for childrearing or further study will have returned to the classroom in the first five years—a proportion that, other estimates suggest, could be about 20% of leavers. With this adjustment, the 5-year cumulative attrition rate would be just over 30% for public school teachers.

- **16.** Analysts have long recognized that salary differentials across teaching areas contribute to shortages, based on the sensible proposition that individuals are influenced by salaries available to them. In response, some have argued for altering the structure of public school salary schedules by allowing differential pay across teaching specialties. Some experiments along these lines have appeared over the years, including recent efforts in Cincinnati, OH, Douglas County, CO, and Denver, CO, among others. In 2003, the Kentucky State Department of Education awarded grants to ten districts for innovations in salary systems. These experiments are worth careful study, but for the most part salary schedules have remained uniform and fixed. See Kershaw & McKean (1962) and Murnane, et al. (1991) for further discussion of this issue.
- **17.** Flanagan and Grissmer (2002) point out, however, that while one-third of the inequality in educational spending is within-state, almost two-thirds of the variance is between-state. Even accounting for between-state differences in the costs of education, this basic fact points to the need for equity policies at the federal level.
- **18.** For example, a study for the California Commission on Teacher Credentialing (CCTC, 1998) documented the difficulties out-of-state candidates experienced in seeking teaching positions. Problems included costs of courses and exams, confusion about how to complete the many and varied requirements, and redundancy with other requirements teachers had already met elsewhere. In a survey of out-of-state teachers who had received an initial permit to teach in California, credential requirements were the leading factor in decisions to leave the state.
- **19.** In the fall of 1999, Connecticut had 30% students of color, including the 12th largest Hispanic enrollment in the nation, and in 2002, 36% of students attended Title I schools. In the same years, North Carolina had 38% students of color, including the 8th largest enrollment of African Americans, and 38% of students attended Title I schools (NCES, 2001, table 42; NAEP State Data, 2002, retrieved from <http://nces.ed.gov/nationsreportcard/statedata>).
- **20.** See Appendix A for a brief history of federal involvement in medical teacher supply policy.
- **21.** See Appendix B for a brief history of federal involvement in the teacher labor market.
- **22.** Although the Schools and Staffing Surveys provide useful data for monitoring aspects of supply and demand, they have never been fully exploited for this purpose. Modifications to the questionnaires have made the data about training and certification too imprecise for some important analyses. Furthermore, the delay between surveys and the delay in releasing data to the public for outside analysis make them much less useful than they could be for monitoring supply trends. Although the SASS was intended to occur every three years, the delayed 1999-2000 survey came six years after the 1993-94 survey.

- 23. While Title I status is a key indicator, the Title I program fails to reach a large portion of students from poor families. Thus a national program of teacher scholarships ultimately should be tied to service targeted at the actual distribution of poor children, not to Title I school status alone.
- 24. Of the 250,000 teachers hired annually, no more than 50,000 enter without standard certification in their main teaching field. This overestimates the need, since many of these teachers are certified in some field, if not the one they are teaching, and some are in transition from one state to another or have been hired without yet taking the state licensing examinations, so they are only temporarily in the 'not fully qualified' category.
- 25. This is enough to pay full tuition and some stipend in a public college or university for a one-year master's program in teaching for recent graduates or mid-career entrants—or enough for 2-3 full years of undergraduate tuition in a state university for juniors and seniors preparing to teach.
- 26. We are indebted to Susanna Loeb for suggesting this point, and for elaborating it in several papers she has written with her colleagues.
- 27. This might include school improvement measures that rely on aggregated longitudinal scores for individual students, rather than annual cross-sectional estimates that can fluctuate from year to year for a variety of reasons unrelated to school practices; averages of these longitudinal score gains over multiple years; annual targets that are not statistically unreasonable; and multiple measures of school practice and performance that extend beyond test scores.

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Linda Darling-Hammond is Charles E. Ducommun Professor of Education at Stanford University School of Education. She also served as executive director of the National Commission on Teaching and America's Future which produced the 1996 widely cited blueprint for education reform: *What Matters Most: Teaching for America's Future*. Darling-Hammond's research, teaching, and policy work focus on teaching and teacher education, school restructuring, and educational equity. She has been active in the development of standards for teaching, having served as a two-term member of the National Board for Professional Teaching Standards and as chair of the Interstate New Teacher Assessment and Support Consortium (INTASC) committee that drafted model standards for licensing beginning teachers. She is author of *The Right To Learn, A License to Teach*, and *Professional Development Schools: Schools for Developing a Profession*, along with six other books and more than 200 book chapters, journal articles, and monographs on education. Dr. Darling-Hammond works on issues of education policy and practice, including school reform, authentic assessment, professional development schools and educational research. She serves as the faculty sponsor for Stanford's Teacher Education Program (STEP). As a leader in the charge for better teacher education and teacher preparedness, Dr. Darling-Hammond is instrumental in redesigning STEP to better prepare teachers to teach diverse learners in the context of challenging new subject matter standards. She also is helping to create a network of Bay Area schools of education and professional development schools (PDS) interested in working together on school reform, and learning communities for Bay Area practitioners through an ongoing series of workshops, institutes, peer coaching networks and study groups.

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Appendix A

Federal Funding for Health Professionals

Since 1944, the federal government has offered loans to students preparing for health professions careers and has supported the development of medical education programs. These programs were expanded during the 1950s by the Medical Manpower Act and in 1963 by the Health Professions Education Assistance Act, which have been amended and expanded regularly ever since. Over a half century, a strong federal role in managing the medical workforce and strengthening medical training has contributed to America's world-class system of medical training. Title 42, chapter 6A, subchapter V of the U.S. Code details the many components of this system, which includes:

1. Forgivable loans, scholarships, fellowships, and traineeships that are designed to:
 - a. Increase the numbers of doctors and nurses in fields of high- demand.
 - b. Improve the geographic distribution of health professionals in medically underserved and rural areas.
 - c. Recruit as medical students individuals who are members of minority groups.
2. Investments in health professions schools, which are designed to:
 - a. Underwrite the costs of planning, developing and operating training programs in specified high-need fields (currently, for example, family medicine, internal medicine, pediatrics and general dentistry), often with special consideration for projects that prepare practitioners to work with underserved populations.
 - b. Create "Centers of Excellence" at specific medical schools for increasing the supply of minority medical students and faculty and improving the capacity of professionals to address minority health issues, including development of community-based health facilities.
 - c. Establish area health education centers that assess regional health personnel needs and assist in the development of training programs to meet such needs, especially in underserved areas. (Some costs are funded by state and local partners).
 - d. Expand training programs for public health workers, especially in "severe shortage disciplines" (e.g. epidemiology, biostatistics, environmental health, maternal and child health, public health nursing and behavioral and mental health).
3. Support for analysis concerning the health professions workforce, which aims to:
 - a. Operate a uniform health professions data reporting system to collect, compile and analyze data on health professions personnel and students-in-training.
 - b. Develop a non-federal analytic infrastructure (via grants to states and other institutions) to conduct research on high priority workforce questions, including projections of supply and need by specialty and location.
 - c. Conduct program evaluations and assessments.

Over the years, as needs have been identified, the Congress has continued to develop innovative strategies to address emerging personnel and service needs. For example, recent amendments to the Public Health Service Act (PL 107-251) added, to existing support for health centers and the National Health Service

Corps, the creation of integrated health care networks in rural areas, grants to expand telehealth resources, and expansion of training grants to include mental health professionals and increase participation of individuals in other training fields experiencing shortages, such as dentists. Using partnership strategies, some grants are directed to states to improve their capacity to recruit and distribute high-need professionals. For example, Section 340G (42 USC 256g) provides for grants to states for innovative programs “to address the dental workforce needs of designated dental health professional shortage areas in a manner that is appropriate to the states’ individual needs.” States may use the funds for loan forgiveness programs for dentists who agree to practice in shortage areas or who agree to provide payments on a sliding scale; for recruitment and retention efforts; for grants or no-interest loans to help dentists establish or expand practices in shortage areas; and for the establishment or expansion of dental residency programs. Through these evolving strategies and the hundreds of millions of dollars annually allocated to them, the federal government responds to local needs for health professionals and manages the labor market so that these needs can be better met.

Appendix B

Federal Funding for Education Professionals

Federal involvement in education manpower issues also emerged in the post-war era in the United States, but it has been more spotty than the steady, consistent involvement in the health professions. Rather than developing any overarching rationale or policy, federal efforts were attached to other priorities, such as national defense or civil rights, which supplied justification for a federal role. In addressing teacher recruitment needs and shortages, the national government tended to rely on incentives with limited time horizons.

The earliest legislation involved support for veterans returning from World War II. The Serviceman’s Readjustment Act of 1944 contained a provision to help defray tuition and other costs for G.I.s, with teachers colleges and normal schools on the list of approved institutions. Subsequently, as the nation was drawn into the Cold War, national defense emerged as the paramount issue. Among its provisions, the National Defense Education Act of 1958 launched a loan program that became identified with its chief sponsor, Congressman Carl Perkins. Title II, the National Defense Loan Program, supplied student loans for college education, with special consideration for students with a superior academic background who expressed a desire to teach in elementary or secondary school. The program provided that any loans would be canceled, at the rate of 10% annually, for each year of service in a public school. The Higher Education Act of 1965 increased the rate of cancellation on Perkins loans from 10% to 15% for teachers who served in schools with high concentrations of students from low- income families. Such teachers also would be eligible for 100% of loan cancellation, based on extended years of service, rather than 50% available to other teachers. The 1998 reauthorization provided Perkins loan cancellations at the rate of 15% for years one and two of service, 20% for years three and four, and 30% for year five of service. The amendments added teachers of learning disabled students to those who teach in high poverty (Title I) schools or in subject-matter shortage areas, including mathematics, science,

foreign languages and bilingual education, among others. These provisions remain in effect. While they are modestly helpful, these loans are a retroactive support for individuals who find their way into teaching, not a proactive recruitment device to attract college students into training programs that ensure they will be induced into shortage fields and well-prepared to teach these disciplines.

A new theme—civil rights—entered the federal mix beginning in the 1960s. In addition to the Perkins loans, the Higher Education Act of 1965 contained provisions aimed at staffing inner-city and rural schools. This act established the National Teacher Corps, which operated for the next 15 years. That program worked through grants to institutions of higher education, which were authorized to train recruits, who would serve in schools attended by poor children. Following a few months of initial training, recruits entered schools as interns on teams made up of an experienced teacher plus other recruits. Continuing their training while working, the interns received starting salaries from the districts where they worked, while experienced teachers received added compensation for team leadership. Over the years, the program was evaluated regularly and improved upon. For example, the model evolved from isolated placements in individual schools to clusters that included feeder schools to middle and high schools, and the training/program evaluation cycle was lengthened from two to five years. The act also funded fellowships that universities could allocate to support full-time graduate study at the master's level in education. A number of Master of Arts in Teaching (MAT) programs evolved out of these fellowships. These programs became, in essence, the first alternatives to traditional undergraduate teacher education. The early MAT efforts, one-year master's degree programs at places like Harvard, Stanford, Columbia's Teachers College, and Duke, later became models for many university-based alternative programs in the 1990s.

The combination of these investments in recruitment and a reduction in teacher demand led to the virtual elimination of emergency hiring of teachers by 1979. Although there were serious questions about the quality of teacher supply at that time (see e.g., Schlecty and Vance, 1983; Carnegie Forum on Education & the Economy, 1986), most federal teacher recruitment programs of the 1960s and 1970s were eliminated in 1981. By the late 1980s, however, concern about the quality and supply of teachers began to emerge again. In 1986, the Paul Douglas Teacher Scholarship Program (formerly the Congressional Teacher Scholarship Program) was authorized. Over a 10-year period until its demise in 1996, this program provided scholarships to outstanding high school graduates who planned to pursue careers in preK-12 teaching. Applicants had to be ranked in the top 10% of their high school graduating class or have GED scores in the top 10% of the state or nation. The program also operated through the states, which could add their own selection criteria in response to particular targets and needs. State criteria often included such factors as recruitment from historically under-represented groups, from low-SES backgrounds, from candidates who wanted to teach in poor schools, and for teaching mathematics and science. The program was modest in size, allocating only \$15 million from 1987 through 1994. Loans under the program were forgiven at the rate of two years of teaching service for each year of scholarship award; this provision was modified to one year of teaching for one year of scholarship support for teaching in subject shortage fields. Evaluations indicated that nearly two-thirds of recipients completed teacher certification, and two-thirds of these taught.

Another program begun in 1986 sought to tap retiring military personnel for teaching. The Army began a pilot program for servicemen to enroll in teacher certification program prior to discharge. The Navy followed several years later with a program of its own. These programs worked through cooperating colleges and universities to ease the transition from the services into teaching. Some years later, the Army also established several alternative teacher certification programs for armed forces personnel, with pilots in Texas and Georgia.

The Troops to Teachers Program (TTT) began as a joint venture between the departments of Defense and Education. The 1993 National Defense Authorization Act (PL 102-484, Section 4441) formally established this program, which offered stipends of up to \$5,000 to allow former members of the armed services to obtain teacher certification. In addition, school districts could receive up to \$50,000 over five years for every TTT teacher they hired. Both the stipends and the grants were discontinued after 1995, but in 1999 the TTT program was reauthorized and transferred from the Defense Department to the Education Department. TTT, too, has been a very modest effort, with the 2001 appropriation reaching only \$3 million, when it was placed within the Eisenhower Professional Development Program. The program operates through grants to states that submit proposals outlining the services and activities they will undertake. As of 2000, 22 states had joined the program, and 13 more were considering it. Studies that have tracked the program report high rates of participation in math, science, special education, and vocational education; more teaching at the high school level; and more teaching in the inner city. Teachers are more likely to be male (86%) and minority (33%) than the overall teacher workforce.

Under the No Child Left Behind Act, the TTT Program is a subpart of the Transitions to Teaching initiative but is still a distinct program. Participants can still receive either stipends of \$5,000 a year (up to 5,000 may be awarded annually in return for a commitment to teach for three years) or bonuses of \$10,000 (up to 3,000 annually in return for an agreement to teach for three years in a high-need school). The Transitions to Teaching Program authorizes 5-year grants to partnerships and eligible entities to establish programs to recruit and retain highly qualified mid-career professionals and recent college graduates as teachers for high-need schools, including recruitment via alternate-route programs that condense the period of preparation. This is a new authority in the No Child Left Behind law, but Congress provided \$31 million for similar activities in 2001. These institutional funds may be used for scholarships, pre- or post- induction activities, placement initiatives, payments to schools to supply incentives for teachers, collaboration with institutions of higher education to develop recruitment programs and other strategies. Program participants must teach in a high-need school for at least three years following receipt of support.

In addition to continued funding for the Perkins loans, another part of the reauthorized Higher Education Act established the Federal Family Education Loan Program, together with a Direct Lending provision. Together, these supplied loan and principal forgiveness of up to \$5,000 for Stafford loans for borrowers who agree to teach for five consecutive years in low-income elementary or secondary schools (i.e., schools where more than 30% of students are eligible for Title I aid). Loan repayment is deferred during the 5-year teaching commitment. These

provisions were further amended in 2001-2002 to include three years of Stafford and Federal Supplemental loans for those who teach in a federally designated teacher-shortage area, including subject matter, grade level or geographic shortages.

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