Analysis of Career and Technical Education (CTE) In SDP: 2012-2013 9th Graders That Participated in CTE, With Comparisons to Those That Did Not

November 2017
Contact: Theodore Wills, Senior Research Associate | twwills@philasd.org | 215-400-5629

Office of Research and Evaluation

Overview

Each year, the Office of Research and Evaluation (ORE) conducts an analysis of the outcomes of students that participate in the District's CTE offerings. This report is a summary of that analysis, and focuses on some key comparisons between students that took CTE courses and those that did not. The report is divided into the following sections:

1. Cohort Characteristics including demographics, prior achievement, and attendance (begins on slide 7)
   - Definitions of CTE Sub-tracks – slide 5
2. Graduation Outcomes (begins on slide 20)
   - Definitions of Outcome Categories – slide 22

Cohort Characteristics: Main Findings

- CTE students' participation and trajectories varied (e.g., not all students began taking courses in 10th grade, and not all students took three years of CTE courses).

- Compared with non-CTE students, CTE students were more likely to be Black or Hispanic, more likely to be male, and more likely to be economically disadvantaged.

- Compared with non-CTE students, CTE students had similar prior attendance, and lower prior test scores.

- All of these findings are consistent with, and similar to, summaries of previous cohorts.

Who was included, and how were they categorized?

- This is a cohort-based study. It includes students that were first-time 9th graders in 2012-2013, but does not include students that joined this cohort in later years.

- All included students are referred to as the "Cohort," which is then divided into CTE and Non-CTE subgroups.

- A student was considered a CTE student if they "touched" CTE during the 4 year window. This includes all students that took a CTE course, or who had an all-CTE school as their last school of record. All other students are considered Non-CTE.
  - There are 5 all-CTE Schools in SDP. Students apply for admission to these schools, and all students in grades 10-12 participate in CTE. There are other schools that also offer CTE courses alongside more traditional academic curricula ("CTE Program").

- Depending on how many years a student participated in CTE, and which years, they are further divided into subgroups, which are fully defined on the next two slides.

Definitions of CTE Sub-Tracks

(Four primary trajectories of CTE participation. Drop, Late Start, and Other each feature sub-trajectories that are listed on the next slide)

- **ON TRACK** – A student is in the "ON TRACK" category if the student takes a CTE course during 10th, 11th, and 12th grades. This is the intended model for full CTE program completion.

- **CTE DROP** – A student is in the "CTE DROP" category if the student begins CTE in 10th grade (or, rarely, 9th grade), but discontinues CTE at some point before 12th grade.

- **CTE LATE START** – A student is in the "CTE LATE START" category if the student does not begin CTE until at least 11th grade, but is still participating in 12th grade.

- **CTE OTHER** – A student is in the "CTE OTHER" category if the student has an unusual trajectory that does not fit any of the above categories.

Definitions and totals for CTE subgroups

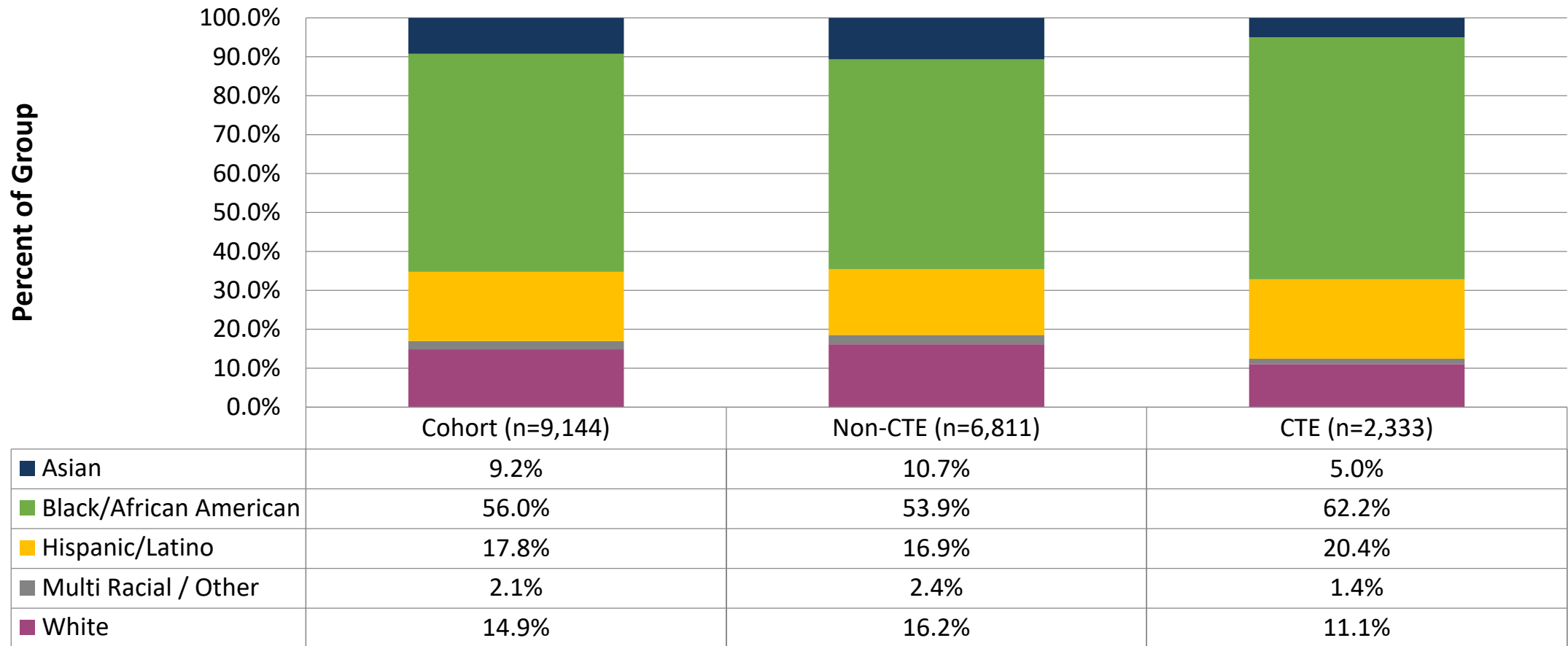| CTE Trajectory	# Years CTE	Took CTE During Grades…	# and (%) of CTE students in 2011-2012 1st time 9th grade cohort	# and (%) of CTE students in 2012-2013 1st time 9th grade cohort
CTE On-track	3	10, 11, 12	1,049 (45.9%)	1,090 (46.7%)
CTE Drop				
Drop- Y1	1	10	669 (29.3%)	617 (26.4%)
Drop-Y2	2	10, 11	284 (12.4%)	314 (13.5%)
Early-Start Drop-Y1	1	9		14 (0.6%)
Early-start Drop-Y2	2	9, 10		6 (0.3%)
CTE Late Start				
Late-start Y2	2	11, 12	78 (3.4%)	119 (5.1%)
Late-start Y3	1	12	39 (1.7%)	42 (1.8%)
CTE Other				
CTE Interrupt	2	10, 12	7 (0.3%)	19 (0.8%)
CTE Late Start AND Drop	1	11	99 (4.3%)	79 (3.4%)
CTE non-start	0	N/A	60 (2.6%)	33 (1.4%)
Overall Totals				
Total CTE students			2,285 (22%)	2,333 (25.5%)
Non-CTE students			8,095 (78%)	6,811 (74.5%)
Full Cohort			10,380 1st time 2011-12 9th graders	9,144 1st time 2012-13 9th graders

Career and Technical Education (CTE) Analysis Part 1

Characteristics of CTE and Non-CTE Students

November 2017

Office of Research and Evaluation

Distribution of Students by Race/Ethnicity: Full Cohort, Non-CTE, and CTE

	Cohort (n=9,144)	Non-CTE (n=6,811)	CTE (n=2,333)
■ Asian	9.2%	10.7%	5.0%
■ Black/African American	56.0%	53.9%	62.2%
■ Hispanic/Latino	17.8%	16.9%	20.4%
■ Multi Racial / Other	2.1%	2.4%	1.4%
■ White	14.9%	16.2%	11.1%

Distribution of Students by Race/Ethnicity: Subgroups of CTE students and Non-CTE

	CTE-Only School in 9th Grade (n=704)	CTE Student at Other School in 9th Grade (n=1,629)	Non-CTE (n=6,811)
■ Asian	2.9%	5.9%	10.7%
■ Black/African American	68.0%	59.7%	53.9%
■ Hispanic/Latino	18.1%	21.5%	16.9%
■ Multi Racial / Other	0.3%	1.7%	2.4%
■ White	10.7%	11.2%	16.2%
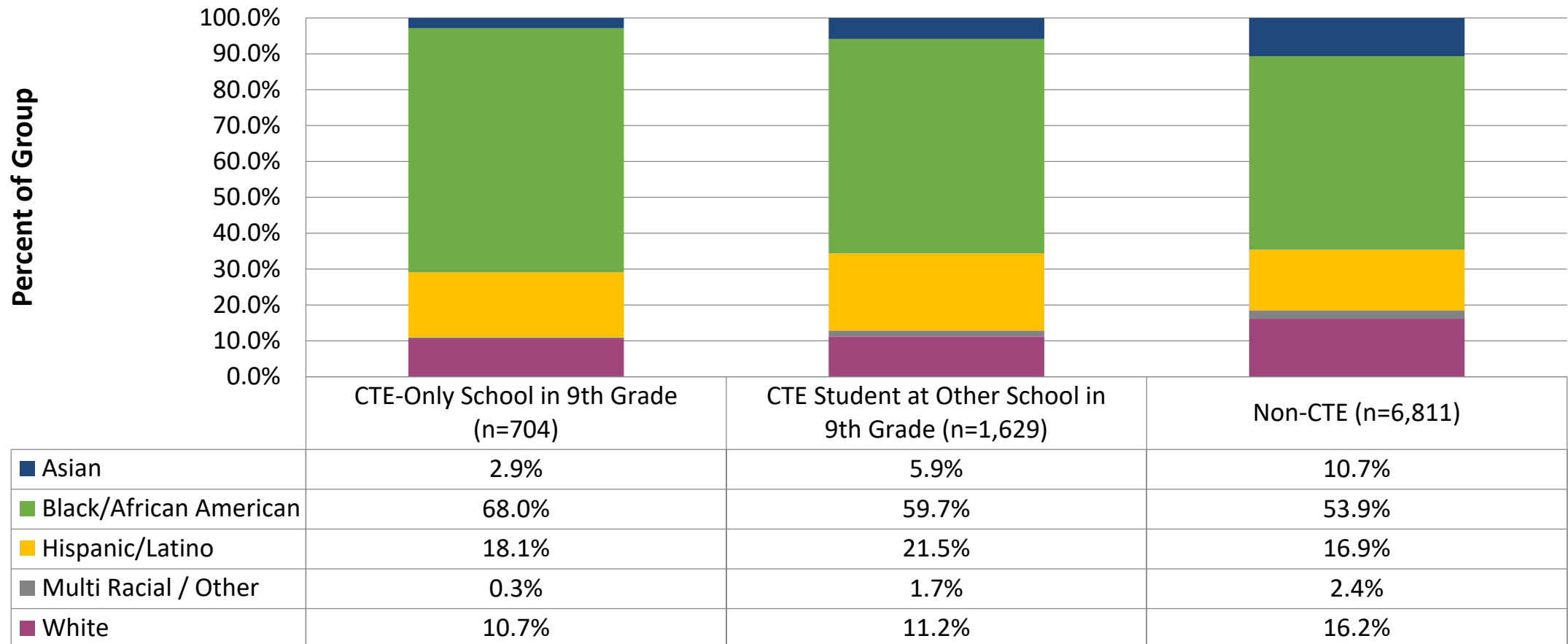
Demographic Characteristics: Full Cohort, CTE, and Non-CTE

Compared With Non-CTE, CTE students are more likely to be male, and more likely to be economically disadvantaged.

Demographic Indicator	Category	Cohort	Non-CTE	CTE	Chi-Square
Gender	Male	51.3%	49.9%	55.4%	$\chi2(1) = 21.40$**
	Female	48.7%	50.1%	44.6%	
IEP Status	IEP	17.1%	17.3%	16.6%	$\chi2(1) = 0.59$, ns
	No IEP	82.9%	82.7%	83.4%	
ELL Status	LEP	8.5%	8.6%	7.9%	$\chi2(1) = 1.30$, ns
	Not LEP	91.5%	91.4%	92.1%	
Free From Tape (Economically Disadvantaged)	FFT	58.5%	56.2%	65.2%	$\chi2(1) = 57.88$**
	Not FFT	41.5%	43.8%	34.8%	

* Significant at p < .05;   ** Significant at p < .01

Demographic Characteristics of Students in CTE Schools and CTE Programs

When comparing students in CTE-only Schools vs students in other CTE programs there were similar distributions of gender, IEP status and poverty status. Students in CTE-only schools were less likely to have ELL status (4.0%) compared with CTE program students (9.6%).

Demographic Indicator	Category	CTE School	CTE Program	Non-CTE	Chi-Square (CTE School vs Program)
Gender	Male	52.6%	56.4%	49.9%	$\chi^2(1) = 2.81$, ns
	Female	47.4%	43.6%	50.1%	
IEP Status	IEP	14.6%	17.1%	17.3%	$\chi^2(1) = 2.32$, ns
	No IEP	85.4%	82.9%	82.7%	
ELL Status	LEP	4.0%	9.6%	8.6%	$\chi^2(1) = 21.56$**
	Not LEP	96.0%	90.4%	91.4%	
Free From Tape (Economically Disadvantaged)	FFT	64.9%	65.3%	56.2%	$\chi^2(1) = 0.34$, ns
	Not FFT	35.1%	34.7%	43.8%	

* Significant at p < .05;   ** Significant at p < .01

CTE student demographics by Career Cluster

Career Cluster	Total Students	Female		IEP		ELL		Black or Latino		Cluster % of all CTE
		#	%	#	%	#	%	#	%	
Business and Finance	292	89	30.5%	49	16.8%	30	10.3%	203	69.5%	12.5%
Communications and Graphics	414	189	45.7%	84	20.3%	33	8.0%	345	83.3%	17.7%
Construction	254	38	15.0%	41	16.1%	13	5.1%	234	92.1%	10.9%
Engineering Technology	71	9	12.7%	6	8.5%	6	8.5%	54	76.1%	3.0%
Health Care	369	269	72.9%	40	10.8%	27	7.3%	303	82.1%	15.8%
Hospitality	290	165	56.9%	53	18.3%	20	6.9%	259	89.3%	12.4%
Human Services	92	74	80.4%	15	16.3%	10	10.9%	89	96.7%	3.9%
Information Technology	156	43	27.6%	23	14.7%	16	10.3%	109	69.9%	6.7%
Natural Sciences and Biotechnology*	200	118	59.0%	28	14.0%	5	2.5%	159	79.5%	8.6%
Transportation	162	34	21.0%	38	23.5%	24	14.8%	149	92.0%	6.9%
None (CTE Non-Start)	33	12	36.4%	10	30.3%	0	0.0%	23	69.7%	1.4%

* Formerly Agriculture.
Note: Non-start students are not assigned clusters

Percentile changes in demographics by Career Cluster

Green tones correspond to increases over the 2011-2012 cohort, while red tones correspond to decreases, and yellow tones are neutral.

Career Cluster	Total Students	Female	IEP	ELL	Black or Latino	Cluster % of all CTE
		%	%	%	%	
Business and Finance	33	-5.8%	3.7%	-1.7%	0.4%	1.2%
Communications and Graphics	106	2.1%	5.0%	-1.8%	0.5%	4.3%
Construction	-64	-0.8%	-3.7%	-4.6%	1.2%	-3.0%
Engineering Technology	27	3.6%	-2.9%	-2.9%	5.6%	1.1%
Health Care	41	0.9%	-5.6%	-2.4%	-6.0%	1.5%
Hospitality	-54	-1.0%	-0.3%	-0.1%	5.9%	-2.6%
Human Services	-33	-6.8%	-4.5%	0.5%	-1.7%	-1.5%
Information Technology	-34	2.8%	6.3%	-4.0%	2.0%	-1.6%
Natural Sciences and Biotechnology*	87	-5.6%	0.7%	1.6%	3.4%	3.6%
Transportation	-34	9.3%	1.0%	1.5%	4.2%	-1.6%
No Record	-27	-8.6%	-1.4%	-5.0%	-8.6%	-1.2%

* Formerly Agriculture.

8th Grade PSSA Performance Levels: Full Cohort, Non-CTE, and CTE

Indicator	Proficiency Level	Cohort (n=7,457)		Non-CTE (n=5,455)		CTE (n=2,002)	
8th Grade PSSA Reading	Below Basic	20.6%	38.8%	19.3%	35.2%	24.3%	48.4%
	Basic	18.2%		16.0%		24.1%	
	Proficient	24.8%	61.2%	23.1%	64.8%	29.7%	51.6%
	Advanced	36.4%		41.7%		21.9%	
		Cohort (n=7,497)		**Non-CTE (n=5,492)**		**CTE (n=2,005)**	
8th Grade PSSA Math	Below Basic	24.5%	42.9%	22.8%	39.8%	29.3%	51.4%
	Basic	18.4%		17.0%		22.1%	
	Proficient	22.8%	57.1%	21.6%	60.2%	26.2%	48.6%
	Advanced	34.2%		38.5%		22.4%	

# Changes in PSSA Performance Levels: Full Cohort, Non-CTE, and CTE

Green tones correspond to increases over the 2011-2012 cohort, while red tones correspond to decreases, and yellow tones are neutral.

.

Indicator	Proficiency Level	Cohort		Non-CTE		CTE	
8th Grade PSSA Reading	Below Basic	1.8%	3.2%	1.3%	2.1%	3.0%	4.5%
	Basic	1.4%		0.9%		1.5%	
	Proficient	-3.0%	-3.2%	-3.4%	-2.1%	-2.3%	-4.5%
	Advanced	-0.2%		1.3%		-2.2%	
8th Grade PSSA Math	Below Basic	1.7%	2.3%	0.0%	0.8%	6.5%	5.7%
	Basic	0.6%		0.8%		-0.8%	
	Proficient	-1.8%	-2.3%	-1.2%	-0.8%	-4.2%	-5.6%
	Advanced	-0.6%		0.3%		-1.4%	

8th Grade PSSA Performance Levels: CTE Schools, CTE Programs, and Non-CTE

Indicator	Proficiency Level	CTE School (n=629)		CTE Program (n=1,349)		Non-CTE (n=5,455)	
8th Grade PSSA Reading	Below Basic	22.1%	46.1%	32.7%	54.0%	19.3%	35.2%
	Basic	24.0%		21.3%		16.0%	
	Proficient	29.3%	53.9%	25.0%	46.0%	23.1%	64.8%
	Advanced	24.6%		21.0%		41.7%	
		CTE School (n=629)		**CTE Program (n=1.345)**		**Non-CTE (n=5,492)**	
8th Grade PSSA Math	Below Basic	17.6%	42.4%	27.4%	51.2%	22.8%	39.8%
	Basic	24.8%		23.8%		17.0%	
	Proficient	34.8%	57.6%	27.2%	48.8%	21.6%	60.2%
	Advanced	22.7%		21.6%		38.5%	

Changes in PSSA Performance Levels: CTE-School vs CTE Program

Green tones correspond to increases over the 2011-2012 cohort, while red tones correspond to decreases, and yellow tones are neutral.

Indicator	Proficiency Level	CTE School		CTE Program		Non-CTE	
8th Grade PSSA Reading	Below Basic	5.3%	7.9%	8.7%	6.7%	1.3%	2.2%
	Basic	2.6%		-2.0%		0.9%	
	Proficient	-6.1%	-7.9%	-5.0%	-6.7%	-3.5%	-2.2%
	Advanced	-1.7%		-1.7%		1.3%	
8th Grade PSSA Math	Below Basic	-4.3%	0.5%	4.1%	3.1%	0.0%	0.9%
	Basic	4.9%		-0.9%		0.8%	
	Proficient	1.1%	-0.5%	-1.3%	-3.1%	-1.2%	-0.9%
	Advanced	-1.7%		-1.9%		0.4%	

Prior Attendance for CTE and Non-CTE, as well as CTE Subgroups

CTE instruction begins in 10th grade, so 9th grade average daily attendance (ADA) provides baseline information about attendance patterns for students who choose to start CTE. Overall, CTE and non-CTE students have similar baseline ADA (.885 vs .879). However, students that drop CTE after 10th grade (CTE Drop-Y1) have lower baseline ADA than all other CTE sub-tracks (.847 vs .899).

9th Grade ADA of CTE vs Non-CTE

■ Overall CTE (n=2,329)   ■ Non-CTE   (n=6,804)

0.885   0.876
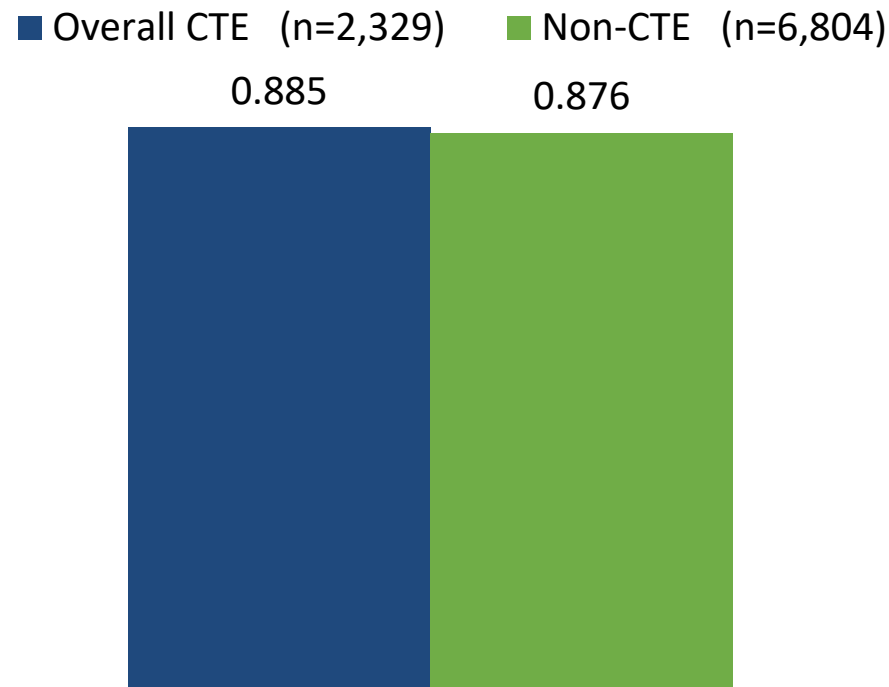
CTE Students: 9th Grade ADA by Subgroup

■ Drop-Y1 (10th grade) (n=669)   ■ CTE Excluding Drop-Y1 (n=1,616)

0.847   0.899
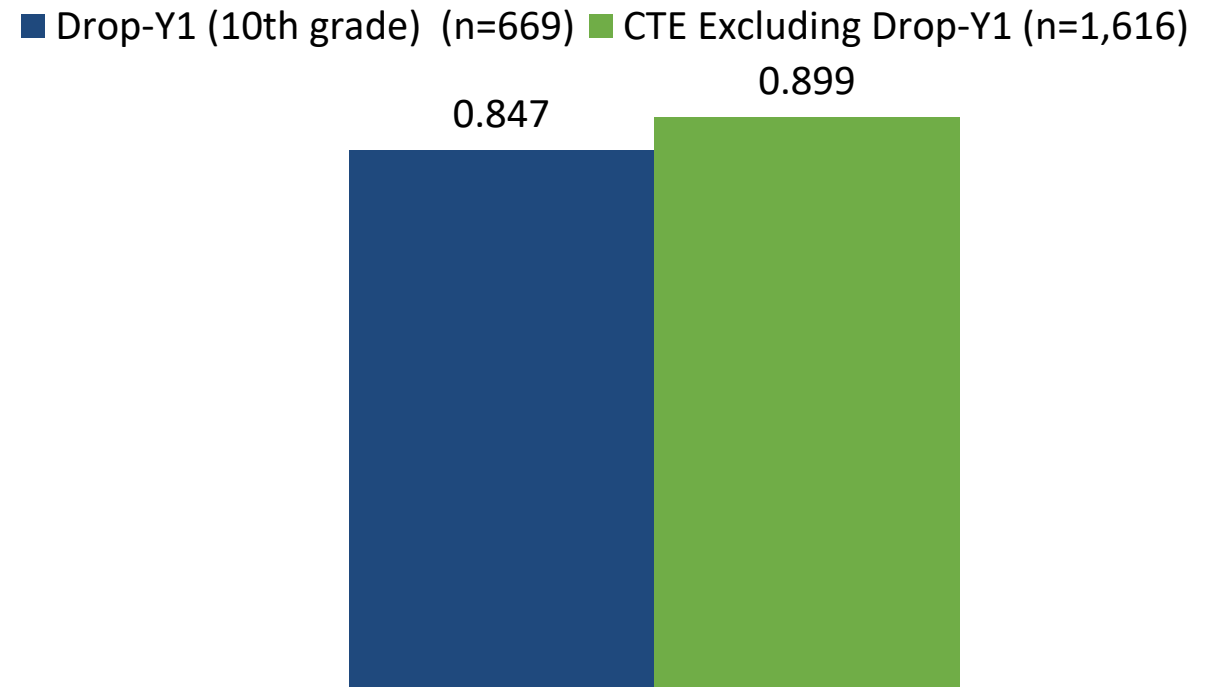
Prior Attendance for CTE and Non-CTE, as well as CTE Subgroups

CTE classes begin in 10th grade, but students enroll in CTE-only schools in 9th grade. To compare attendance histories of students who enroll in CTE schools with those that do not, 8th grade ADA is summarized for CTE school, CTE program and non-CTE students. ADA is also calculated for these same groups of students one year later.
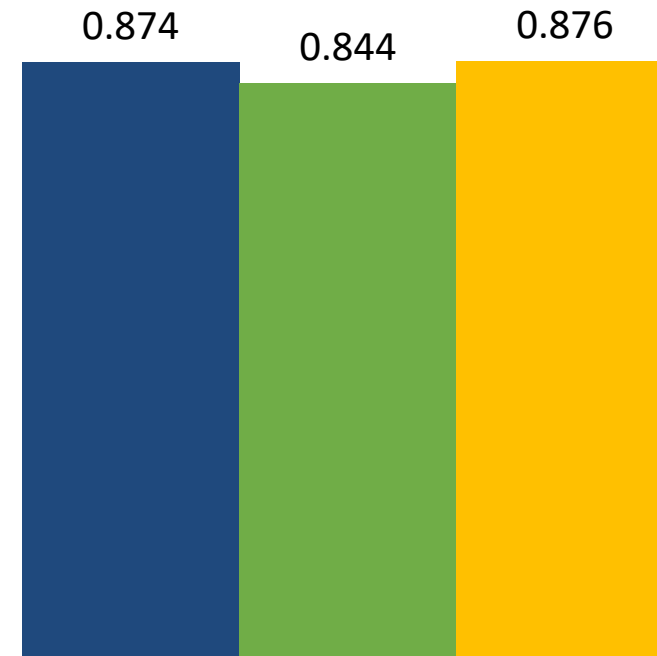
CTE School v CTE Program: 8th Grade ADA

■ CTE School (n=691)   ■ CTE Program (n=1,486)
■ Non-CTE (n=5,986)

0.952   0.928   0.935
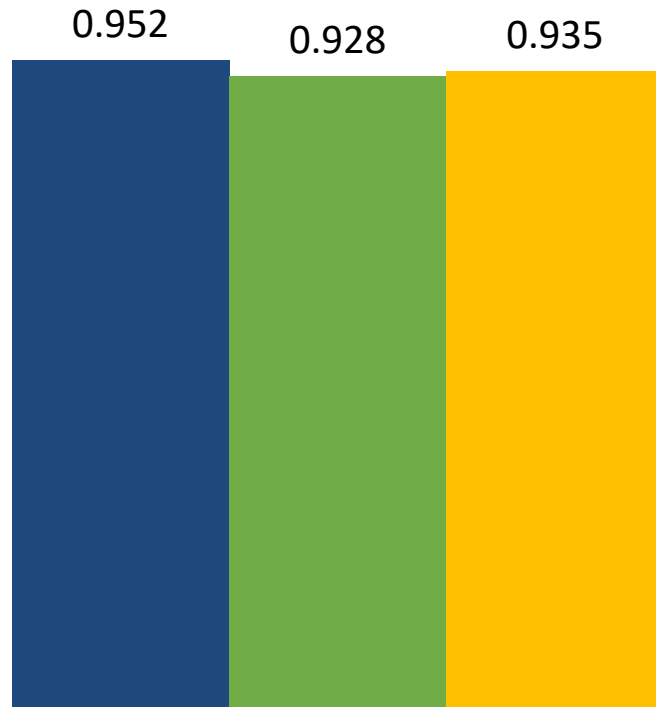
CTE School v CTE Program: 9th Grade ADA

■ CTE School (n=704)   ■ CTE Program (n=1,629)
■ Non-CTE (n=6,804)

0.874   0.844   0.876

Career and Technical Education (CTE) Analysis Part 2

Graduation Outcomes

November, 2017
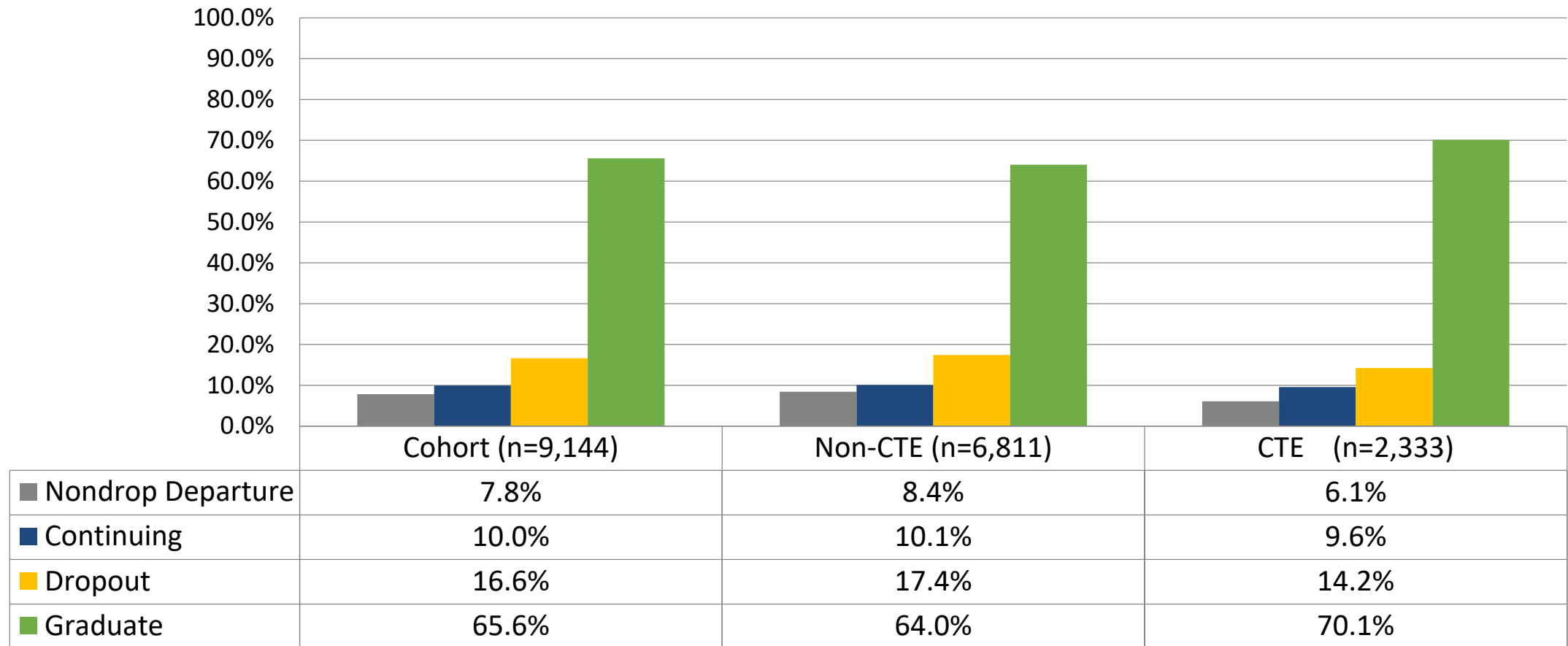
Office of Research and Evaluation

Cohort Graduation Outcomes

- CTE participants were more likely to remain in the District (rather than depart to other schools), and to graduate on time.

- CTE participants that were in the "On Track" and "Late Start" trajectories had the best outcomes.
  - Those that Dropped CTE had very poor outcomes, compared with other CTE students, and also with the cohort as a whole.

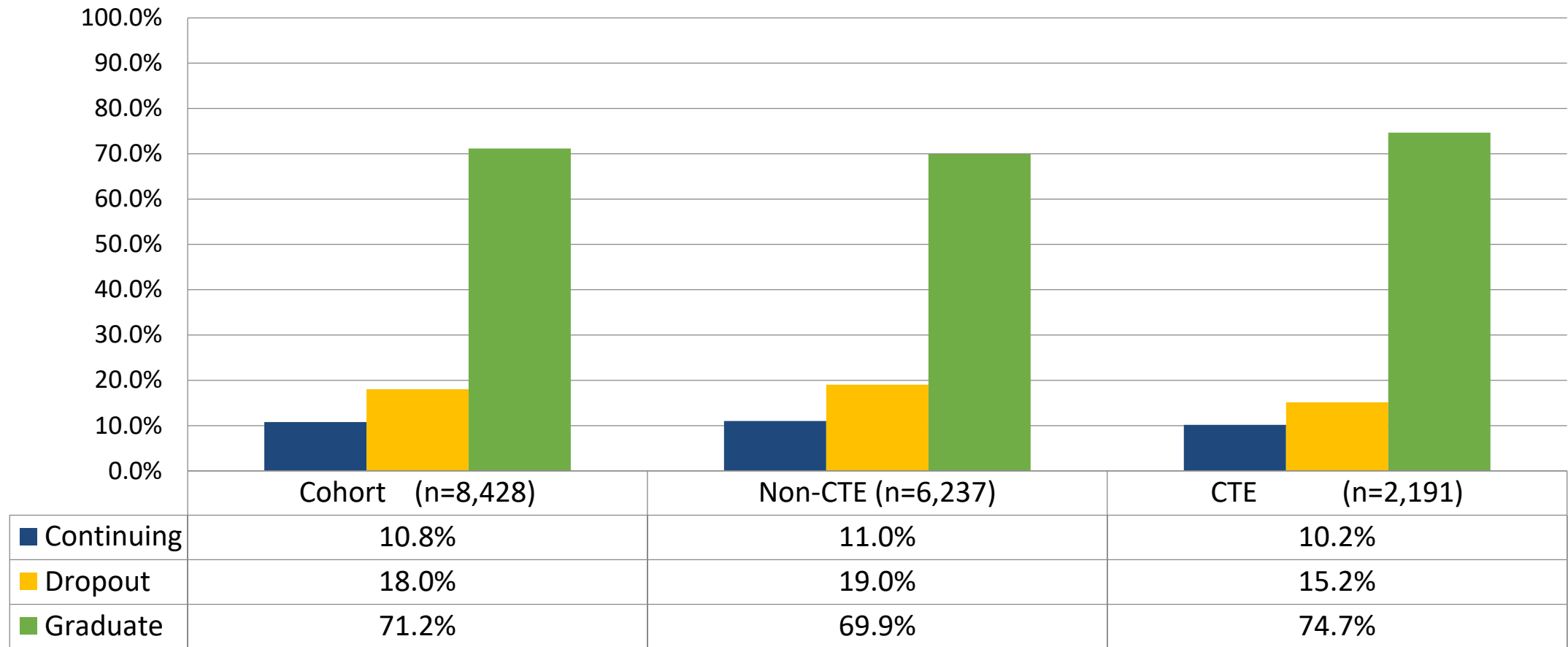- Overall, patterns were similar to prior years.

Definitions of Outcome Categories

- "Four Year Outcomes" describe the full range of possible circumstances that a cohort member might possess after four years in high school
  - Graduated
  - Continuing (still enrolled)
  - Dropped Out (no longer in school)
  - "Nondrop Departure," which refers to students that leave the District, but do not drop out of school.

- "Graduation Rate" excludes Nondrop Departures. This is the standard statistic that is used to express the percentage of students that graduate within four years of their first 9th grade year.

Four Year Outcomes:
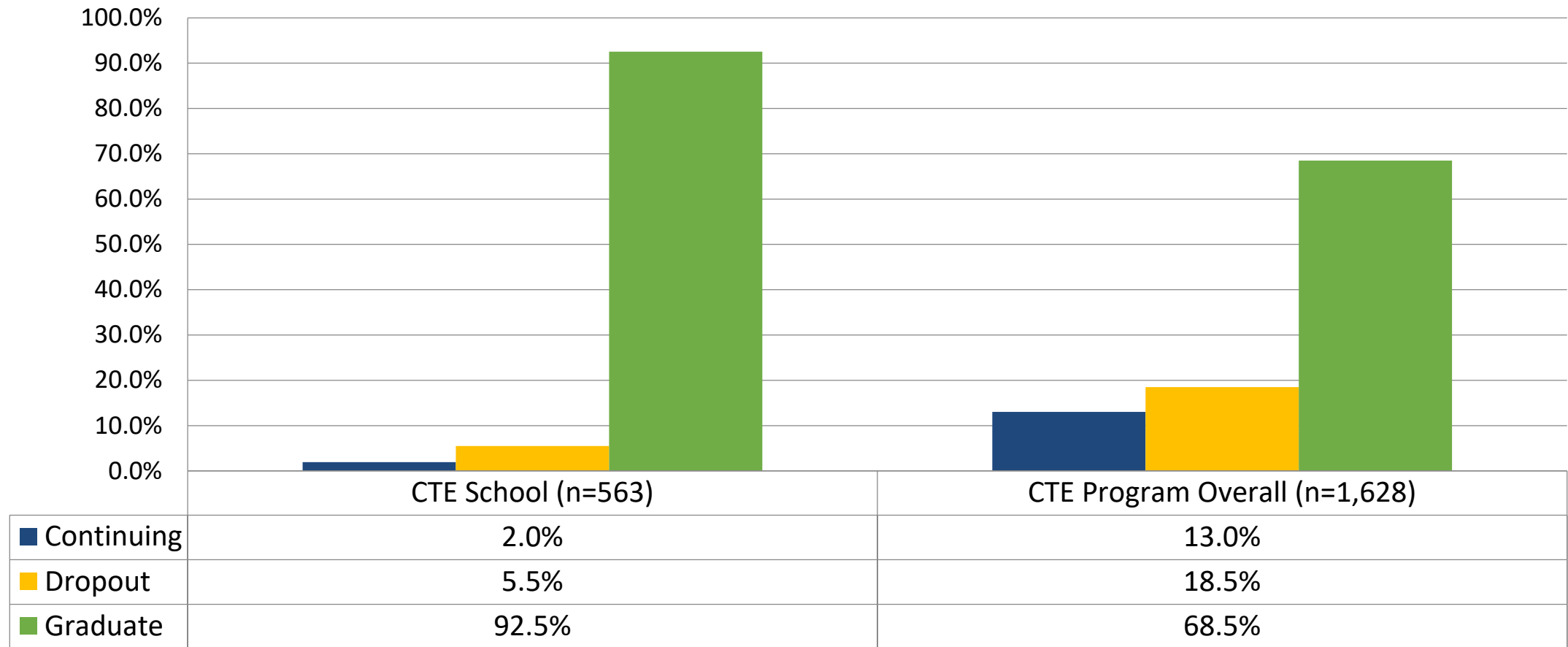# Full Cohort, Non-CTE, and CTE

	Cohort (n=9,144)	Non-CTE (n=6,811)	CTE (n=2,333)
■ Nondrop Departure	7.8%	8.4%	6.1%
■ Continuing	10.0%	10.1%	9.6%
■ Dropout	16.6%	17.4%	14.2%
■ Graduate	65.6%	64.0%	70.1%

Four Year Graduation Rates:
Full Cohort, Non-CTE, and CTE

	Cohort (n=8,428)	Non-CTE (n=6,237)	CTE (n=2,191)
■ Continuing	10.8%	11.0%	10.2%
■ Dropout	18.0%	19.0%	15.2%
■ Graduate	71.2%	69.9%	74.7%

Four Year Graduation Rates: CTE School vs CTE Program

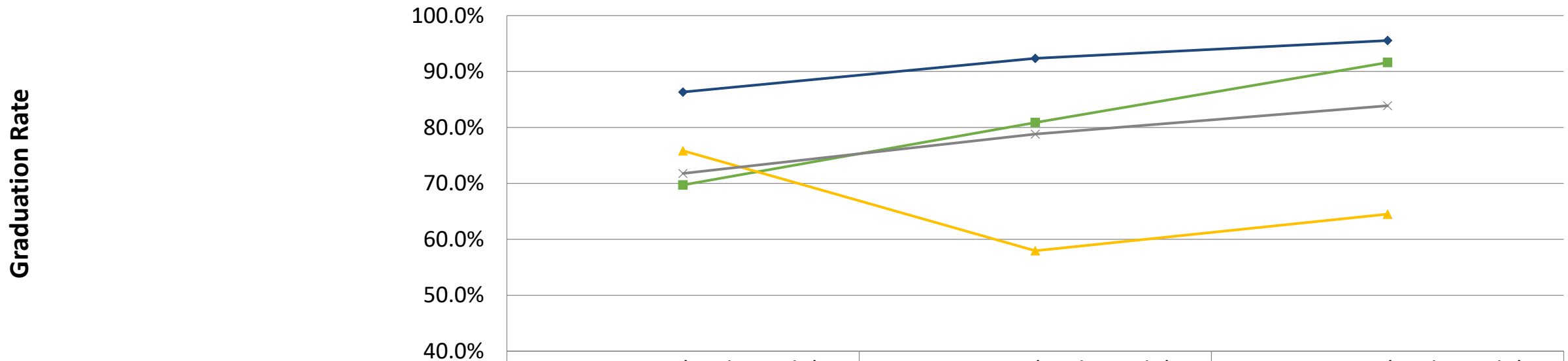|	CTE School (n=563)	CTE Program Overall (n=1,628)
■ Continuing	2.0%	13.0%
■ Dropout	5.5%	18.5%
■ Graduate	92.5%	68.5%

Projected Graduation Rates by School Year: CTE School and CTE Program

In this graph (and the one on the next slide), each data point represents a snapshot taken in a specific year. For example, if we identify all of the students that were enrolled in a CTE school in 2013-2014, we find that those students eventually graduated at a rate of 86.3%. The rate for students enrolled in a CTE school in 2014-2015 was 92.3%. Please note, since students might enter or exit CTE schools from year to year, these two groups of students are not identical.

	2013-2014 (10th grade)	2014-2015 (11th grade)	2015-2016 (12th grade)
CTE School	86.3%	92.3%	95.5%
CTE Program	69.7%	80.9%	91.6%
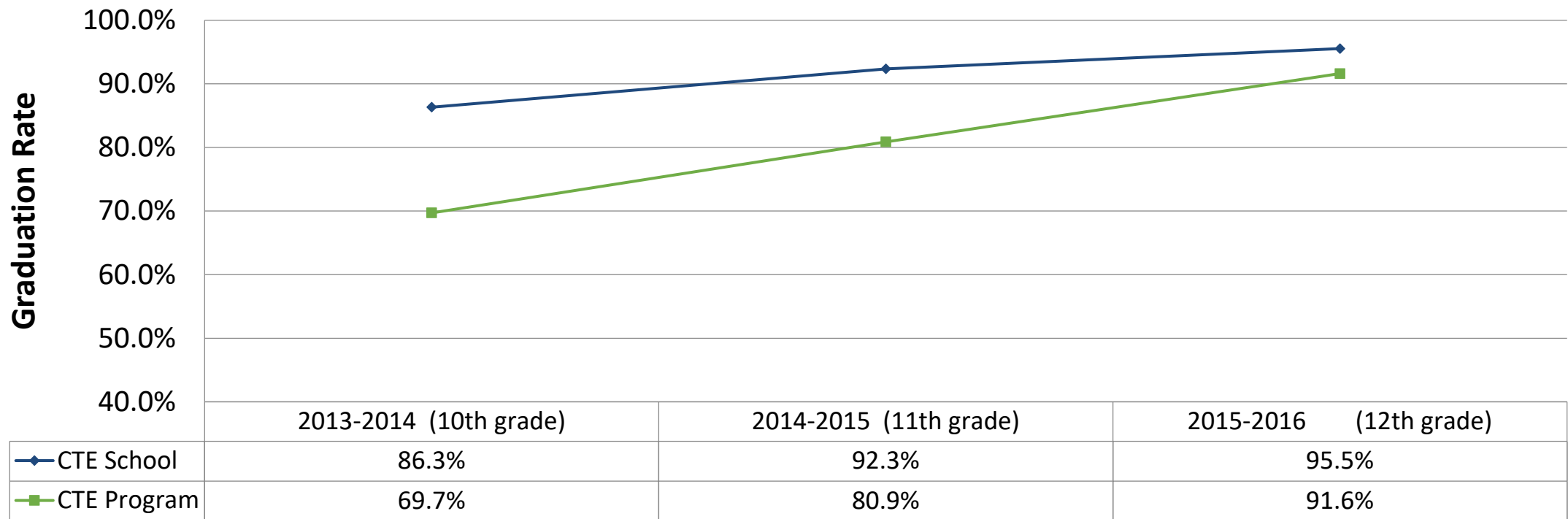
Projected Graduation Rates by School Year: CTE School, CTE Program, Inactive CTE, and Non-CTE

Here, two additional groups are added in order to provide more context - Non-CTE, and students that participated in CTE in some OTHER year, but not during the specified year. For example, in 2013-2014 there were a group of students that were not enrolled in CTE, but who would enroll in CTE at some later point. Those students eventually graduated at a rate of 75.8%

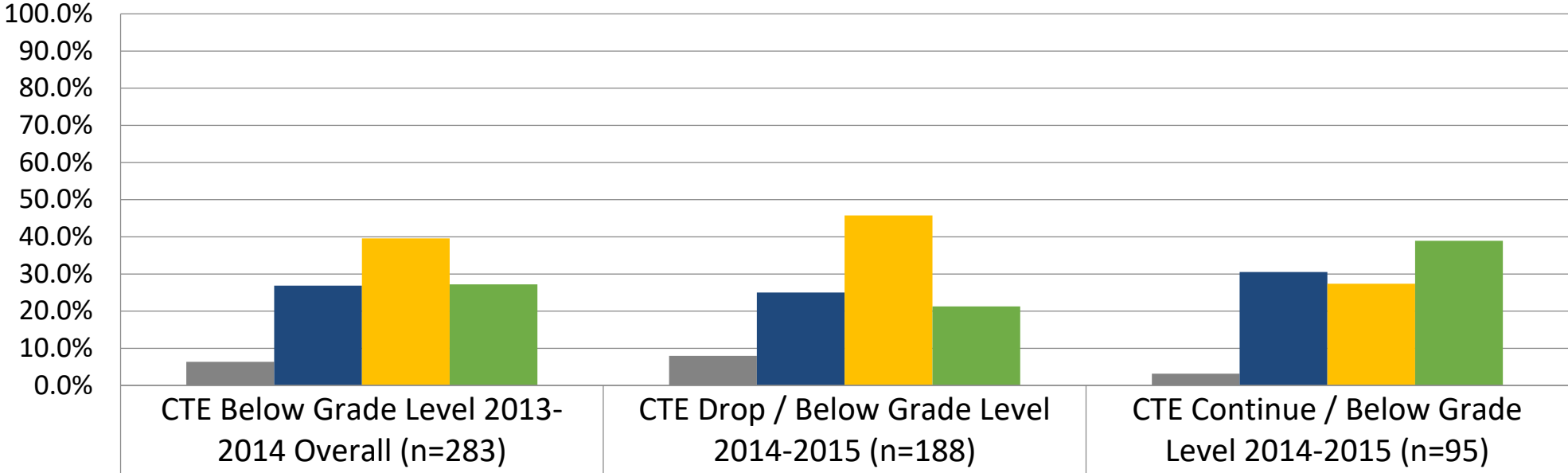|	2013-2014 (10th grade)	2014-2015 (11th grade)	2015-2016 (12th grade)
CTE School	86.3%	92.3%	95.5%
CTE Program	69.7%	80.9%	91.6%
Inactive CTE: Students Not Actively Enrolled in CTE, but active in CTE during some other year(s)	75.8%	58.0%	64.5%
Non-CTE, Enrolled in District School	71.8%	78.8%	83.9%

Four Year Outcomes of Different CTE Tracks

See Slides 5 and 6 for detailed definitions of different CTE tracks
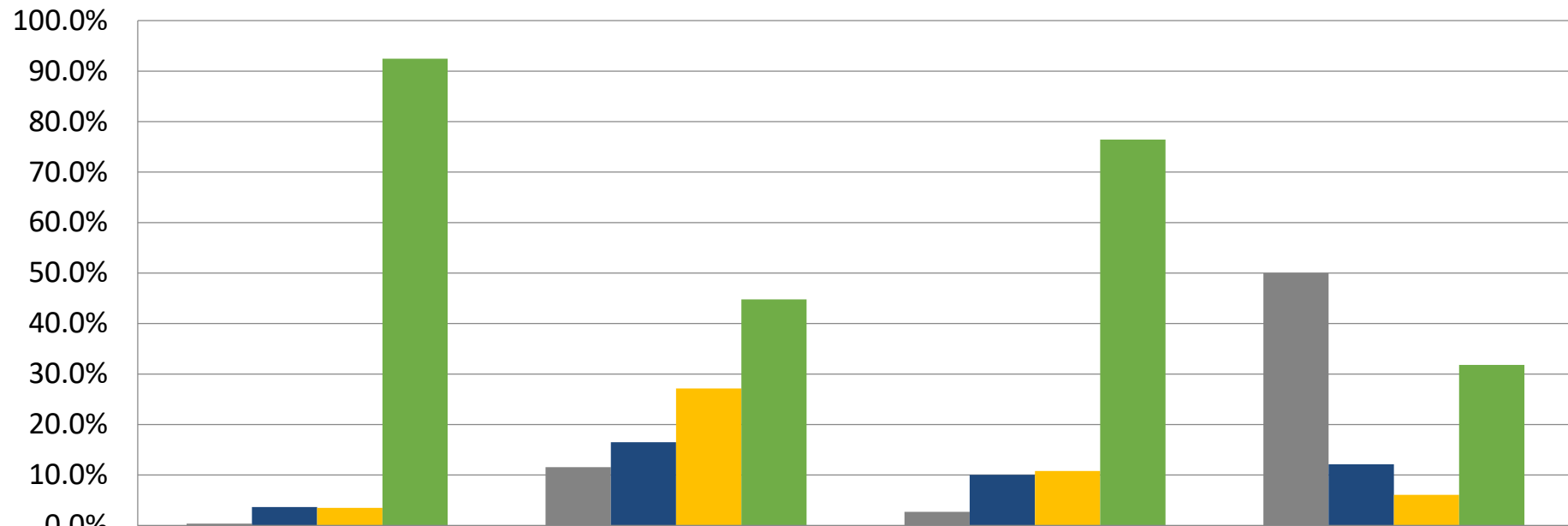
	CTE On Track (n=1,090)	CTE Drop (n=951)	CTE Late/Interrupt (n=259)	CTE Non-Start (n=60)
■ Nondrop Departure	0.4%	11.6%	2.7%	50.0%
■ Continuing	3.7%	16.5%	10.0%	12.1%
■ Dropout	3.5%	27.1%	10.8%	6.1%
■ Graduate	92.5%	44.8%	76.4%	31.8%

Four Year Outcomes of Students Enrolled in CTE in 2013-2014 (10th grade) that Were Below Grade Level in 2014-2015: CTE-Drop Vs CTE-Continue

283 of the students that were enrolled in CTE during 2013-2014 did not earn promotion to 11th grade in 2014-2015. When those students continued their CTE programming (CTE Continue), they had better outcomes than if they discontinued CTE (CTE Drop). For example, 38.9% of those that continued were able to recover their grade level and graduate on time, compared with 21.3% of those that dropped CTE.

	CTE Below Grade Level 2013-2014 Overall (n=283)	CTE Drop / Below Grade Level 2014-2015 (n=188)	CTE Continue / Below Grade Level 2014-2015 (n=95)
Nondrop Departure	6.4%	8.0%	3.2%
Continuing	26.9%	25.0%	30.5%
Dropout	39.6%	45.7%	27.4%
Graduate	27.2%	21.3%	38.9%

Graduation Achievement Gap by Race/Ethnicity: Cohort, Non-CTE, and CTE

Ethnicity	Graduation Rate					
	Cohort		Non-CTE		CTE	
Black/African American	69.4%	68.3%	68.2%	66.2%	72.7%	73.2%
Hispanic/Latino	64.3%		59.8%		74.8%	
White	75.9%	79.7%	74.4%	79.3%	82.0%	81.7%
Asian	85.6%		86.3%		80.9%	

Ethnicity Distribution of Enrollment and Graduation: Full Cohort and CTE

Ethnicity	% of Full Cohort (n=9,144)	% of Cohort Graduates (n=5,998)	Gap		% of CTE Population (n=2,285)	% of CTE Graduates (n=1,636)	Gap
Black/African American	56%	55%	-1		62%	61%	-1
Hispanic/ Latino	18%	16%	-2		20%	20%	0
White	15%	16%	+1		11%	12%	+1
Asian	9%	11%	+2		5%	5%	0
Multi Racial / Other	2%	2%	0		1.2%	1.5%	0