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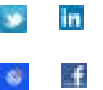
Recent Trends in Teacher Retention & Hiring in New York City Public Schools



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Executive Summary

Teachers are arguably the most important school factor that affects educational outcomes, with recent research also underlining the high fiscal and academic costs of teacher turnover. More than three years after the onset of the COVID-19 pandemic, concerns remain about the pandemic's impact on K-12 teachers working in schools. The changing nature of teaching, once a relatively predictable profession, has become a job with increasing demands since the pandemic began. Nationally, there are reports of increased teacher burnout and subsequent turnover in recent years.

In New York City, which was hard hit in the early stages of COVID-19, many teachers faced loss and grief in their personal lives while helping their students cope with ongoing academic, emotional and behavioral challenges. In this brief, IBO draws on individual teacher-level data between 2015-2016 and 2022-2023, obtained from the Department of Education (DOE), to study recent trends in the rate of retention of teachers and the rate of new hires in the city's public schools over the last several years.

- Teacher retention had been stable, even improving, in the years leading up to the COVID-19 outbreak. During the 2020-2021 school year, when the city's public schools offered hybrid instruction in the wake of the pandemic, few teachers left. But there was a drop in retention in the next school year, which was further magnified during the last school year (2022-2023).
- This recent drop in teacher retention is observed across both general education teachers and special education teachers, and across teachers with different levels of experience, with less-experienced teachers leaving at even higher rates than more-experienced teachers.
- Few teachers were hired in the immediate aftermath of COVID-19. But the hiring rate recovered thereafter and for the last two years, the city has hired almost as many (or more) new public school teachers annually as it did in 2019-2020.
- While teacher hiring in 2022-2023 returned to levels seen prior to COVID-19, a lower retention rate means that the school system now has 2,500 teachers less than in 2018-2019, the peak of the teaching force in recent years.

The system-wide declines come as teachers and schools are experiencing significant challenges, including a push to recover academically following disruption from the pandemic, and a national decline in the number of graduates choosing teaching as a profession. Additional considerations include pressures to expand the teacher workforce following a new class size reduction law (as the IBO found in its recent brief) and to hire enough bilingual teachers to assist the new students, from families of asylum seekers, entering the system. Most recently, the Department of Education, along with other city agencies, faces a hiring freeze and will need to identify reductions in spending over the next three financial plans, extending from fiscal years 2024 through 2027. IBO will be monitoring these trends closely.

Table of Contents

Introduction	1
Total Number of Teachers in the Past Seven Years	2
Teacher Retention Has Declined Slightly in the Past Two Years	3
Teacher Hiring Has Rebounded but the City’s Public Schools Continue to Hire Fewer Teachers Than in Pre-Pandemic Years	5
Looking Ahead	6
Glossary	7
Endnotes	Back Cover

Introduction

Teachers are perhaps the most important school-related factor that affects a student's educational outcomes. Recent research suggests that the impact of teachers is twice or three times as high as that of other school inputs, including services, facilities, and even leadership.¹ Research also underlines the high costs of teacher turnover, particularly with respect to student achievement: a large study of New York City (NYC) fourth- and fifth-grade students found that students in classes with higher teacher turnover performed at significantly lower rates in both English and mathematics.² There are persistent concerns about teacher retention and hiring in the city's public schools. A 2019 report by the City Comptroller's Office shows that close to 20 percent of new teachers do not teach in the same school the following year, a figure which is much higher than that for teachers in schools in other parts of New York State.³ An earlier report by the IBO tracked successive new cohorts of the city's public school teachers and found only 60 percent of entering teachers to be working in NYC Public Schools after five years, and less than half to be doing so after ten years. However, these retention rates significantly improved between the 2000s and the 2010s.⁴

More than three years after the onset of COVID-19, concerns remain about the pandemic's impact on K-12 teachers. The changing nature of teaching, once a relatively predictable profession, has become a job with increasing demands since the pandemic began, which has likely contributed to increased stress and burnout. In spring 2020, teachers had to adapt quickly to the uncertainty around schooling and to start teaching in unprecedented ways—immediately transitioning to remote schooling and, in the first full school year of the pandemic (2020-2021), often providing both in-person and remote instruction. On the other hand, some teachers were able to work fully remotely in that first full pandemic year as students also had the option to attend remotely. In the past three years, teachers have faced enormous responsibilities as they have been tasked with providing academic recovery from the learning loss resulting from the pandemic. Nationally, there are reports of increased teacher burnout and subsequent turnover in the wake of the pandemic.⁵ In NYC, which was hard hit in the early stages of the pandemic, many teachers faced loss and grief in their personal lives while helping their students cope with ongoing academic, emotional, and behavioral challenges.⁶

Furthermore, as many other professions available to college graduates increasingly incorporate days of remote work, teaching—with its focus on in-person, face-to-face interactions five days a week—is often ranked lower in career choices of today's youth.⁷ Some have suggested pandemic learning loss will even worsen as schools face ongoing staffing challenges, particularly with respect to teachers, which negatively impact classroom instruction.⁸ Over the last 10-15 years, interest in choosing teaching as a career has appreciably waned: nationally, 20 to 30 percent fewer young people are choosing to become teachers.⁹ Two education experts argue in a recent study, using an array of metrics, that “the current state of the teaching profession is at or near its lowest levels in 50 years.”

While teacher turnover has increased nationwide—and in NYC Public Schools, as this brief shows—student enrollment has been declining in the largest school districts across the country.¹⁰ A [previous IBO study](#) found that the city's traditional public schools experienced large enrollment losses—exceeding 10 percent from pre-K through the 12th grade—in the aftermath of the pandemic, with a bigger reduction in the second pandemic year (2021-2022) than the first (2020-2021). With fewer students in the system, the city would need fewer teachers. There is also a close connection between the number of students in a school and its funding. In fact, student enrollment is one of the major factors guiding New York State Foundation Aid to NYC Public Schools, and it is also a major factor in the NYC Public Schools Fair Student Funding formula, which in turn allocates money to individual schools. So a fall in student enrollment translates into less revenues for a school to retain or recruit teachers. However, recent passage of a class size reduction bill would require more teachers in New York City public schools, as we discuss later.

Additional considerations specific to NYC would also have played a role in teacher retention and hiring over the past several years. First, New York State passed a bill during its 2020-2021 legislative session allowing New York City to offer an Early Retirement Incentive (ERI) to municipal workers that would either increase their pension benefits or waive a penalty for retiring early. Mayor de Blasio passed up on the offer (the deadline for the city to opt in was June 2021), since the incentive did not appear to save the city money.¹¹ Second, the change in mayoral administration in January

2022, when Mayor Adams took office, meant that the city would look to negotiate new contracts for the city's collective bargaining units. The United Federation of Teachers' (UFT) contract was set to expire in September 2022. Both factors may have affected teachers' decisions about their careers.

Looking ahead, New York State recently passed legislation, signed by Governor Kathy Hochul in September 2022, that established new, smaller class size limits for kindergarten through 12th grade in New York City Public Schools. IBO found that, to comply with the new requirements, the NYC Department of Education (DOE) would need to hire almost 17,700 teachers over the five years of the bill's implementation.¹² Most recently, the Department of Education, along with other city agencies, faces a hiring freeze and will need to identify reductions in spending over the next three financial plans, extending from fiscal years 2024 through 2027. In this brief, IBO draws on individual teacher-level data over the last eight years, obtained from the DOE, to study recent trends in the rate of retention of teachers and the rate of new hires in the city's public schools.¹³ This will provide important context as the DOE embarks on fulfilling the mandates of the class size reduction bill beginning this fall, managing the proposed budget cuts, and perhaps dealing with a limited ability to hire additional teachers.

IBO finds that teacher retention had been stable, even improving, in the years leading up to the COVID-19 outbreak. In the wake of the pandemic during the 2020-2021 school year, when the city's public schools offered hybrid instruction—either fully remote or a combination of remote and in-person instruction—few teachers left. But there was a drop in retention in the next school year, which was further magnified during the last school year (2022-2023). This recent drop in teacher retention is observed across both general education teachers and special education teachers. It is also observed across all levels of experience, but with greater magnitude among less-experienced teachers. The fact that less-experienced teachers are leaving at higher rates compared with their more-experienced peers has contributed to an increase in the average years of experience of NYC public school teachers. While teacher hiring in 2022-2023 returned to levels seen prior to COVID-19, a lower retention rate means that the school system now has 2,500 teachers less than before the pandemic.

Total Number of Teachers in the Past Seven Years

The NYC DOE employed between 76,000 and 78,000 teachers in its traditional public schools annually in 2015-2016 through 2019-2020.¹⁴ After a smaller decline of 1,100 teachers in the immediate aftermath of the pandemic in 2020-2021 (partially offset in the next school year), there was a larger reduction in teacher headcount of 2,000 in 2022-2023. This decline stems entirely from the number of general education teachers—the system today employs less than 50,000 general education teachers compared with more than 54,000 in school years 2015-2016 through 2018-2019. The number of special education teachers rose during this period, and they now comprise 34.4 percent of the teaching force, up from 28.7 percent seven years ago.¹⁵

Student enrollment has been declining in DOE-operated traditional public schools since the middle of the last decade. Between 2015-2016 and 2019-2020, the decrease was relatively modest, caused by factors like a decline in birth rates, slowing immigration to the city, and expansion of charter schools.¹⁶ Since the pandemic began, DOE schools have experienced much larger declines in the number of students, and this has been the case despite the expansion of 3-K, a preschool program for 3-year olds.¹⁷ The decline has been particularly noticeable among general education students, with DOE schools in 2022-2023 educating more than 100,000 fewer students than they did five years ago. Between 2018-2019—when the number of teachers was the highest in recent years—and 2022-2023, DOE schools have witnessed a decline in student enrollment exceeding 10 percent while the number of teachers has declined by 3 percent.

The net decrease in the number of teachers in New York City's traditional public schools in recent years reflects lower retention rates than in earlier years, which have only partially been offset by new hires. The steady decline in students in DOE schools may at least partially be a factor in lower teacher hires during this period. The hiring rates have rebounded to pre-COVID levels after an initial lull. IBO examined retention rates of existing teachers and hiring of new teachers to document current trends in the teacher labor market in New York City.

Number of Public School Teachers in New York City Has Declined by More Than 2,500 Over the Last Three Years, with a Rise in Special Education Teachers Offsetting the Larger Decline in General Education Teachers

	School Year							
	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
All Teachers	76,349	77,279	78,212	78,235	78,174	77,029	77,610	75,654
General Education Teachers	54,430	54,602	54,782	54,128	52,984	51,589	51,650	49,607
Special Education Teachers	21,919	22,677	23,430	24,107	25,190	25,440	25,960	26,047

SOURCE: IBO analysis based on annual Pinpoint files obtained from the New York City Department of Education

NOTES: Neither teachers in charter schools, nor teachers in community-based organizations (CBO's, which are non-profit organizations serving a majority of preschool students in grades 3K and pre-K), are hired by the NYC DOE. Thus, they are not included among the teacher counts in this table.

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Teacher Retention Has Declined Slightly in the Past Two Years

More than 91 percent of teachers working in NYC public schools in the previous year returned to teach in DOE schools in 2016-2017.¹⁸ The retention rate had inched up to 92 percent by 2019-2020, when the COVID-19 pandemic hit the city. Few teachers employed by the DOE in 2019-2020 left in by the fall of 2020, perhaps due to the increased flexibility for remote instruction during the hybrid schooling year and the possibility of an Early Retirement Incentive from the State. Over the last two years, though, retention rates in NYC Public Schools have declined to about 88 percent in 2022-2023. This mirrors a nationwide trend of higher teacher turnover, reflecting the fact that teachers across the country reported higher rates of anxiety during the pandemic—even more than health-care workers, according to a large survey of U.S. workers conducted over seven months in 2020 and 2021.¹⁹

When IBO disaggregated by teacher license, we found that special education teachers share the same turnover patterns as their general education peers. This was true in the years leading up to the pandemic, and remained true in the years since the pandemic began. In each case, a steadily improving trend in retention from 2016-2017 through 2019-2020 was followed by a sudden increase in retention in the first full pandemic year but subsequent decreases in retention rates well below pre-pandemic levels.

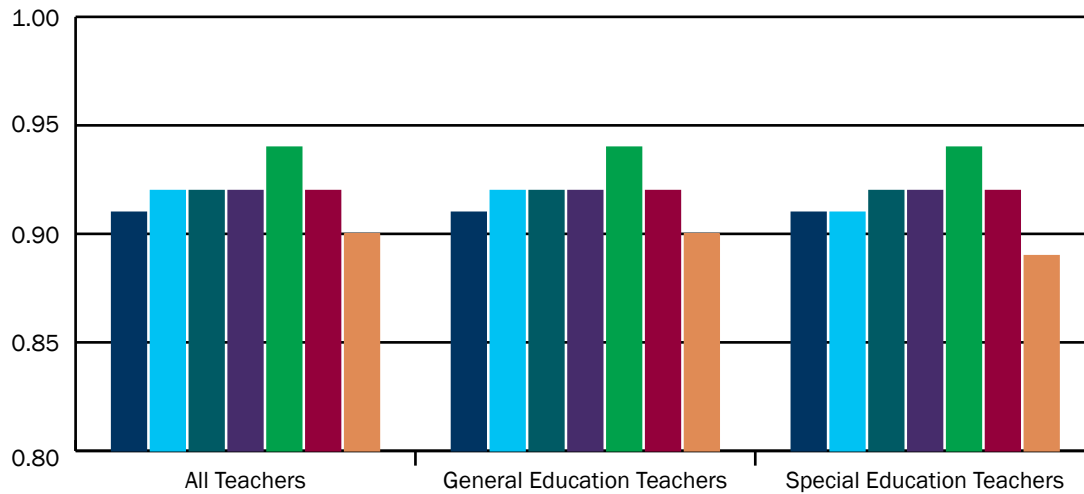
Since the decision to leave the teaching profession may vary based on years of experience—which would factor into potential pension and medical benefits—IBO examined these patterns. We classified teachers into five groups based on their number of years teaching in NYC Public Schools and separately tracked their retention rates over this period. The five groups are: teachers with less than 5 years; between 5 and 10 years; between 10 and 15 years; between 15 and 20 years; and more than 20 years. As per the contract between New York City and UFT, teachers with at least 10 years of credited service become vested for pension purposes; teachers with at least 15 years of credited service are eligible for health insurance and welfare benefit coverage in retirement, and teachers with at least 20 years of credited service enjoy pension enhancements and other benefits like enhanced job protection at current school. Note that the 10-year requirement for pension benefit eligibility was lowered to 5 years in December 2022, as per state law; while this change could not have affected decision-making of 2022-2023 teachers, it might affect future career decisions.²⁰ In 2022-2023, roughly a quarter of teachers had been teaching for less than 5 years and another quarter of teachers had been teaching for 5-10 years. Conversely, almost 20 percent of teachers had been teaching for 15-20 years and another 20 percent had more than 20 years of teaching experience.

Teachers at all levels of experience demonstrated rising retention rates prior to the pandemic. This trend was particularly salient for the most-experienced teachers (those with 20 or more years of teaching experience) who also tended to have the lowest retention rates. Across the spectrum, teachers with 15-20 years of experience had the highest retention rate, presumably because they are trying to reach the sought-after threshold of 20 years of service at which benefits are significantly enhanced.

After a Boost to Retention in the First Pandemic Year (2020-2021, with Hybrid Instruction), New York City Public School Teachers Are Continuing Teaching At Lower Rates Compared to Earlier



Teacher Retention Rate

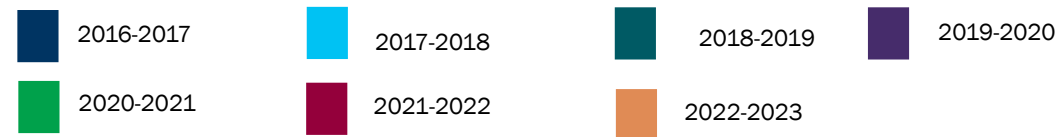


SOURCE: IBO analysis based on annual Pinpoint files obtained from the New York City Department of Education

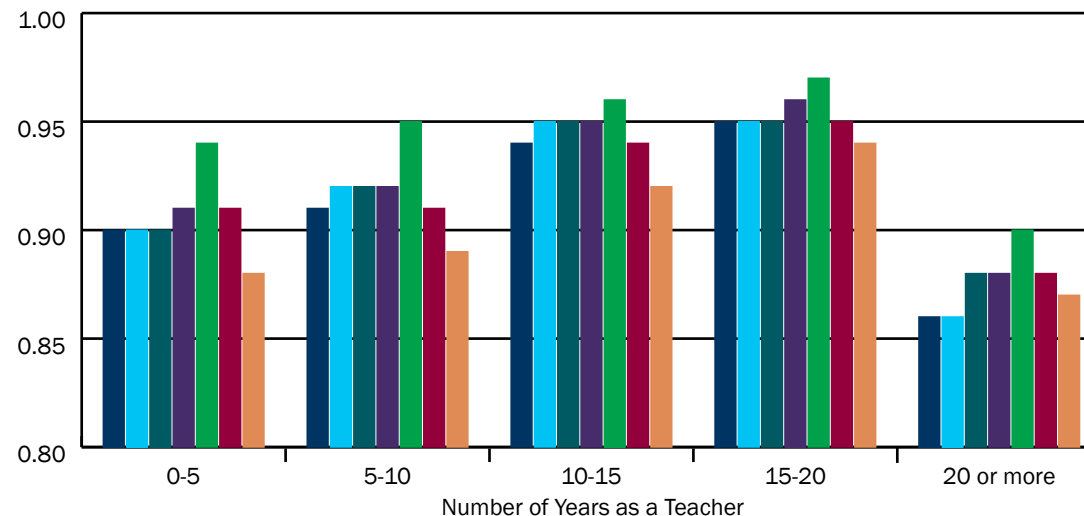
NOTES: The retention rate for 2016-2017 reflects the share of teachers from the 2015-2016 school year who returned to teach in the public school system in 2016-2017. The same is true for other years.

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Teachers at All Levels of Experience Are Staying on at Lower Rates than Before the Pandemic



Teacher Retention Rate



SOURCE: IBO analysis based on annual Pinpoint files obtained from the New York City Department of Education

NOTES: The retention rate for 2016-2017 reflects the share of teachers from the 2015-2016 school year who returned to teach in the public school system in 2016-2017. The same is true for other years. IBO classifies teachers in various experience bins depending upon the number of years that they have been teaching in NYC Public Schools.

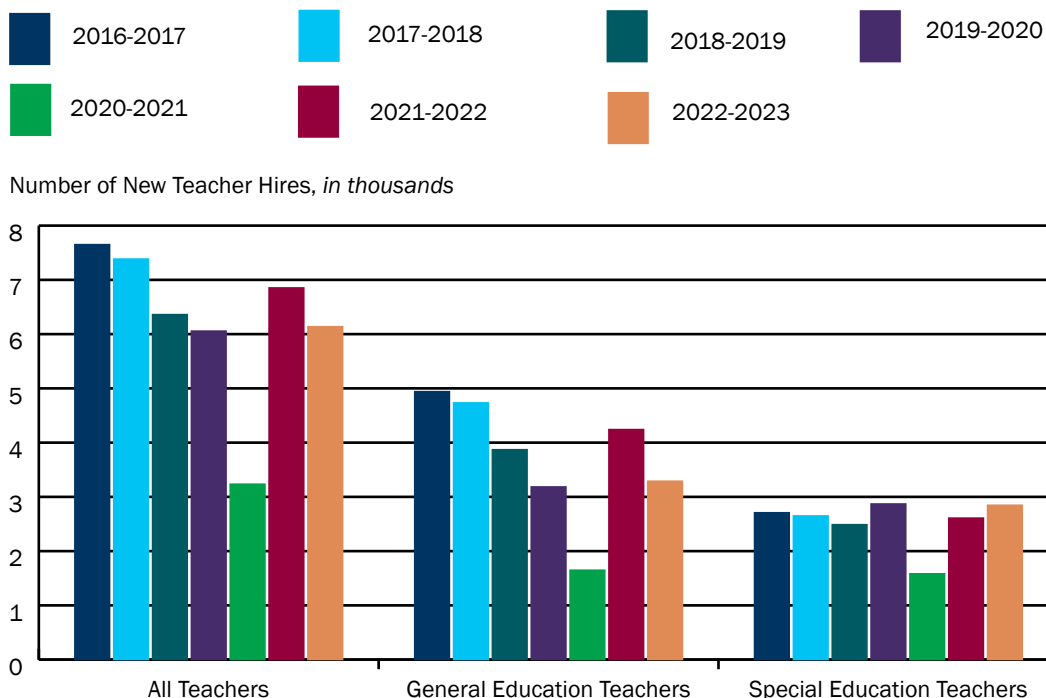
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All groups with less than 15 years of teaching experience continued teaching in NYC Public Schools at lower rates than earlier. The recent declines are larger for teachers with relatively less experience—there was about a 3-percentage point decline in retention for each of the three groups with the least experience (teachers with 0-5 years, 5-10 years, and 10-15 years of teaching experience). Partly because of this, New York City Public School students now have more experienced teachers on average—between 2015-2016 and 2022-2023, the median experience level of a general education teacher rose from 11.2 to 13.1 years, and that of a special education teacher rose from 6.0 to 7.1 years. However, it is important to note that even more-experienced teachers are now leaving at slightly higher rates than six years ago. It is telling that there is a noticeable decline in retention even among teachers with 15-20 years of experience—these teachers are willing to accept lower retirement benefits rather than continue teaching.

Teacher Hiring Has Rebounded but the City's Public Schools Continue To Hire Fewer Teachers Than in Pre-Pandemic Years

NYC Public Schools has been hiring fewer teachers since the middle of the last decade. The decline was mostly among general education teachers, with the number of special education teachers hired remaining more steady. This probably reflects the fact that between 2015-2016 and 2019-2020 the number of general education students in the city's public schools dropped by 6.4 percent while the number of students with disabilities increased by 2.1 percent. Few teachers were hired in the immediate aftermath of COVID-19, but the hiring rate recovered thereafter and for the last two years the DOE has hired as many (or more) new teachers annually as it did in the last pre-pandemic year of 2019-2020. The hiring rate has rebounded for both general education teachers and special education teachers. Notably, there were slightly more general education teachers hired compared with special education teachers in the last two school years—as was the case in 2019-2020 before the onset of COVID-19.

After a Lull in the First Pandemic Year, New Teacher Hiring is Back to Pre-pandemic Levels



SOURCE: IBO analysis based on annual Pinpoint files obtained from the New York City Department of Education

NOTES: For 2016-2017, IBO identifies teachers as new hires if they were not working as teachers in NYC public schools during the preceding school year, 2015-2016. The same is true for other years.

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Looking Ahead

Are the recent declines in teacher retention a harbinger of things to come, or will the rate stabilize at a similar or higher level compared to now? Since the pandemic destabilized schools and demoralized teachers, with many educators experiencing heightened levels of stress and burnout, will more teachers be leaving and fewer be applying for open positions? Will new teacher hiring continue to be robust in the coming years? Two recent developments have the potential to attract new hires as the teaching profession seems to be returning to its historically more predictable routine: the recently negotiated increases and annual retention payments in the new contract with UFT, and the implementation of the state's new class size limits for DOE schools.

The new UFT contract, among other things, provides annual salary increases and retention bonuses increasing to \$1,000 in 2026 (and will remain in future years), proposes to nearly cut in half the amount of time it will take for a NYC Public Schools teacher to reach a \$100,000 salary (from fifteen years to eight years), and allows high schools and schools serving grades 6-12 to offer virtual courses after school and on the weekends (creating opportunities for remote teaching).²¹

Both hiring of new teachers and retention of current teachers will be key as the DOE begins the implementation of state-mandated class sizes. Our recent brief finds that in order to achieve full compliance, there will be a significant need for new teachers in the next three years—2025-2026 through 2027-2028. On the other hand, if student enrollment in NYC Public Schools continues to fall, fewer teachers may be needed to fulfill the class size mandates. Also, most recently, the Department of Education, along with other city agencies, faces a hiring freeze and will need to identify reductions in spending over the next three financial plans, extending from fiscal years 2024 through 2027. IBO will be monitoring these trends closely.

Glossary

Class Size Bill: In 2022 New York State passed an education bill that limits maximum class sizes for grades K through 12 in New York City public schools. Kindergarten through 3rd grade classes are limited to 20 students, 4th through 8th grade classes to 23 students, and high school classes to 25 students. Implementation of these new class sizes is to be phased in over five years starting in September 2023 and compliance across all classes must increase by 20 percent each year up to full compliance by September 2027.

Early Retirement Incentive (ERI): In 2020-2021 New York State allowed New York City to offer an Early Retirement Incentive (ERI) to municipal workers that would either increase their pension benefits or waive a penalty for retiring early. Mayor de Blasio passed up on the offer, since the incentive did not appear to save the city money.

General Education Teacher: A General Education Teacher is one that holds a license in an area other than special education. It is still possible for them to teach in a classroom with students with disabilities, however, as part of ICT classes (see below).

Hybrid Schooling/Instruction: School year 2020-2021 was a hybrid learning year for New York City Public Schools, with a fully remote option offered to families alongside a blended instructional model. Since schools varied tremendously in terms of utilization (building capacity relative to enrollment, which determined the potential for social distancing) and share of students who chose blended learning, there was significant variation in the amount of in-person instruction offered across schools.

New Teacher Hire: IBO identifies teachers in one school year as new hires if they were not working as teachers in NYC public schools during the preceding school year.

Special Education Teacher: Teachers are classified as Special Education Teachers based on their titles in the annual Pinpoint files. Note that special education teachers in NYC Public Schools do not only teach in classrooms with students with disabilities and vice versa, as over the last decade the DOE has been increasingly moving towards Integrated Co-Teaching (ICT) classrooms where students with and without disabilities learn together. Each ICT class contains two teachers—one general education or content area teacher and one special education teacher—who work together to support all of the students in the class.

Teacher Retention: The retention rate is calculated as the share of teachers from one school year who return to teach in the city's public school system in the next year. These teachers do not need to be working in the same school as before. Note that this definition excludes former teachers who are currently employed in the school system in a non-teaching capacity (such as an assistant principal)—this transition from teaching to non-teaching positions within the public schools accounts for only a few hundred teachers each year.

Endnotes

¹See Oppen, Isaac M. (2019). Teachers Matter: Understanding Teachers' Impact on Student Achievement. RAND Corporation Research Reports RR-4312, <https://doi.org/10.7249/RR4312>.

²See Ronfeldt, Matthew, Susanna Loeb, and James Wyckoff (2013). How Teacher Turnover Harms Student Achievement. American Educational Research Journal, Volume 50 Issue 1, February 2013, <https://journals.sagepub.com/doi/abs/10.3102/0002831212463813>.

³See Office of the New York City Comptroller (2019). Teacher Residencies: Supporting the Next Generation of Teachers and Students, June 24, 2019, <https://comptroller.nyc.gov/reports/teacher-residencies-supporting-the-next-generation-of-teachers-and-students/>.

⁴See New York City Independent Budget Office (2017). New York City Public School Indicators: Teachers. June 2017, <https://ibo.nyc.ny.us/iboreports/education-indicators-teachers-2017.pdf>.

⁵See Barnum, Matt (2023). Teacher turnover hits new highs across the U.S., Chalkbeat, March 6, 2023, <https://www.chalkbeat.org/2023/3/6/23624340/teacher-turnover-leaving-the-profession-quitting-higher-rate>.

⁶See Elsen-Rooney, Michael (2023). As mental health toll on NYC educators mounts, schools scramble to offer support, Chalkbeat New York, March 13, 2023, <https://ny.chalkbeat.org/2023/3/13/23634324/nyc-teachers-pandemic-mental-health-effects-school-support>.

⁷See Schaeffer, Katherine (2022). A dwindling number of new U.S. college graduates have a degree in education, Pew Research Center, Pew Research Center, September 27, 2022, <https://www.pewresearch.org/short-reads/2022/09/27/a-dwindling-number-of-new-u-s-college-graduates-have-a-degree-in-education/>.

⁸See Rainey, Lydia, Paul Hill, and Robin Lake (2023). Teaching recovery? Three years in, school system leaders report that the pandemic weakened instruction. Center on Reinventing Public Education, July 2023, https://crpe.org/wp-content/uploads/ASDP_Wave4_final.pdf.

⁹See Aldeman, Chad (2019). Why Are Fewer People Becoming Teachers? Education Next, September 22, 2022, <https://www.educationnext.org/why-are-fewer-people-becoming-teachers/>.

¹⁰See Dee, T.S. & Murphy, M. (2021). Patterns in the pandemic decline of public school enrollment. Educational Researcher, 50 (8), 566-569.

¹¹The incentive was aimed at motivating employees to retire earlier by increasing their pension benefits—either by crediting them with additional years worked or eliminating the usual pension reduction applicable when an employee retires before the age of 55 years with 25 years of service. This initiative was spearheaded by the union to stave off potential layoffs while New York City was under financial pressures in the immediate aftermath of COVID-19. But after the passage of the federal stimulus package in 2021 which provided the city and the NYC DOE significant resources, the administration did not want to lower the size of the DOE workforce.

Note that in addition, under the initial terms of negotiations between the de Blasio administration and the UFT in 2018, a final lump sum payment for the contract covering the period 2009 to 2018 was due in October 2020. When, in the wake of the pandemic, the city moved to defer this payment, the UFT went to arbitration—the eventual decision was deferral of half the payment, a no layoff pledge for the school year, and agreement to pay the 3% wage increase in May 2021.

See Andrew Rein (2021). Early retirement incentives for city workers foolhardy and expensive, Crain's New York Business, April 14, 2021, <https://www.crainsnewyork.com/op-ed/early-retirement-incentives-city-workers-foolhardy-and-expensive>, and personal communication with Dean Fuleihan, former first deputy mayor of the City of New York.

¹²See New York City Independent Budget Office, How Would The New Limits To Class Sizes Affect New York City Schools?, July 2023, <https://www.ibo.nyc.ny.us/iboreports/how-would-the-new-limits-to-class-sizes-affect-new-york-city-schools-july-2023.pdf>.

¹³While interpreting these numbers, it is useful to keep in mind that school year 2020-2021 was a hybrid learning year for New York City Public Schools, with a fully remote option offered to families alongside a blended instructional model (with significant variation in in-person schedules depending on a student's school and grade level.)

¹⁴The brief includes every teacher employed by NYC Public Schools, including teachers in community school districts 1-32 and teachers in district 75 (serving students with disabilities) and district 79 (transfer high schools). However, teachers in charter schools (district 84) are not included as they are not DOE employees.

¹⁵Teachers are classified as Special Education Teachers based on their titles in the annual Pinpoint files. Note that special education teachers in NYC Public Schools do not only teach students with disabilities and vice versa, as over the last decade the DOE has been increasingly moving towards Integrated Co-Teaching (ICT) classrooms where students with and without disabilities learn together. Each ICT class contains two teachers - one general education or content area teacher and one special education teacher - who work together to support all of the students in the class.

¹⁶See Zimmer, Amy (2023). NYC schools want to boost enrollment. It might prove a major challenge. Chalkbeat New York, February 9, 2023, <https://ny.chalkbeat.org/2023/2/9/23591966/nyc-schools-covid-enrollment-loss-population-exodus>. For the impact of COVID-19 on the city's population, and recent trends in births and out-migration, see New York City Planning (March 2023). New York City's Current Population Estimates and Trends, <https://www.nyc.gov/assets/planning/download/pdf/planning-level/nyc-population/population-estimates/population-trends-2022.pdf?r=a>.

¹⁷For a more disaggregated analysis of trends in student enrollment in NYC Public Schools since COVID-19 broke, including trends in charter school enrollment, see our earlier report, How Has Public School Enrollment Changed Two Years Into the Covid-19 Pandemic?, New York City Independent Budget Office, July 2022, <https://www.ibo.nyc.ny.us/iboreports/how-has-public-school-enrollment-changed-two-years-into-the-covid-19-pandemic-nycbtn-july2022.html>.

¹⁸When calculating teacher retention rates, IBO includes every public school teacher from the previous year who is teaching in DOE schools in the current school year—they do not need to be working in the same school. Note that this definition excludes the few hundred former teachers who are employed in the school system in a non-teaching capacity (such as an assistant principal) in the following year.

¹⁹See Kush, J. M., Badillo Goicoechea, E., Musci, R. J., & Stuart, E. A. (2022). Teacher mental health during the COVID-19 pandemic. Educational Researcher, Volume 51, Issue 9, December, 2022, <https://www.doi.org/10.3102/0013189X221134281>.

²⁰See United Federation of Teachers (2022). Five-year vesting, New York Teacher, December 22, 2022, <https://www.uft.org/news/you-should-know/secure-your-future/five-year-vesting>.

²¹See Amin, Reema and Amy Zimmer (2023). NYC teachers union and Adams administration reach tentative deal on 5-year contract, Chalkbeat New York, June 13, 2023, <https://ny.chalkbeat.org/2023/6/13/23759620/nyc-uf-teachers-union-contract-deal-raises-mayor-eric-adams>.