What's Happening

October 2017

Graduation exam participation and performance, graduation rates, and advanced coursetaking following changes in New Mexico graduation requirements, 2011–15

Jill Walston
Clyde Tucker
Cong Ye
Dong Hoon Lee
American Institutes for Research

Key findings

In 2009 New Mexico introduced new graduation requirements beginning with the 2013 cohort (the cohort of students who were in grade 9 in 2009/10 and expected to graduate from high school in 2013): a new graduation exam and advanced math and science coursework requirements. The new exam was introduced for the 2012 cohort, but the 2013 cohort was the first cohort that was required to pass it to graduate. Among the key findings:

- About 25 percent of the 2011 cohort scored proficient or better on the reading, math, and science sections of a prior graduation exam. That percentage did not change substantially among the 2012 cohort (the first to take the new graduation exam) but increased to more than 30 percent among the 2013–15 cohorts.
- The percentage of students who took Algebra II and two lab science courses by grade 12 increased 3 percentage points from the 2014 cohort (63 percent) to the 2015 cohort (66 percent)—and to more than 70 percent among American Indian and White students.
- The four-year graduation rate was higher among students who took Algebra II and two lab science courses than among students who did not.

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Summary

The New Mexico graduation rate has lagged behind the national graduation rate in recent years. In 2015 the graduation rate was 69 percent in New Mexico and 83 percent nationwide (New Mexico Public Education Department, 2016; U.S. Department of Education, 2017). Of particular interest to education leaders in New Mexico are differences in graduation rates among American Indian (63 percent in 2015), Hispanic (67 percent), and White students (74 percent). Improving graduation rates among all student subgroups is a priority for New Mexico, as is ensuring that all students have the math and science knowledge and skills required for success in the 21st century workplace or in postsecondary education.

In 2009 New Mexico introduced a new graduation exam (the Standards Based Assessment/High School Graduation Assessment, which replaced the New Mexico High School Competency Examination) and added more advanced math and science coursework (specifically, Algebra II and two lab science courses) as requirements to graduate. The new exam is based on and aligned to New Mexico's Assessment Standards, which the state established from the New Mexico Content Standards with Benchmarks and Performance Standards. Students must take the exam—which contains three sections (reading, math, and science)—in grade 11 and can retake in grade 12 sections that they do not pass in grade 11.

The 2013 cohort (the cohort of students who were in grade 9 in 2009/10 and were expected to graduate in 2013) was the first to be subject to the new requirements. The 2012 cohort also took the new exam, although there was no graduation requirement related to performance on it. Students in the 2011 and 2013–15 cohorts who did not take or pass the old or new graduation exam were permitted to use an alternative demonstration of competency for reading, math, and science.

This study responds to the Regional Educational Laboratory Southwest New Mexico Achievement Gap Research Alliance's and the New Mexico Public Education Department's interest in student performance on the graduation exam and in graduation rates among students at various levels of performance on the exam. The alliance and the department were also interested in patterns of enrollment in Algebra II and lab science courses, along with the four-year graduation rate among students who take and those who do not take these additional courses.

The study reports student participation in the graduation exam and proficiency rates (the percentage of students who score proficient or better)[1] for each section and provides the four-year graduation rate among the last cohort that took the old exam (the 2011 cohort) and among the four cohorts that took the new exam (the 2012–15 cohorts). The study also reports the percentage of students who took Algebra II and two lab science courses and the graduation rate among the 2014 and 2015 cohorts, which were subject to the new math and science course requirements. Results are reported by cohort overall and by gender, race/ethnicity, eligibility for the federal school lunch program (a proxy for socioeconomic deprivation), and English learner status. The study does not provide evidence on the causal impact of the changes to graduation requirements.

Key findings include:

- The percentage of students who took a graduation exam in grade 11 or 12 and scored proficient or better on the math or science section was higher among the

2015 cohort (46 percent for math and 44 percent for science) than among the 2011 cohort (38 percent for math and 35 percent for science). The reading proficiency rate was higher than the math and science proficiency rates but did not improve from the 2011 cohort (56 percent) to the 2015 cohort (55 percent).

- About 25 percent of the 2011 cohort scored proficient or better on all three sections (reading, math, and science) of a prior graduation exam. The percentage did not change substantially among the 2012 cohort (the first to take the new graduation exam) but increased to more than 30 percent among the 2013–15 cohorts.
- The graduation rate among students who took a graduation exam improved as the number of sections on which a student scored proficient or better increased (for example, the four-year graduation rate among the 2015 cohort was 72 percent for students who did not score proficient or better on any section and 95 percent for students who scored proficient or better on all three sections).
- The percentage of students who attended four years of high school and took Algebra II and two lab science courses by grade 12 increased 3 percentage points from the 2014 cohort (63 percent) to the 2015 cohort (66 percent)—and to more than 70 percent among American Indian and White students.
- For both the 2014 and 2015 cohorts the graduation rate was higher among students who took Algebra II and two lab science courses (82 percent among the 2014 cohort and 84 percent among the 2015 cohort) than among students who did not (66 percent among the 2014 cohort and 67 percent among the 2015 cohort). Students who did not take Algebra II and who had fewer than two lab science courses had the lowest four-year graduation rate, which increased from 33 percent among the 2014 cohort to 41 percent among the 2015 cohort.

Changes to graduation requirements, such as the ones enacted in New Mexico, are usually intended to motivate positive change, such as better student performance and higher enrollment in more-challenging courses. The study findings show that the overall direction of change is positive for graduation exam performance, advanced course enrollment, and graduation rates but that differences exist across subgroups. The differences may have implications for targeting resources and services to students most in need of support for staying in school and fulfilling graduation requirements.

Changes in graduation requirements were not the only changes taking place in New Mexico during the years covered in the study, and changes in student outcomes may have occurred for reasons unrelated to graduation requirements. Similarly, a lack of change across cohorts does not necessarily mean that the policy change did not have its intended effect.

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Why this study?

Students who earn a high school diploma are on track for better academic, economic, and health outcomes than students who do not graduate from high school (Sum, Khatiwada, McLaughin, & Palma, 2009; Mitra, 2011; Texas Association of School Boards, 2012). The national four-year graduation rate[2] has increased in recent years, from 78 percent in 2010 to 83 percent in 2015 (Stillwell & Sable, 2013; U.S. Department of Education, 2017), but the New Mexico graduation rate—70 percent in 2012 and 2013 and 69 percent in 2014 and 2015—has lagged behind (New Mexico Public Education Department, 2016). In addition, the dropout rate in New Mexico rose nearly 4 percentage points, from 20 percent in 2012 to 24 percent in 2014. Of particular interest to education leaders in New Mexico are differences in graduation rates among American Indian (63 percent in 2015), Hispanic (67 percent), and White students (74 percent). (See appendix A for more information about graduation rates in New Mexico by year and subgroup.)

This study examines student outcomes among the 2011–15 cohorts before and after changes in New Mexico high school graduation requirements—in particular American Indian and Hispanic students' exam performance, graduation rates, and enrollment in Algebra II and lab science courses

Improving graduation rates for all student subgroups, particularly American Indian and Hispanic students, is a priority for New Mexico, as is ensuring that all students have the math and science knowledge and skills required for success in the 21st century workplace or in postsecondary education. In 2009 New Mexico introduced a new graduation exam (the Standards Based Assessment/High School Graduation Assessment, which replaced the New Mexico High School Competency Examination) and added more advanced math and science coursework (specifically, Algebra II and two lab science courses) as requirements to graduate. The new exam is based on and aligned to New Mexico's Assessment Standards, which the state established from the New Mexico Content Standards with Benchmarks and Performance Standards. Students take the exam—which contains three sections (reading, math, and science)—in grade 10 and again in grade 11 (regardless of grade 10 performance) and can retake in grade 12 sections that they do not pass in grade 11.[3] The previous coursework requirement was Algebra I and one lab science course.

The 2013 cohort (the cohort of students who were in grade 9 in 2009/10 and were expected to graduate in 2013) was the first to be subject to the new requirements. The 2012 cohort also took the new exam, although there was no graduation requirement related to performance on it.[4] Students in the 2011 and 2013–15 cohorts who did not take[5] or pass the old or new graduation exam were permitted to use an alternative demonstration of competency for reading, math, and science. See table 1 and appendix B for more information about graduation requirements and alternatives to graduation exams.

Findings from nonexperimental research studies of student outcomes associated with state graduation requirements are mixed. Buddin and Croft (2014) found a positive association between increased math requirements and college enrollment, but other studies have found negative effects, such as higher dropout rates among students with lower academic performance and among Black and Hispanic students (Dee & Jacob, 2006; Jacob, 2001; Ou, 2009; Reardon, Arshan, Atteberry, & Kurlaender, 2010; Warren, Jenkins, & Kulick, 2006; see appendix C for a detailed summary of related research).[6]

The Regional Educational Laboratory (REL) Southwest's New Mexico Achievement Gap Research Alliance[7] and the New Mexico Public Education Department partnered with REL Southwest to examine student outcomes among the 2011–15 cohorts before and after the changes in high school graduation requirements were implemented. Alliance members were

Table 1. Changes in New Mexico graduation requirements: competency exam and math and science coursework, 2011–15

Graduation cohort	Competency exam[a]	Math courses	Science courses
2011	New Mexico High School Competency Examination (administered in grades 10 and 11; retakes offered in grade 12). Passing the exam was a graduation requirement.	Three units, including Algebra I	Three units, including one lab course
2012	Standards Based Assessment/High School Graduation Assessment (administered in grades 10 and 11; retakes offered in grade 12). Passing the exam was not a graduation requirement.		
2013–15	Standards Based Assessment/High School Graduation Assessment (administered in grades 10 and 11; retakes offered in grade 12). Performance at the top of the nearing proficiency level or better on each exam section (or a combined reading and math score of 2,273 when reading and math performance are both nearing proficient or better) was a graduation requirement.	Four units, including Algebra II	Three units, including two lab courses

Note: New Mexico students take the graduation exam in grade 10 and again in grade 11 regardless of grade 10 performance. For the 2012 cohort and prior cohorts, students were required to take 8.5 units of elective courses, including one unit in communication, business, or a foreign language. For the 2013–15 cohorts the 8.5 units of elective courses had to include one unit in workplace readiness or a foreign language (New Mexico Public Education Department, 2012). This report did not study the effect of this change.

a. Students in the 2009–11 and 2013–15 cohorts who did not pass the relevant exam by their senior year were able to submit a competency portfolio or pass other qualifying exams to demonstrate proficiency in reading, math, and science. This was not applicable to students in the 2012 cohort, for whom exam performance was not a graduation requirement. See appendix B for more information about the graduation requirements.

Source: New Mexico Public Education Department, n.d.

particularly interested American Indian and Hispanic students' exam performance, graduation rates, and enrollment in Algebra II and lab science courses. Although this study does not provide evidence on the causal impact of the changes in graduation requirements, it does provide descriptive data that may be useful for tracking student subgroups of interest to the Achievement Gap Research Alliance and the New Mexico Public Education Department and for informing efforts to target support and resources to help student subgroups persist in high school and meet graduation requirements. It may also inform policymakers in New Mexico and other states that are changing or considering changing graduation requirements.

Although this study does not provide evidence on the causal impact of the changes in graduation requirements, it does provide descriptive data that may be useful for tracking student subgroups and for informing efforts to target support and resources to help student subgroups persist in high school and meet graduation requirements

This study also provides a baseline from which to compare future exam performance and advanced coursetaking, such as performance on the Partnership for Assessment of Readiness for College and Careers exam, which replaced the Standards Based Assessment/High School Graduation Assessment as a graduation requirement beginning with the 2016 cohort.

What the study examined

The study was guided by five research questions:

1. What percentage of students who attended grade 11 took a graduation exam in grade 11 or grade 12?

2. What were the proficiency rates (the percentage of students who scored proficient or better by grade 12) on each section of the exam among students who took a graduation exam in grade 11 or 12?

3. What was the graduation rate among grade 11 students who did not take a graduation exam and among those who scored proficient on none, one, two, and three sections of the exam in grade 11?

4. What percentage of students took Algebra II and two lab science courses after the new math and science course requirements went into effect?

5. What was the graduation rate among students who took Algebra II and two lab science courses after the new math and science course requirements went into effect?

The results for research questions 1–3 cover the last cohort to take the New Mexico High School Competency Examination (the 2011 cohort) and the four cohorts that took the Standards Based Assessment/High School Graduation Assessment (the 2012–15 cohorts). The results for research questions 4 and 5 cover the 2014 and 2015 cohorts only. The results for all five research questions are reported by cohort for the full sample and by gender, race/ethnicity, eligibility for the federal school lunch program, and English learner status. Box 1 summarizes the data and methods, and appendix D provides further details.

Box 1. Data and methods

Data

Data for the study are from the New Mexico Public Education Department's Student Teacher Accountability Reporting System, which is a comprehensive student, staff, and course information system that provides data on all preK–12 students served by New Mexico public schools. Appendix D provides further details on the system's variables.

The study sample draws from all New Mexico public high schools. It excludes students who transferred in from outside the New Mexico public school system after grade 9 and students who left the New Mexico public school system before grade 11. Students who began grade 9 in a New Mexico public school and were enrolled in a third year of high school are included in the analyses that cover graduation exam-taking. Students who were enrolled in their fourth year of high school are included in the analyses that cover coursetaking.[1] Consistent with New Mexico's strategy for defining grade 9 graduation cohorts, each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9).[2]

For research questions 1–3 graduation exam data for school years 2010/11–2014/15 were used, which covered five cohorts: the last cohort that took the New Mexico High School Competency Examination (the 2011 cohort) and the four cohorts that took the Standards Based Assessment/High School Graduation Assessment (the 2012–15 cohorts). Most students took the graduation exam in grade 11, and 1–3 percent retook at least one section in grade 12 (see table E3 in appendix E).[3] The average percentage of students across all cohorts who did not take the exam in grade 11 and who were in school the following year was 15 percent (ranging from 12 percent among the 2015 cohort to 18 percent among the 2013 cohort). Only proficiency rates were available for the study. The cutscore for passing was near the top of the score range for the nearing proficiency level, so some students passed an exam section without demonstrating proficiency.

For research questions 4 and 5, high school course enrollment data for school years 2010/11–2014/15 were used. These data included coursework for grades 9–12 for the 2014 and 2015 cohorts. Coursework information was not available prior to 2010, so complete

(continued)

Box 1. Data and methods *(continued)*

information on coursework for the 2011–13 cohorts was not available. See tables D2 and D3 in appendix D for sample sizes by research question.

Methods

The descriptive findings for each research question are presented as the percentages of students across cohorts, and within subgroups, with the outcome of interest. Statistical tests were not conducted to compare percentages in part because large cohort sizes would have resulted in many differences that were statistically significant but too small in magnitude to be considered meaningfully different. Differences in outcomes over time are described in relation to the changes in requirements, but the study design does not support causal interpretations.

Notes

1. The graduation rates in the main text differ from the rates in appendix A, which include all students who began grade 9 and exclude only students who transferred to another diploma-granting school outside the New Mexico public school system.

2. Therefore, a student who took five years to graduate and did so in 2012 would be considered part of the 2011 cohort.

3. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the Standards Based Assessment/High School Graduation Assessment for the 2016 cohort, in 2015, when they were in grade 12.

What the study found

This section presents the findings of the study.

The percentage of students who attended grade 11 and took a graduation exam in grade 11 or 12 was higher among the 2015 cohort than among the 2009–14 cohorts

The percentage of students who attended grade 11 and took a graduation exam in grade 11 or 12 increased from 76 percent among the 2011 cohort to 79 among the 2015 cohort

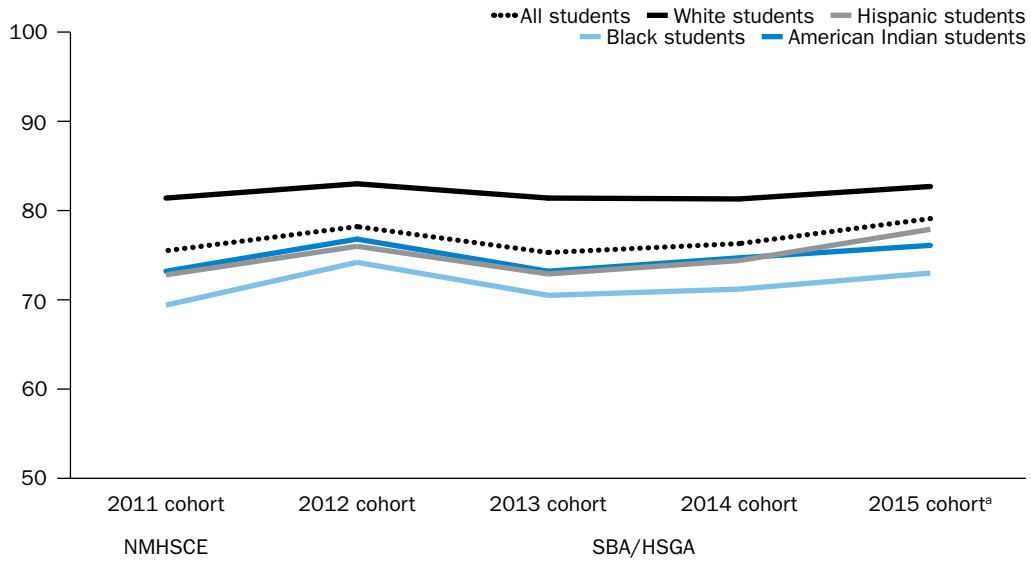
The percentage of students who attended grade 11 and took a graduation exam in grade 11 or 12 increased from 76 percent among the 2011 cohort to 79 among the 2015 cohort (figure 1; see also table E1 in appendix E). The rate increased from the 2011 cohort (the last to take the old exam) to the 2012 cohort (the first to take the new exam) then declined among the 2013 cohort before rising again among the 2014 and 2015 cohorts. The overall change was less pronounced for White students (from 81 percent among the 2011 cohort to 83 percent among the 2015 cohort) and more pronounced for Hispanic students (from 73 percent among the 2011 cohort to 78 percent among the 2015 cohort). Black male students was the only subgroup whose rate declined from the 2011 cohort (68 percent) to the 2015 cohort (65 percent). Black female students had the most dramatic increase (71 percent to 82 percent; see table E1 in appendix E).[8] Across cohorts the percentage of students who took an exam was higher among White students than among students of other races/ethnicities.

The percentage of students who took a graduation exam in grade 11 or 12 and scored proficient or better on all three sections by grade 12 increased from 25 percent among the 2011 cohort to more than 30 percent among the 2013–15 cohorts

Among the 2011 cohort (the last to take the old exam) about 25 percent of students who took a graduation exam in grade 11 or 12 scored proficient or better on all three exam

Figure 1. The percentage of New Mexico students who took a graduation exam in grade 11 or 12 dipped among the 2013 cohort but then rose among the 2014 and 2015 cohorts

Percent of students who took a graduation exam in grade 11 or 12



NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

The overall change from 2011 to 2015 was pronounced for Hispanic students (from 73 percent among the 2011 cohort to 78 percent among the 2015 cohort)

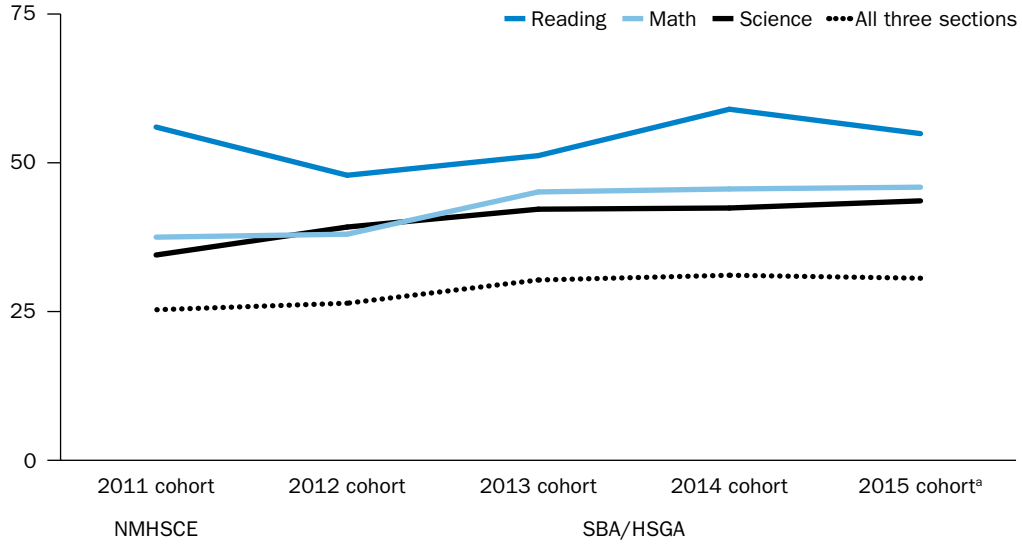
sections by grade 12 (figure 2; see also table E2 in appendix E). That percentage increased about 1 point among the 2012 cohort (the first to take the new exam) and to more than 30 percent among the 2013–15 cohorts.

The percentage of students who took a graduation exam in grade 11 or 12 and scored proficient or better on the math or science section by grade 12 increased over time. For math the percentage increased slightly from 37.5 percent among the 2011 cohort to 38.0 percent among the 2012 cohort, jumped to 45 percent among the 2013 cohort, and steadily increased to 46 percent among the 2015 cohort (see figure 2 and table E2 in appendix E). For science the percentage increased from 35 percent among the 2011 cohort to 39 percent among the 2012 cohort and steadily increased to 44 percent among the 2015 cohort.

The reading proficiency rate was higher than the math and science proficiency rates across cohorts but did not improve over time. The reading proficiency rate was higher than the math and science proficiency rates among all cohorts. However, while the math and science proficiency rates improved from the 2011 cohort to the 2015 cohort, the reading proficiency rate declined from 56 percent among the 2011 cohort to 48 percent among the 2012 cohort (the first to take the new exam), rose to 59 percent among the 2013 and 2014 cohorts and then dipped down to 55 percent among the 2015 cohort.

Figure 2. Among the 2011–15 cohorts of New Mexico students who took a graduation exam in grade 11 or 12, the reading proficiency rate by grade 12 was higher than the math and science proficiency rates but did not increase across the study period

Percent of students who scored proficient or better by grade 12



NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

The percentage of students who took a graduation exam in grade 11 or 12 and scored proficient or better on the math section increased from 37.5 percent among the 2011 cohort to 46 percent among the 2015 cohort

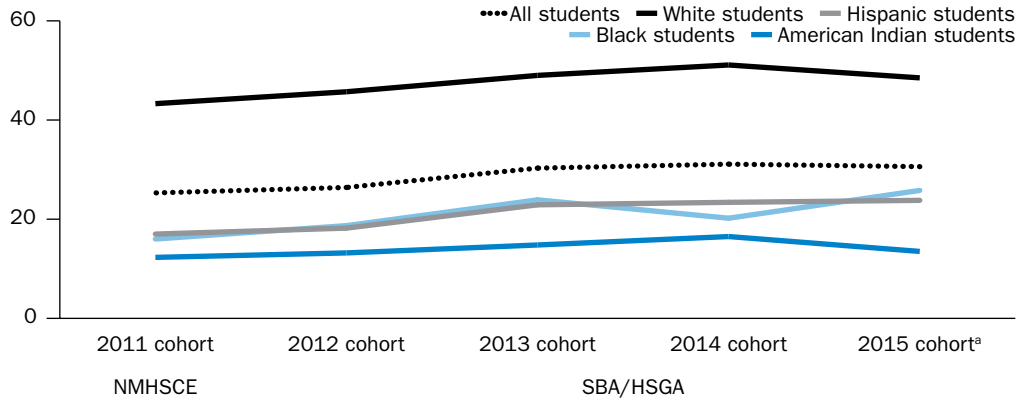
Students eligible for the federal school lunch program and Hispanic and Black students showed the largest gain in proficiency rates, and American Indian and English learner students showed the smallest. The percentage of students who scored proficient or better on all three sections of the graduation exam increased 5 percentage points from the 2011 cohort to the 2015 cohort, although most of the increase was from the 2012 cohort (the first to take the new exam) to the 2013 cohort, with little change from the 2013 cohort to the 2015 cohort (figure 3; see also table E5 in appendix E). The increase in the proficiency rate from the 2011 cohort to the 2015 cohort was particularly large for students eligible for the federal school lunch program (7 percentage points; figure 4; see also table E5 in appendix E), Hispanic students (7 percentage points), and Black students (10 percentage points) and was particularly small for American Indian students (1 percentage point) and English learner students (0.7 percentage point). (See table E4 in appendix E for the percentage of students in each cohort who scored proficient or better on zero, one, two, and three sections of the graduation exam.)

Graduation rates improved among students in all five cohorts who took a graduation exam in grade 11 as the number of sections of the exam on which they scored proficient or better increased

The percentage of students who took a graduation exam in grade 11 and graduated on time (that is, the following year) was 94–95 percent among those who scored proficient or

Figure 3. The percentage of New Mexico students who took a graduation exam in grade 11 or 12 and scored proficient or better on all three sections by grade 12 increased from the 2011 cohort to the 2015 cohort, particularly among Black and Hispanic students

Percent of students who scored proficient or better by grade 12



NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/ High School Graduation Assessment.

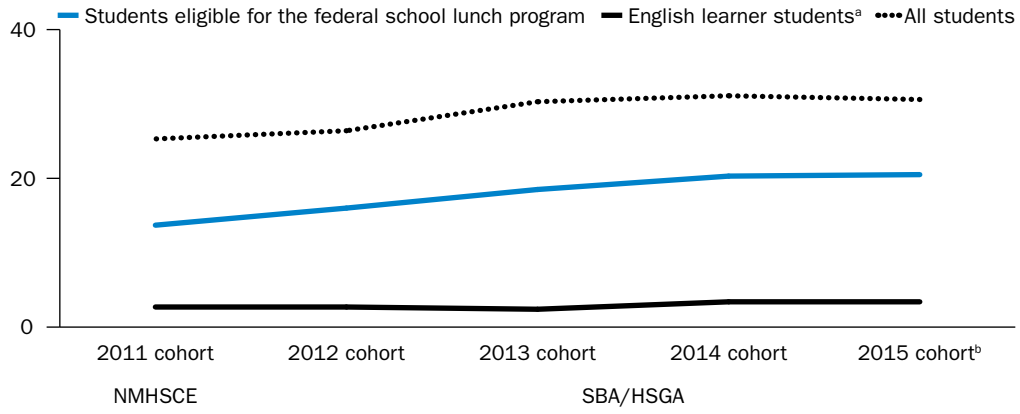
Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

Figure 4. The percentage of New Mexico students eligible for the federal school lunch program who took a graduation exam in grade 11 or 12 and scored proficient or better on all three sections by grade 12 increased from the 2011 cohort to the 2015 cohort

Percent of students who scored proficient or better by grade 12



NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/ High School Graduation Assessment.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 2 percent of English learner students who took an exam took the Spanish version of the exam.

b. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

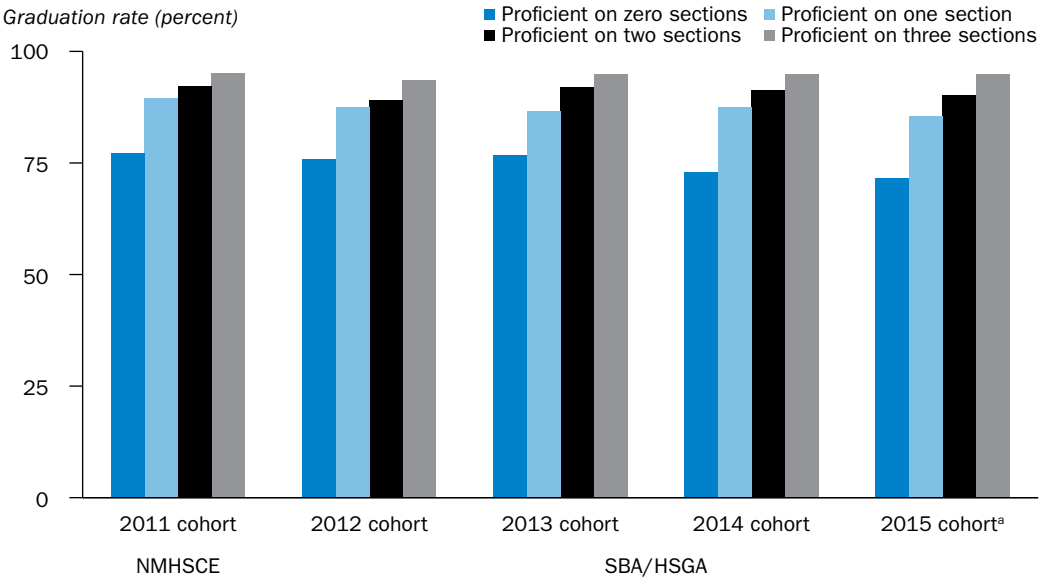
better on all three sections, 89–92 percent among those who scored proficient or better in two sections, 86–90 percent among those who scored proficient or better on one section, and 72–77 percent among those who scored proficient or better on zero sections (figure 5).

Among the 2011 cohort 7 percent of students who began grade 11 but did not take a graduation exam in grade 11 graduated the following year (that is, four years after entering high school), and 2 percent graduated two years later (that is, five years after entering high school; see table E6 in appendix E). Among the 2014 cohort 9 percent of students who began grade 11 but did not take a graduation exam in grade 11 graduated the following year, and 1 percent graduated two years later. Among the 2015 cohort 7 percent of students who began grade 11 but did not take a graduation exam in grade 11 graduated the following year (the percentage of students who graduated two years later was not available).

The percentage of students who attended four years of high school and took Algebra II and two lab science courses by grade 12 increased 3 percentage points from the 2014 cohort to the 2015 cohort

Among students who attended four years of high school the percentage of students who enrolled in Algebra II and two lab science courses increased 3 percentage points from the 2014 cohort (63 percent) to the 2015 cohort (66 percent; figure 6; see also table E7 in appendix E).[9] More than two-thirds of students in the 2014 cohort (69 percent) and the 2015

Figure 5. The graduation rate among New Mexico students in the 2011–15 cohorts who took a graduation exam in grade 11 was higher among those who scored proficient or better on more sections of the exam



The percentage of students who took a graduation exam in grade 11 and graduated on time was 94–95 percent among those who scored proficient or better on all three sections

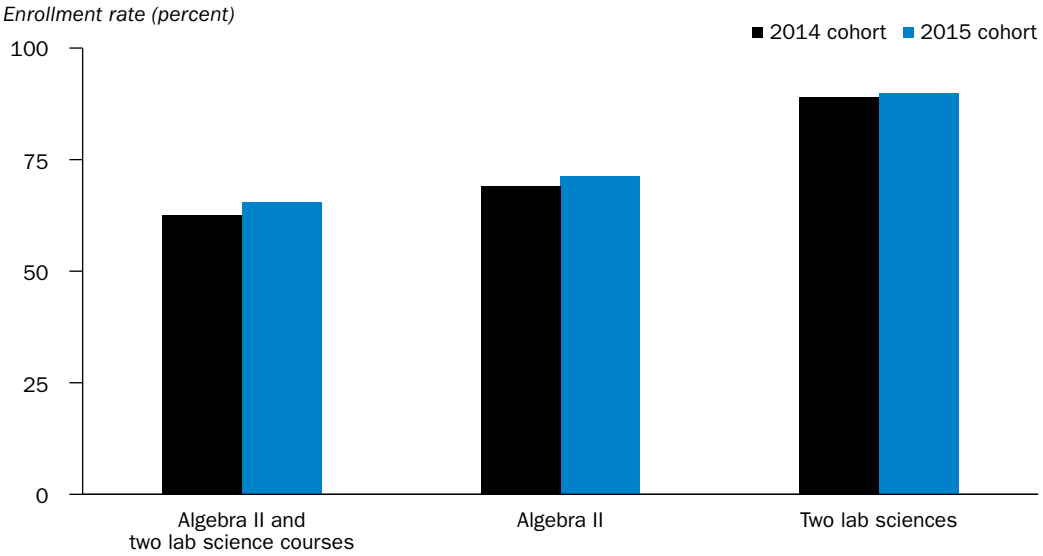
NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

Figure 6. The percentage of New Mexico students who attended four years of high school and took Algebra II and two lab science courses increased from the 2014 cohort to the 2015 cohort



The percentage of students who enrolled in Algebra II and two lab science courses increased 3 percentage points from the 2014 cohort (63 percent) to the 2015 cohort (66 percent)

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

cohort (71 percent) enrolled in Algebra II, and most students in the 2014 cohort (89 percent) and the 2015 cohort (90 percent) enrolled in two lab science courses. In addition, more than 95 percent took a lab biology course, more than 60 percent took a lab chemistry course, and 77 percent took some other lab science course (see table E8 in appendix E for details about specific lab science courses and the grade levels when the courses were taken).

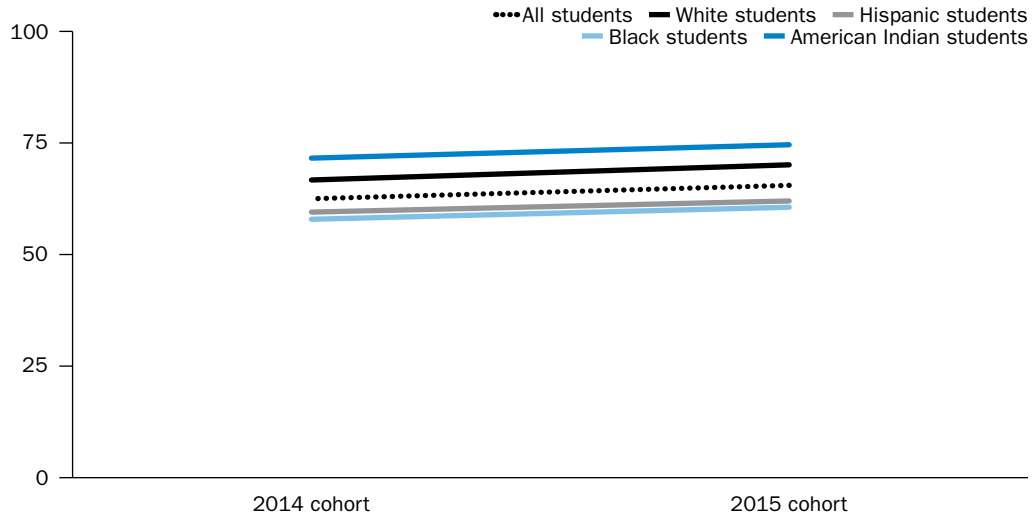
More than 70 percent of American Indian and White grade 12 students in the 2015 cohort took Algebra II and two lab science courses. The increase in enrollment rates in Algebra II and two lab science courses from the 2014 cohort to the 2015 cohort held across racial/ethnic subgroups (figure 7) but was smaller among English learner students and Black male students (see table E9 in appendix E). Among the 2015 cohort enrollment rates were highest among American Indian students (75 percent) and White students (70 percent) and lowest among English learner students (59 percent), Black students (61 percent), and Hispanic students (62 percent). And rates were higher among female students (67 percent) than among male students (64 percent), a pattern that held across racial/ethnic groups (see table E9 in appendix E).

For students in the 2014 and 2015 cohorts who attended four years of high school, graduation rates were higher among those who took Algebra II and two lab science courses by grade 12 than students who did not take those courses

More than three-quarters of students who attended a fourth year of high school graduated after that year (78 percent among the 2014 cohort and 79 percent among the 2015 cohort; figure 8; see also table E10 in appendix E). For both cohorts graduation rates were higher among those who took Algebra II and two lab science courses (82 percent among the 2014

Figure 7. The increase in enrollment rates in Algebra II and two lab science courses among New Mexico students who attended four years of high school from the 2014 cohort to the 2015 cohort held across racial/ethnic groups, with American Indian students showing the highest rates

Enrollment rate in Algebra II and two lab science courses (percent)

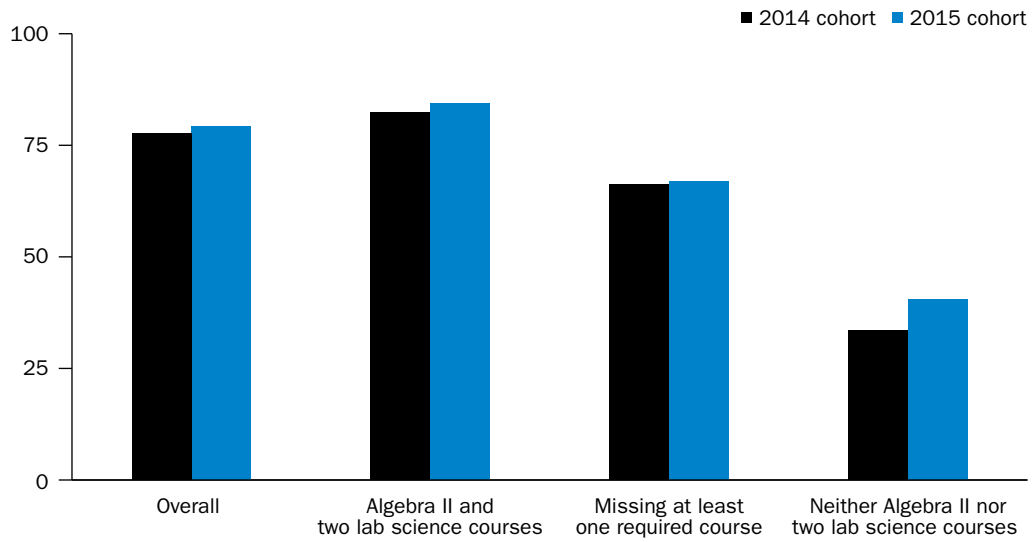


Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

Figure 8. The graduation rate was higher among students who took Algebra II and two lab science courses by grade 12 than among those who did not and increased 2 percentage points from the 2014 cohort to the 2015 cohort

Graduation rate (percent)



Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

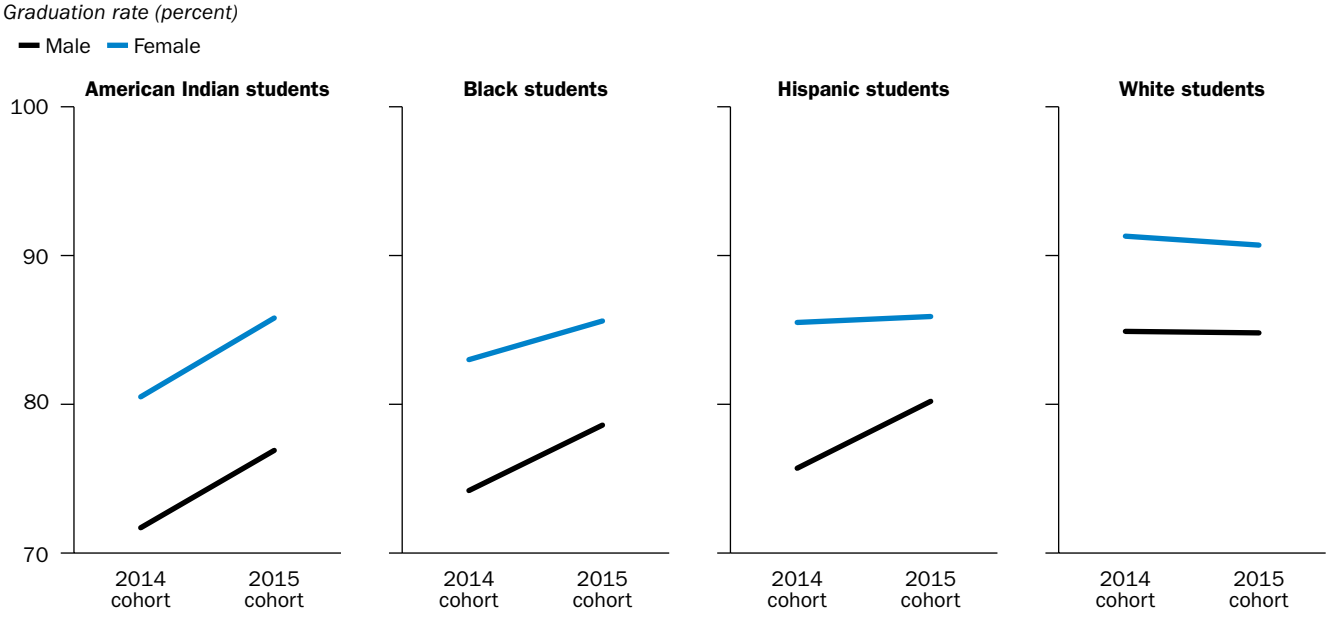
Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

cohort and 84 percent among the 2015 cohort) than among those who did not (66 percent among the 2014 cohort and 67 percent among the 2015 cohort). The lowest four-year graduation rate was among students who did not take Algebra II and who took fewer than two lab science courses (33 percent among the 2014 cohort and 41 percent among the 2015 cohort).

Among students in the 2014 and 2015 cohorts who took Algebra II and two lab science courses by grade 12, a higher percentage of female students than of male students graduated within four years, a finding that held across racial/ethnic groups, but the graduation rate increased most for Hispanic male students and for American Indian and Black students. The graduation rate was higher for female students (87 percent among the 2014 cohort and 88 percent among the 2015 cohort) than among male students (78 percent among the 2014 cohort and 81 percent among the 2015 cohort), and this held within racial/ethnic subgroups (figure 9; see also table E11 in appendix E). The largest increases between the cohorts were among American Indian male students (from 72 percent to 77 percent), American Indian female students (from 81 percent to 86 percent), Hispanic male students (from 76 percent to 80 percent), and English learner students (from 69 percent to 73 percent). White students who took Algebra II and two lab science courses had a higher graduation rate than did students in other racial/ethnic subgroups. Among the 2015 cohort the rate was about 1 percentage point higher among American Indian female students, Black female students, and Hispanic female students than among White male students (85 percent).

The largest increases in graduation rates between the 2014 and 2015 cohorts were among American Indian male students, American Indian female students, Hispanic male students, and English learner students

Figure 9. Among New Mexico students in the 2014 and 2015 cohorts who enrolled in Algebra II and two lab science courses by grade 12, the four-year graduation rate was higher among female students than among male students across racial/ethnic groups



Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort

Source: Authors' calculations based on data from the New Mexico Student Teacher Accountability Reporting System.

Implications of the study findings

Changes to graduation requirements, such as the ones enacted in New Mexico, are usually intended to motivate positive change, such as better student performance and higher enrollment in more-challenging courses. The study findings show that the overall direction of change is positive for graduation exam performance, advanced course enrollment, and graduation rates but that differences exist across subgroups. The differences may have implications for targeting resources and services to students most in need of support for staying in school and fulfilling graduation requirements.

A large percentage of English learner students take a graduation exam, but only a small percentage score proficient on the reading, math, and science sections. More than half of English learner students take Algebra II and two lab science courses by grade 12, but graduation rates among those who do are lower than graduation rates among students overall. Further investigation of English learner students' use of alternative demonstrations of competency, as well as of the support available to English learner students to prepare for graduation exams and to succeed in Algebra II and lab science courses, could inform efforts to boost graduation rates for these students.

The differences in graduation exam performance, advanced course enrollment, and graduation rates across subgroups may have implications for targeting resources and services to students most in need of support for staying in school and fulfilling graduation requirements

American Indian students' proficiency rates on the reading, math, and science sections of the graduation exam improved 4 percentage points between 2011 and 2014 but then declined 3 percentage points between 2014 and 2015. However, the percentage of students who attended four years of high school and who took Algebra II and two lab science courses was higher among American Indian students than among students in other racial/ethnic subgroups. The overall graduation rate for American Indian students is low (New Mexico Public Education Department, 2016; see also tables A2 and A3 in appendix A), but 81 percent of American Indian students in the 2015 cohort who took Algebra II and two lab science courses graduated within four years—a promising outcome. Further studies of the experiences and support available to American Indian students could inform future efforts to increase their graduation rate.

Within each racial/ethnic subgroup a smaller percentage of male students than of female students take a graduation exam or Algebra II and two lab science courses. Male students, especially racial/ethnic minority male students, could be targeted for support. Reporting graduation rates by race/ethnicity crossed by gender could help track the outcomes for these students in the future.

Changes to graduation requirements can also have unintended negative effects, such as higher dropout rates (see appendix C). Dropout rates in New Mexico have increased since the new requirements were introduced, from 20 percent among the 2012 cohort to 24 percent among the 2014 cohort (New Mexico Public Education Department, 2016; see also table A1 in appendix A), though the impact of the new requirements on dropout rates is unclear, in part because the old and new exams were both graduation requirements.

In addition, about two-thirds of the grade 12 students in the 2014 and 2015 cohorts graduated without taking the newly required Algebra II and two lab science courses, and the percentage of students who graduated without taking Algebra II or more than one lab science course increased between the two cohorts. Many students graduated in four years without scoring proficient on any of the exam sections, which suggests that alternative

demonstrations of competency are commonly used to satisfy the graduation requirement. Additional analyses that examine district policies related to exceptions to the state policy, including the use of parent waivers for courses and alternative demonstrations of competency, could shed light on this trend. However, some of the students had passing scores for an exam section but were not at the proficient level because the cutscore for passing was near the top of the score range for the nearing proficiency level.

This study also provides a baseline from which to compare future exam performance and coursetaking, such as performance on the Partnership for Assessment of Readiness for College and Careers exam, which replaced the Standards Based Assessment/High School Graduation Assessment as a graduation requirement for the 2016 cohort.

Limitations of the study

Changes in graduation requirements were not the only changes taking place in New Mexico during the years covered in the study. Changes in student outcomes may have occurred for reasons unrelated to graduation requirements

The difficulty of the New Mexico High School Competency Examination and the Standards Based Assessment/High School Graduation Assessment cannot be not compared, so changes in proficiency rates are not evidence of changes in student achievement. Complete end-of-course data were not available for any cohort, so the study does not include findings related to course achievement or course completion.

New Mexico students take the graduation exam in grade 10 and again in grade 11 regardless of grade 10 performance. Grade 10 graduation exam data were not available, so the study team could not investigate the relationship between graduation rates and early performance on the exam. Only proficiency data were available for the study. The percentage of students scoring at the proficient level or higher on an exam section did not include students who passed but scored just below the proficient cutscore.

For students who appear in a data file in one grade but not the subsequent grade, the available data do not indicate when during the school year or summer that student left school. For example, the low graduation rate among grade 11 students who did not take a graduation exam in grade 11 likely included students who were no longer in school at the end of grade 11 when the exams were administered.

Students in the 2011 and 2013–15 cohorts who did not take or pass the graduation exam were permitted to use an alternative demonstration of competency for reading, math, and science. Data were not available on students' use of this option.

Information about parent waivers for Algebra II was not included, so the study team could not determine why students did not take Algebra II.

Changes in graduation requirements were not the only changes taking place in New Mexico during the years covered in the study: The state also adopted a new school rating system, a new teacher evaluation system, and the Common Core State Standards. Changes in student outcomes may have occurred for reasons unrelated to graduation requirements. Similarly, a lack of change across cohorts does not necessarily mean that the policy change did not have its intended effect.

Appendix A. New Mexico graduation rates

The four-year graduation rate averaged 66 percent across the 2009 (66 percent), 2010 (67 percent), and 2011 (63 percent) cohorts and increased to 70 percent in 2012 (table A1).[10] This may indicate that some students who graduated in 2012 would not have done so if passing a graduation exam had been a requirement. However, the four-year graduation rate among the 2013–15 cohorts—for which the Standards Based Assessment/High School Graduation Assessment exam was a requirement—averaged just 1 point lower, 69 percent (with a range of 69–70 percent). The dropout rate (the percentage of students who do not graduate within five years of beginning grade 9) increased from 18 percent among the 2011 cohort to 24 percent among the 2014 cohort. Meanwhile, the percentage of students who graduated in five years declined. The percentage of students earning a certificate of completion within five years of entering high school was consistently less than 2 percent among the 2009–14 cohorts.

Graduation rates by subgroup fluctuated before and after the change in graduation requirements. For all subgroups the four-year graduation rate was higher among the 2015 cohort than among the 2011 cohort, though most subgroups' rates declined slightly from the 2014 cohort to the 2015 cohort (table A2). The decline was most dramatic for Black students, whose graduation rate rose from 60 percent among the 2011 cohort to 69 percent among the 2012 cohort and then declined to 61 percent among the 2015 cohort. White students and female students consistently had the highest graduation rates.

The difference between four-year and five-year graduation rates is large among the 2011 cohort (63 percent versus 72 percent), particularly for Hispanic students in the 2011 cohort (59 percent versus 80 percent; see table A3). The graduation exam requirement was eliminated for students who graduated in 2012 (the fifth year of high school for the 2011 cohort). Published five-year graduation rates among the 2010 cohort are lower than the four-year rates; thus details for this cohort are not included in table A3.

Table A1. Graduation and dropout rates among New Mexico students in the 2009–15 cohorts

	Before new requirements			Transition year	New requirements		
Graduation outcome	2009 cohort	2010 cohort	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort
Graduated within four years	66.1	67.3	63.0	70.4	70.3	69.3	68.6
Graduated within five years	70.5	66.5	72.1	74.0	71.4	70.5	—
Graduated in five years	4.4	[a]	9.1	3.6	1.1	1.2	—
Dropped out	18.5	20.7	17.8	19.8	20.8	23.9	—
Earned a certificate of completion	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	—

— is not available.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). The graduation rates in the main text differ from the rates presented here, which include all students who began grade 9 and exclude only students who transferred to another diploma-granting school outside the New Mexico public school system.

a. The five-year graduation rate was less than the four-year graduation rate for the 2010 cohort, so the percentage of students who graduated in five years could not be computed.

Source: New Mexico Public Education Department, 2016.

Table A2. Four-year graduation rates among New Mexico students in the 2009–15 cohorts, by subgroup

Subgroup	Before new requirements			Transition year	New requirements		
	2009 cohort	2010 cohort	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort
Overall	66.1	67.3	63.0	70.4	70.3	69.3	68.6
Female	70.0	72.0	67.8	75.3	74.9	73.9	72.8
Male	62.5	62.8	58.6	65.8	65.9	64.8	64.6
American Indian	57.8	60.5	56.0	65.3	64.3	61.7	62.9
Black	61.4	62.1	60.1	69.3	68.7	64.3	61.0
Hispanic	63.0	64.1	59.3	67.7	67.9	67.6	67.2
White	74.5	75.6	73.2	77.5	77.0	75.7	73.6
Eligible for the federal school lunch program	59.9	61.3	56.4	64.8	64.6	63.0	63.5
English learner	63.2	60.8	55.9	65.8	65.4	64.5	64.0

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). The graduation rates in the main text differ from the rates presented here, which include all students who began grade 9 and exclude only students who transferred to another diploma-granting school outside the New Mexico public school system.

Source: New Mexico Public Education Department, 2016.

Table A3. Five-year graduation rates among New Mexico students in the 2009–15 cohorts, by subgroup

Subgroup	Before new requirements		Transition year		New requirements	
	2009 cohort (graduated in 2010)	2010 cohort (graduated in 2011)	2011 cohort (graduated in 2012)	2012 cohort (graduated in 2013)	2013 cohort (graduated in 2014)	2014 cohort (graduated in 2015)
Overall	70.5	66.5	72.1	74.0	71.4	70.5
Female	73.7	[a]	75.8	78.3	76.0	74.9
Male	62.5	[a]	68.7	69.9	67.1	66.3
American Indian	64.3	[a]	65.9	70.7	65.4	62.9
Black	68.5	[a]	68.1	71.7	69.1	65.8
Hispanic	67.3	[a]	79.7	71.6	69.1	69.0
White	78.3	[a]	79.4	79.7	78.3	76.4
Eligible for the federal school lunch program	65.3	[a]	67.1	69.6	66.1	64.6
English learner	68.2	[a]	67.7	70.8	66.7	66.3

— is not available.

a. Among the 2010 cohort the overall five-year graduation rate was less than the four-year graduation rate, so details by subgroup are not reported.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9).

Source: New Mexico Public Education Department, 2016.

Appendix B. New Mexico graduation requirements

This appendix provides details about New Mexico graduation exams and course requirements during the study years.

Graduation exams

The New Mexico High School Competency Examination (NMHSCE) was the state's high school graduation assessment from 1986 to 2011. In 2009/10 New Mexico adopted a new standards-aligned high school graduation exam, the Standards Based Assessment/High School Graduation Assessment (SBA/HSGA), which has three sections (reading, math, and science).[11] Students in the 2012 cohort took the SBA/HSGA in grades 10 and 11 but were not required to pass it to graduate. The 2013 cohort was the first class required to pass the SBA/HSGA to earn a diploma. The schedule for administering the exam did not change: Grade 10 and 11 students take the exam (grade 11 students take the exam even if they passed it in grade 10), and grade 12 students can take sections of the exam that they have not yet passed. A Spanish version was available for both exams but was rarely used: 2 percent of English learner students who took an exam took the Spanish version.

The passing score for the SBA/HSGA is 1,137 for reading and math and 1,138 for science, both of which are close to the top of the range for the nearing proficiency level (1,129–1,139 for reading, 1,127–1,139 for math, and 1,130–1,139 for science) and to the bottom of the range for the proficient level (1,140–1,150 for reading and math and 1,140–1,151 for science; table B1). Students could also pass the math and reading sections if their math

Table B1. Passing scores for New Mexico's high school graduation exams, by section

Section	2011 cohort: New Mexico High School Competency Examination	2012–15 cohorts: Standards Based Assessment/ High School Graduation Assessment
Reading	Score of 175 (range: English version 30–330; Spanish version 40–350)	Score of 1,137 (range: 1,100–1,180) or combined reading and math scores of 2,273 when reading and math are both nearing proficient or better · Beginning proficient: 1,100–1,128 · Nearing proficiency: 1,129–1,139 · Proficient: 1,140–1,150 · Advanced: 1,151–1,180
Math	Score of 175 (range: English version 17–320; Spanish version 51–360)	Score of 1,137 (range: 1,100–1,180) or combined reading and math scores of 2,273 when reading and math are both nearing proficient or better · Beginning proficient: 1,100–1,126 · Nearing proficiency: 1,127–1,139 · Proficient: 1,140–1,150 · Advanced: 1,151–1,180
Science	Score of 175 (range: English version 60–330; Spanish version 75–360)	Score of 1,138 (range: 1,100–1,180) · Beginning proficient: 1,100–1,129 · Nearing proficiency: 1,130–1,139 · Proficient: 1,140–1,151 · Advanced: 1,152–1,180
Language arts	Score of 175 (range: English version 20–340; Spanish version 40–340)	Not applicable
Social science	Score of 175 (range: English version 50–340; Spanish version 40–360)	Not applicable
Writing	Score of 3 (range: 1–6)	Not applicable

Source: New Mexico Public Education Department, n.d.

and reading scores were both at the nearing proficiency level and their combined reading and math score was 2,273.

Only proficiency-level data were available for this study. The percentage of students who scored proficient or better is smaller than the percentage of students who passed. Students who did not pass by their senior year were able to submit a competency portfolio[12] or pass other qualifying exams to demonstrate proficiency in reading, math, and science. Both the NMHSGE and the SBA/HSGA had these alternative provisions.

Coursework requirements

The math and science coursework requirements necessary to obtain a high school diploma in New Mexico increased beginning with the 2013 cohort. Prior cohorts needed only three math courses (including Algebra I), and only one of three science courses had to include a lab.[13] For the 2013 cohort the requirements increased to four math courses, including Algebra II, and at least two of three science courses had to include a lab. As part of the new requirements, parents could request a waiver for their child to be exempt from the Algebra II requirement. For the 2012 cohort and prior cohorts students were required to take 8.5 units of elective courses, including one unit in communication, business, or a foreign language. For the 2013–15 cohorts the 8.5 units of elective courses had to include one unit in workplace readiness or a foreign language (New Mexico Public Education Department, 2012).

Appendix C. Literature review

Many states have instituted policies that increase requirements for high school graduation, including graduation exams and advanced math and science course requirements. This is to help ensure that all students who graduate from high school are ready for college and careers. In 2015, 21 states had high school graduation exams (Hyslop, 2014). New Mexico is one of 24 states that required the completion of Algebra II for graduation (Adams, 2014) and one of 12 states (along with the District of Columbia) that required two or more lab science courses or three science courses for their 2014 graduating classes (Education Commission of the States, 2007). The intended outcome of higher academic requirements for graduation is higher student achievement. The rationales are that students should be motivated to learn what is required to meet the higher standards necessary to graduate and that schools should be motivated to help all students meet the requirements. However, policymakers are concerned that unintended outcomes could result from instituting more-rigorous graduation requirements, especially for students who are struggling.

High school graduation exams

A large body of literature is devoted to studying the relationship between high school graduation exam performance and student outcomes, such as graduation rates, dropout rates, and academic performance. Of the 14 studies reviewed, 9 were conducted at the state level using data from national surveys such as the National Education Longitudinal Study of 1988, the Current Population Survey, and the Common Core of Data, and most studied the outcomes related to graduation and dropout rates. The rest of the studies used secondary education data from the state of interest. Only three of the studies analyzed the association between performance on more-difficult graduation exams and student outcomes.

State-level studies using national survey data generally found little or no statistically significant association between graduation exam performance and graduation or dropout rates when considering all students. However, three of these studies found higher dropout rates among students with lower academic performance and among Black and Hispanic students (Dee & Jacobs, 2006; Jacob, 2001; Warren et al., 2006). Three of the studies highlighted passing rates of general educational development (GED) tests in their studies by including them in the calculation of dropout rates or by separately analyzing the relationship with passing GED tests; all three found no statistically significant relationship with academic achievement (Warren & Edwards, 2005; Warren & Jenkins, 2005; Warren et al., 2006). Generally speaking, statistically significant differences were more likely to be found across the three studies when passing GED tests was not considered a graduation outcome, when the effects were examined by socioeconomic status and race/ethnicity, and when a large number of states were included.

Five studies at the district or school level found few statistically significant effects of graduation exam performance on student outcomes such as persistence, graduation, and dropout rates. Most of the significant relationships were among racial/ethnic minority students or among students with lower academic performance. The findings for these students are inconsistent across studies; some found a positive association with graduation and persistence (Martorell, 2004), and others found a negative association with the same outcomes (Ou, 2009; Reardon et al., 2010).

Course completion requirements

The study team reviewed 13 studies on the relationship between coursetaking patterns and student outcomes. Three studies reported on the relationship between rigorous course-taking and student outcomes and found that students who take more-advanced courses have more-positive outcomes, as measured by scores on standardized tests, four-year college enrollment rates, and graduation rates (Bozick & Ingels, 2008; Long, Conger, & Iatarola, 2012; Noble & Schnelker, 2007). The three studies did not examine the role of course requirements but simply looked at outcomes for students who took advanced courses, whether by choice or as mandated. The other 10 studies examined the role of course requirements on student outcomes.

Ten studies focused on student outcomes related to math or science course completion requirements. These requirements were typically a number of courses and specific courses, such as Algebra II. Except for two studies that used district-level data (Buddin & Croft, 2014; Montgomery, Allensworth, & Correa, 2010), the studies used data from national surveys similar to those used in the aforementioned studies of graduation exams.

The district-level studies reported mixed results in student outcomes. One study found no difference between math or science ACT scores and an increase in the required number of math and science courses, but it did find a positive association between increased math requirements and college enrollment rates (Buddin & Croft, 2014). The other district-level study found that increasing the required number of science courses from one to three had a negative association with graduation rates and no effect on college enrollment rates (Montgomery et al., 2010).

The studies that used national survey data, such as the National Education Longitudinal Study of 1988, the Current Population Survey, and the Public Use Microdata Sample, also found mixed results. Students in states with more required math or science courses were found to earn more math or science course credits than students in states without higher requirements (Federman, 2007; Harvill, 2011; Plunk, Tate, Bierut, & Grucza, 2014; Schiller & Muller, 2003; Teitelbaum, 2003). But some studies found lower graduation rates when more math and science courses were required for graduation (Harvill, 2011; Plunk et al., 2014; Teitelbaum, 2003). One study reported no association between increased course requirements and graduation rates (Dee & Jacobs, 2006). One study found that increased course graduation requirements were associated with a greater dropout rate and a decrease in the probability of attending college for Hispanic students (Plunk et al., 2014). However, that study also found that, overall, increases in high school course requirements were related to higher college graduation rates. One study found that increased course requirements were associated with higher college graduation rates as well as higher SAT and ACT scores (Attewell & Domina, 2008), and another found that more-stringent math requirements were positively associated with college enrollment (Daun-Barnett & St. John, 2012).

Appendix D. Data and methodology

This appendix provides the sources of the study data, variable definitions, graduation requirements, sample, and analyses.

Data

Data for the study are from the New Mexico Public Education Department's Student Teacher Accountability Reporting System, which is a comprehensive student, staff, and course information system that provides data for each preK–12 student served by the New Mexico public education system. The data files for the study contain student demographics, enrollment, and graduation data for school years 2007/08–2014/15, assessment data for school years 2008/09–2014/15, and course enrollment data for school years 2010/11–2014/15 (table D1). Student identifiers link data across files for each year to form longitudinal data files for each cohort.

Key variables. To determine the number of years in which a student was enrolled, an identifier was created that indicated the year in which the student record is in the data (1 for the first year, 2 for the second year, and so on). This variable was created in order to assign each student the number of records that he or she had in the data system so that calculations could be made for each student (rather than for each record) and the number of years that the student took to graduate could be determined.

Grade level. Some grade-level variables in the data file were coded directly as the grade number; for others, H1, H2, H3, and H4 were used to indicate the second, third, or fourth year of high school rather than 9, 10, 11, and 12. For consistency, these were recoded as grades 9, 10, 11, and 12.

Cohort. If a student was in grade 9 as indicated in the recoded grade-level variable in school year 2007/08 for the first time, the student was classified as being in the 2011 cohort;

Table D1. Data files and variables, 2007/08–2014/15

File	Years of data	Variable
Student demographic data	2007/08–2014/15	School year Student identifier Grade level Graduation status Gender Race/ethnicity Eligibility for the federal school lunch program English learner status
Assessment data	2008/09–2014/15	School year Student identifier Graduation exam (reading, math, and science) Proficiency level (beginning proficient, nearing proficient, proficient, advanced)
Course enrollment data	2010/11–2014/15	School year Student identifier Course name

Source: Authors' compilation.

if the student was in grade 9 in school year 2008/09 for the first time, the student was classified as being in the 2012 cohort; and so on.

Race/ethnicity. Student race/ethnicity was based on a race code and an ethnicity code. Students with a code indicating "Hispanic" for ethnicity were coded as Hispanic regardless of the race variable code. Students who were not Black, White, Hispanic, or American Indian were included in the overall results but not in the breakdowns by race/ethnicity.

Eligibility for the federal school lunch program. Students who were coded as eligible for either free lunch or reduced-priced lunch were coded together as eligible for the federal school lunch program.

Graduation status. Students were classified as graduates if they had a graduation code in any school year. Students with a graduation code for multiple school years were classified as graduates in the first school year in which they had a graduation code. Graduation rates were calculated as the number of students flagged in the graduation indicator variable divided by the total number of students in the analysis group. Graduation rates discussed in appendix A came directly from New Mexico Public Education Department published rates.

Graduation exam scores. The raw scores for reading, math, and science graduation exam scores were not available. For some findings the beginning proficient and nearing proficient levels were coded as not proficient, and the proficient and advanced levels were coded as proficient or better.

Course enrollment. Course enrollment was determined by the course names in which the student was enrolled. Four types of courses were coded: Algebra II, chemistry, biology, and other science courses whose course name indicated "with lab" (these were human anatomy, physical science, and environmental science).

Sample. The study sample draws from all New Mexico public schools. Consistent with New Mexico's strategy for defining the grade 9 graduation cohort, each cohort was identified by the year in which students were expected to graduate (that is, four years after entering grade 9). Students transferring in from outside the New Mexico public school system after grade 9 and students who left the New Mexico public school system before grade 11 were not included.

Graduation exam data were available for school years 2010/11–2014/15 and thus cover five cohorts (the 2011–15 cohorts). Grade 10 exam scores were not available. Students took the exam in grade 11 regardless of their performance in grade 10. The Standards Based Assessment/High School Graduation Assessment (SBA/HSGA) was phased in such that each cohort took either the New Mexico High School Competency Examination (NMHSCE) at each grade administered or the SBA/HSGA at each grade. The available exam outcomes are compared over time for only the last cohort that took the NMHSCE (the 2011 cohort) and for four cohorts that took the SBA/HSGA (the 2012–15 cohorts). High school course enrollment data were available for school years 2010/11–2014/15 and thus cover the 2014 and 2015 cohorts.

Research questions 1, 2, and 3 about exam participation and performance and subsequent graduation outcomes are answered for all students who were enrolled in a third year of high school (all students who appear in the data files two years after beginning grade 9; table D2).

Table D2. Number of grade 11 New Mexico students in the 2011–15 cohorts, by subgroup

Subgroup	NMHSCE	SBA/HSGA			
	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort[a]
All students	23,719	24,444	23,418	23,106	23,412
Female	11,536	11,853	11,404	11,413	11,364
Male	12,183	12,591	12,014	11,693	12,048
American Indian	3,107	3,099	2,632	2,461	2,430
Female	1,519	1,569	1,279	1,234	1,144
Male	1,588	1,530	1,353	1,227	1,286
Black	568	656	522	472	456
Female	271	293	233	214	216
Male	297	363	289	258	240
Hispanic	12,644	13,399	13,486	13,535	13,473
Female	6,162	6,525	6,623	6,720	6,527
Male	6,482	6,874	6,863	6,815	6,946
White	7,100	7,010	6,293	6,122	6,477
Female	3,449	3,334	3,035	2,994	3,185
Male	3,651	3,676	3,258	3,128	3,292
Eligible for the federal school lunch program	12,992	13,824	14,039	14,264	14,422
English learner[b]	3,293	3,243	2,814	2,932	2,919

NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

b. About 2 percent of English learner students who took an exam took the Spanish version of the exam.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9).

Source: New Mexico Student Teacher Accountability Reporting System.

Research questions 4 and 5, about courses taken by grade 12 and subsequent graduation outcomes, are based on students enrolled in their fourth year of high school (table D3). Data from grades 9–12 were available only for the 2014 and 2015 cohorts.

Methodology

The descriptive findings for each research question are presented as the percentages of students across cohorts, and within subgroups, with the outcome of interest. Statistical tests were not conducted to compare percentages in part because large cohort sizes would result in many differences that were statistically significant but too small in magnitude to be considered meaningfully different. Differences in outcomes over time are described in relation to the changes in requirements, but the study design does not support causal interpretations.

Table D3. Number of grade 12 New Mexico students in the 2014 and 2015 cohorts, by subgroup

Subgroup	2014 cohort	2015 cohort
All students	20,346	20,672
Female	10,111	10,093
Male	10,235	10,579
American Indian	2,171	2,119
Female	1,090	996
Male	1,081	1,123
Black	401	391
Female	187	194
Male	214	197
Hispanic	11,969	12,002
Female	5,991	5,836
Male	5,978	6,166
White	5,339	5,648
Female	2,615	2,807
Male	2,724	2,841
Eligible for the federal school lunch program	12,435	12,582
English learner	2,559	2,538

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9).

Source: New Mexico Student Teacher Accountability Reporting System.

Appendix E. Supplemental descriptive data tables

This appendix provides additional details on the findings presented in the main body of the report.

Table E1. Percentage of New Mexico students in the 2011–15 cohorts who took a graduation exam in grade 11 or 12

	NMHSCE	SBA/HSGA			
Subgroup	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort[a]
All students	75.5	78.2	75.3	76.3	79.1
Female	78.2	80.4	78.8	78.8	81.3
Male	73.0	76.1	72.1	73.9	77.0
American Indian	73.2	76.8	73.2	74.7	76.1
Female	75.2	78.5	75.9	76.3	77.7
Male	71.3	75.1	70.6	73.1	74.7
Black	69.4	74.2	70.5	71.2	73.0
Female	70.8	77.5	73.0	79.0	82.4
Male	68.0	71.6	68.5	64.7	64.6
Hispanic	72.8	76.0	72.9	74.4	77.9
Female	75.5	79.3	76.8	77.3	79.9
Male	70.3	72.9	69.1	71.5	76.0
White	81.4	83.0	81.4	81.3	82.7
Female	84.6	83.5	84.3	82.5	85.0
Male	78.3	82.6	78.8	80.1	80.5
Eligible for the federal school lunch program	71.8	76.3	70.6	72.6	75.7
English learner[b]	69.1	72.0	64.0	68.1	72.1

NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

b. About 2 percent of English learner students who took an exam took the Spanish version of the exam.

Source: New Mexico Student Teacher Accountability Report System.

Table E2. Percentage of New Mexico students in the 2011–15 cohorts who took a graduation exam in grade 11 or 12 and scored proficient or better, by section

Section	NMHSCE	SBA/HSGA			
	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort[a]
All three sections	25.3	26.4	30.3	31.1	30.6
Reading	56.0	47.9	51.2	59.0	54.9
Math	37.5	38.0	45.1	45.6	45.9
Science	34.5	39.2	42.2	42.4	43.6

NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

Note: Each cohort is identified by the year in which students were be expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: New Mexico Student Teacher Accountability Report Data System data.

Table E3. Percentage of New Mexico grade 11 students in the 2011–15 cohorts who retook the graduation exam in grade 12 and percentage who scored proficient or better in grade 12, by section

Section	NMHSCE	SBA/HSGA			
	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort[a]
Overall					
Retook any section in grade 12	1.3	3.2	1.4	1.1	—
Retakers who scored proficient or better on all three sections in grade 12	10.0	7.0	17.4	17.0	—
Reading					
Retook reading section in grade 12	1.3	3.2	1.4	1.0	1.1
Retakers who scored proficient or better on the reading section in grade 12	24.5	19.8	34.3	35.7	24.2
Math					
Retook math section in grade 12	1.3	3.2	1.4	1.0	1.1
Retakers who scored proficient or better on the math section in grade 12	15.8	13.8	30.1	29.4	17.6
Science					
Retook science section in grade 12	1.3	3.2	1.3	0.8	—
Retakers who scored proficient or better on the science section in grade 12	16.2	16.2	30.7	27.0	—

— is not available.

NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

Note: Cohorts are identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: New Mexico Student Teacher Accountability Report System.

Table E4. Percentage of New Mexico students in the 2011–15 cohorts who took a graduation exam in grade 11 or 12 and scored proficient or better, by number of sections and subgroup

	NMHSCE	SBA/HSGA			
Number of sections and subgroup	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort[a]
Scored proficient or better on zero sections	38.7	43.0	38.0	33.3	35.8
Female	34.8	41.9	37.8	31.1	34.3
Male	42.7	44.0	38.3	35.5	37.3
American Indian	49.5	57.2	53.6	47.0	51.5
Black	48.7	49.1	48.1	41.7	41.7
Hispanic	45.9	50.7	44.7	38.6	41.6
White	22.9	24.1	20.3	18.2	20.4
Eligible for free or reduced price lunch	49.2	54.5	49.4	42.8	45.6
English learner[b]	75.3	82.6	82.5	75.4	78.3
Scored proficient or better on one section	21.2	16.7	16.8	19.4	18.3
Female	25.3	18.9	19.1	22.8	20.2
Male	17.1	14.5	14.4	15.8	16.4
American Indian	24.9	17.1	18.5	20.7	20.9
Black	18.5	17.9	14.7	21.4	18.3
Hispanic	23.2	17.9	18.2	21.6	19.9
White	17.0	14.2	13.6	14.6	14.5
Eligible for free or reduced price lunch	23.4	17.0	18.3	21.1	19.8
English learner[b]	16.3	9.9	11.0	14.9	12.9
Scored proficient or better on two sections	14.8	13.9	14.9	16.3	15.3
Female	15.7	14.2	15.1	16.7	15.5
Male	13.9	13.7	14.7	15.9	15.0
American Indian	13.3	12.4	13.0	15.8	14.2
Black	16.8	14.4	13.3	16.7	14.1
Hispanic	13.8	13.2	14.2	16.4	14.7
White	16.7	16.0	17.1	16.1	16.6
Eligible for free or reduced price lunch	13.7	12.5	13.7	15.8	14.1
English learner[b]	5.6	4.8	4.1	6.3	5.4
Scored proficient or better on three sections	25.3	26.4	30.3	31.1	30.6
Female	24.2	25.0	28.0	29.4	30.0
Male	26.4	27.9	32.6	32.8	31.2
American Indian	12.3	13.2	14.8	16.5	13.5
Black	16.0	18.7	23.9	20.2	25.8
Hispanic	17.0	18.2	22.9	23.4	23.8
White	43.3	45.7	49.0	51.1	48.5
Eligible for free or reduced price lunch	13.7	16.0	18.5	20.3	20.5
English learner[b]	2.7	2.7	2.4	3.4	3.4

NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/High School Graduation Assessment.

Note: Cohorts are identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

b. About 2 percent of English learner students who took an exam took the Spanish version of the exam.

Source: New Mexico Student Teacher Accountability Report Data System.

Table E5. Percentage of New Mexico students in the 2011–15 cohorts who took a graduation exam in grade 11 or 12 and scored proficient or better on the reading, math, and science sections, by subgroup

	NMHSCE	SBA/HSGA			
Subgroup	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort[a]
All students	25.3	26.4	30.3	31.1	30.6
Female	24.2	25.0	28.0	29.4	30.0
Male	26.4	27.9	32.6	32.8	31.2
American Indian	12.3	13.2	14.8	16.5	13.5
Female	11.5	11.9	12.5	15.3	12.7
Male	13.0	14.6	17.3	17.7	14.2
Black	16.0	18.7	23.9	20.2	25.8
Female	17.2	19.4	27.1	18.3	27.5
Male	14.9	18.1	21.2	22.2	23.9
Hispanic	17.0	18.2	22.9	23.4	23.8
Female	15.6	16.9	20.2	20.6	22.5
Male	18.5	19.6	25.8	26.3	25.1
White	43.3	45.7	49.0	51.1	48.5
Female	42.5	45.1	47.6	51.6	48.6
Male	44.1	46.3	50.5	50.6	48.4
Eligible for the federal school lunch program	13.7	16.0	18.5	20.3	20.5
English learner[b]	2.7	2.7	2.4	3.4	3.4

NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/ High School Graduation Assessment.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of high school students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

b. About 2 percent of English learner students who took an exam took the Spanish version of the exam.

Source: New Mexico Student Teacher Accountability Report Data System.

Table E6. Graduation status of New Mexico students in the 2011–15 cohorts, by grade 11 graduation exam status (percent)

Grade 11 graduation exam status and graduation status	NMHSCE	SBA/HSA			
	2011 cohort	2012 cohort	2013 cohort	2014 cohort	2015 cohort[a]
Did not take exam in grade 11					
Graduated from high school the following year	7.1	6.4	9.4	9.3	6.5
Graduated from high school two years later	2.1	1.6	1.2	0.8	—
Did not graduate from high school in two years after grade 11	90.8	92.0	89.4	89.9	—
Scored proficient or better on zero sections in grade 11 (among those who took exam)					
Graduated from high school the following year	77.3	75.8	76.8	73.0	71.5
Graduated from high school two years later	5.4	3.9	3.6	4.3	—
Did not graduate from high school in two years after grade 11	17.3	20.3	19.6	22.7	—
Scored proficient or better on one section in grade 11 (among those who took exam)					
Graduated from high school the following year	89.6	87.4	86.7	87.4	85.5
Graduated from high school two years later	1.8	1.6	2.1	2.1	—
Did not graduate from high school in two years after grade 11	8.6	11.0	11.2	10.5	—
Scored proficient or better on two sections in grade 11 (among those who took exam)					
Graduated from high school the following year	92.2	89.1	91.9	91.3	90.2
Graduated from high school two years later	1.3	1.0	1.2	1.0	—
Did not graduate from high school in two years after grade 11	6.5	9.9	6.9	7.7	—
Scored proficient or better on three sections in grade 11 (among those who took exam)					
Graduated from high school the following year	95.2	93.5	94.9	94.9	94.9
Graduated from high school two years later	0.6	0.5	0.6	0.4	—
Did not graduate from high school in two years after grade 11	4.3	6.0	4.5	4.7	—

NMHSCE is New Mexico High School Competency Examination. SBA/HSGA is Standards Based Assessment/ High School Graduation Assessment.

— is not available.

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D2 in appendix D for the number of students in each cohort.

a. About 1 percent of students in the 2015 cohort took the Partnership for Assessment of Readiness for College and Careers exam, which replaced the SBA/HSGA for the 2016 cohort, in 2015, when they were in grade 12.

Source: New Mexico Student Teacher Accountability Report Data System.

Table E7. Percentage of New Mexico students in the 2014 and 2015 cohorts who took Algebra II and two lab science courses by grade 12

Course	2014 cohort	2015 cohort
Algebra II	69.0	71.4
Two lab science courses	89.1	89.9
Algebra II and two lab science courses	62.5	65.5
Algebra II, no lab science courses	6.5	5.9
Two lab science courses, no Algebra II	26.6	24.4
Neither Algebra II nor two lab science courses	4.4	4.2

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

Source: New Mexico Student Teacher Accountability Report Data System.

Table E8. Percentage of New Mexico students in the 2014 and 2015 cohorts who attended four years of high school and took Algebra II, chemistry, biology, or other lab science, by grade when course was taken

Course	2014 cohort	2015 cohort
Algebra II		
Ever	69.0	71.4
Grade 9 or 10	21.6	21.5
Grade 11	39.8	40.2
Grade 12	16.2	17.6
Biology		
Ever	95.4	96.1
Grade 9 or 10	81.3	82.8
Grade 11	22.1	22.4
Grade 12	9.7	8.8
Chemistry		
Ever	62.2	65.3
Grade 9 or 10	33.9	36.7
Grade 11	26.9	27.7
Grade 12	8.9	8.8
Other lab science		
Ever	76.9	76.6
Grade 9 or 10	51.0	49.1
Grade 11	31.3	30.8
Grade 12	18.3	17.7

Note: Cohorts are identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

Source: New Mexico Student Teacher Accountability Report Data System.

Table E9. Percentage of New Mexico students in the 2014 and 2015 cohorts who attended four years of high school and took Algebra II and two lab science courses by grade 12, by subgroup

Subgroup	2014 cohort	2015 cohort
All students	62.5	65.5
Female	64.1	67.0
Male	61.0	64.1
American Indian	71.6	74.6
Female	72.9	76.9
Male	70.3	72.5
Black	57.9	60.6
Female	59.9	64.4
Male	56.1	56.9
Hispanic	59.5	62.0
Female	60.7	63.5
Male	58.4	60.7
White	66.7	70.1
Female	69.2	71.5
Male	64.4	68.7
Eligible for the federal school lunch program	61.3	64.3
English learner	58.0	58.6

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

Source: New Mexico Student Teacher Accountability Report Data System.

Table E10. Percentage of New Mexico students in the 2014 and 2015 cohorts who did and who did not take Algebra II and two lab science courses in grade 12 who went on to graduate

	2014 cohort		2015 cohort
Course	Four-year graduation rate	Five-year graduation rate	Four-year graduation rate
Overall	77.6	82.5	79.1
Algebra II and two lab science courses	82.3	87.5	84.3
Missing at least one required course	66.3	71.3	66.9
Neither Algebra II nor two lab science courses	33.4	43.8	40.5

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

Source: New Mexico Student Teacher Accountability Report Data System.

Table E11. Percentage of New Mexico students in the 2014 and 2015 cohorts who took Algebra II and two lab science courses who went on to graduate, by subgroup

Subgroup	2014 cohort		2015 cohort
	Four-year graduation rate	Five-year graduation rate	Four-year graduation rate
All students	82.3	87.5	84.3
Female	86.6	90.7	87.5
Male	77.9	84.2	81.2
American Indian	76.2	85.7	81.2
Female	80.5	89.3	85.8
Male	71.7	82.0	76.9
Black	78.4	83.6	82.3
Female	83.0	86.6	85.6
Male	74.2	80.8	78.6
Hispanic	80.7	86.3	83.0
Female	85.5	89.9	85.9
Male	75.7	82.6	80.2
White	88.2	90.7	87.8
Female	91.3	92.9	90.7
Male	84.9	88.4	84.8
Eligible for the federal school lunch program	77.9	84.4	80.9
English learner	68.9	79.4	72.9

Note: Each cohort is identified by the year in which students were expected to graduate (that is, four years after entering grade 9). See table D3 in appendix D for the number of students in each cohort.

Source: New Mexico Student Teacher Accountability Report Data System.

Notes

1. Only proficiency rates were available for the study. The cutscore for passing was near the top of the score range for the nearing proficiency level, so some students passed an exam section without demonstrating proficiency.
2. The four-year adjusted cohort graduation rate is the number of students who graduate in four years with a regular high school diploma divided by the number of students who form the adjusted cohort for the graduating class. From the beginning of grade 9, students who are entering this grade for the first time form a cohort that is adjusted by adding students who subsequently transfer into the cohort and subtracting students who subsequently transfer out, emigrate to another country, or die.
3. Only proficiency rates were available for the study. The cutscore for passing was near the top of the score range for the nearing proficiency level, so some students passed an exam section without demonstrating proficiency.
4. The state's decision to exclude performance of proficient or better on the new assessment as a graduation requirement was announced in 2012 when this cohort was in grade 12, after the students had taken the assessment.
5. More than 20 percent of students in grade 11 did not take the exam (see table E1 in appendix E). It is possible that these students had started grade 11 (and were therefore counted as grade 11 students) but had left school before the exam was administered in the spring of grade 11; however, no information was available to verify whether this was the case.
6. No studies were found that examined the impact of a simultaneous change in graduation exams and course requirements.
7. New Mexico Achievement Gap Research Alliance member organizations are Cooperative Educational Services, Dual Language Education of New Mexico, Eastern New Mexico University, High Plains Regional Education Cooperative #3, the Intercultural Development Research Association South Central Collaborative for Equity, Las Cruces Public Schools, Native Solutions in Education, the New Mexico Association for Bilingual Education, the New Mexico Coalition of Educational Leaders, the New Mexico Coalition of School Administrators, New Mexico Highlands University, the New Mexico Legislative Education Study Committee, the New Mexico Public Education Department, New Mexico State University, Northeast Regional Education Cooperative #4, Northern New Mexico College, the Region IX Education Cooperative, Santa Fe Indian School, the University of New Mexico, and the U.S. Bureau of Indian Education.
8. Findings for Black students should be interpreted with caution. New Mexico has far fewer Black students than students in other racial/ethnic subgroups. A small cohort size can contribute to less stable characteristics from year to year (see table D2 in appendix D for cohort sample sizes).
9. Not all students enroll in Algebra II and two lab science courses, despite the fact that the courses are required. One reason may be parent waivers for Algebra II, but data on the use of waivers were not available. Reasons for not enrolling in two lab courses were unclear.
10. The graduation rates in the main text differ from the rates presented here, which include all students who began grade 9 and exclude only students who transferred to another diploma-granting school outside the New Mexico public school system.
11. See New Mexico Public Education Department (2014) for details about the SBA/HSGA.

12. A competency portfolio can include school-based projects such as extended papers, themes, theses, or research projects; performances or works of art that can be recorded in an electronic format; and community-based projects such as internships, service learning, preapprenticeships, or afterschool job performance.
13. Lab science courses include biology and chemistry. Other science courses were included when the course name indicated "with lab" (these were human anatomy, physical science, and environmental science).

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