



November 10, 2015

# TESTING AND BEYOND: The Future of College Math Placement in California

# ACKNOWLEDGEMENTS

## ADVISORY CIRCLE

3CSN  
Career Ladders Project  
CORE Districts  
Education Insights Center  
Educational Results Partnership  
PACE  
WestEd

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The James Irvine Foundation  
College Futures Foundation  
California Education Policy Fund

# DEGREES OF FREEDOM:

Three part series by Pamela Burdman



“Decisions about math requirements and expectations will have a major impact on the academic opportunities of millions of students nationally.”





# COLLEGE MATH PLACEMENT: The California Context

PAMELA BURDMAN

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# CHALLENGE: Developmental Placements

## NOT PROFICIENT

<b>California Community Colleges</b>	~ 85 percent of incoming students	~ 234,000 students
<b>California State University</b>	~ 33 percent of admitted high school graduates	~ 20,000 students
<b>University of California</b>	unknown (~ 18 percent UC-Riverside)	unknown (749 students UCR)

A photograph of four students in a classroom. A male student with long blonde hair is leaning over a female student with long dark hair, who is sitting at a desk. Another male student in a grey hoodie is sitting at a desk with a computer monitor. A fourth student is partially visible on the left. The text 'OUTCOMES: Developmental Math' is overlaid in white on the right side of the image.

# OUTCOMES: Developmental Math

## CCC

- + About 30 percent of developmental math students complete a “gatekeeper” math class required for transferring. (AA students don’t require transfer-level math.)
- + (Alternative pathways for non-math-intensive majors have far better gatekeeper completion rates, but only some are accepted for transfer.)

## CSU

- + About 5 percent of Cal State students leave un-remediated (in English, math, or both) and 2 percent of students are permitted to re-enroll for a second year even though they are un-remediated.

# FOCUS FOR TODAY

Placing More Students Into  
College-Level Math



Ensuring Students Have Quantitative  
Skills for Success in College and Life



Improving College Readiness  
and Completion







# STATUS QUO: UC Admissions & Placement

## Selective Admissions:

- + Top 1/8 of high school grads
- + Minimum high school of GPA or 3.0
- + C or better in a-g courses (Includes: Algebra 1, Geometry, Algebra 2)
- + Sufficiently high SAT or ACT scores

## Presumed Readiness:

At most UC campuses students are not required to take placement exams unless they wish to enroll in calculus without taking a prerequisite course.





# STATUS QUO: CSU Admissions Standards

## + Moderately Selective Admissions:

- Top 1/3 of high school grades
- Minimum GPA of 2.0
- Completion of a-g courses (Includes: Algebra 1, Geometry, Algebra 2)
- High school diploma or equivalent

# DEV MATH PLACEMENT IN THE CSU: Assessed Readiness Statewide

## ENTRY LEVEL MATHEMATICS EXAMINATION (ELM)

### EXEMPT FROM ELM – 51%

SAT math (550 or above)

ACT math (23 or above)

AP Statistics (3 or above)

AP Calculus (3 or above)

Early Assessment Program

- EAP test (ready)
- Conditionally ready + 12<sup>th</sup> grade math

Transferable college math course

- C or better in approved course

### REQUIRED TO TAKE ELM – 49%

Pass ELM (score  $\geq 50$ ) 16%

**Not proficient** (score  $< 50$ ) **33%**

Source: CSU Analytic Studies Proficiency Reports, 2014 data

A photograph of three students in a classroom. On the left, a young woman with dark hair tied back, wearing a pink shirt and a patterned scarf, smiles. In the center, a young woman with dark curly hair, wearing glasses and a black polo shirt, leans forward and smiles. On the right, a young man wearing a black baseball cap, glasses, and a grey plaid shirt, also smiles. The background shows a bright classroom with large windows and other students.

# STATUS QUO: CCC Admissions Standards

- + **OPEN ADMISSIONS:**
  - Top 100% of students.
  - High school graduation requires two years of mathematics, including Algebra 1
  - High school graduation is not required for admission.



# PLACEMENT IN THE CCC: Assessed Readiness by College

## UNTIL NOW

### MULTIPLE TESTS

ACCUPLACER (49%)  
MDTP (35%)  
Compass (13%)  
Self-assessment (4%)  
Locally developed (7%)

CUT SCORES: Vary by college  
(In 2010 ACCUPLACER college-  
level score ranged from 43 to 63.)

**Below transfer-level: ~ 85%**

## GOING FORWARD

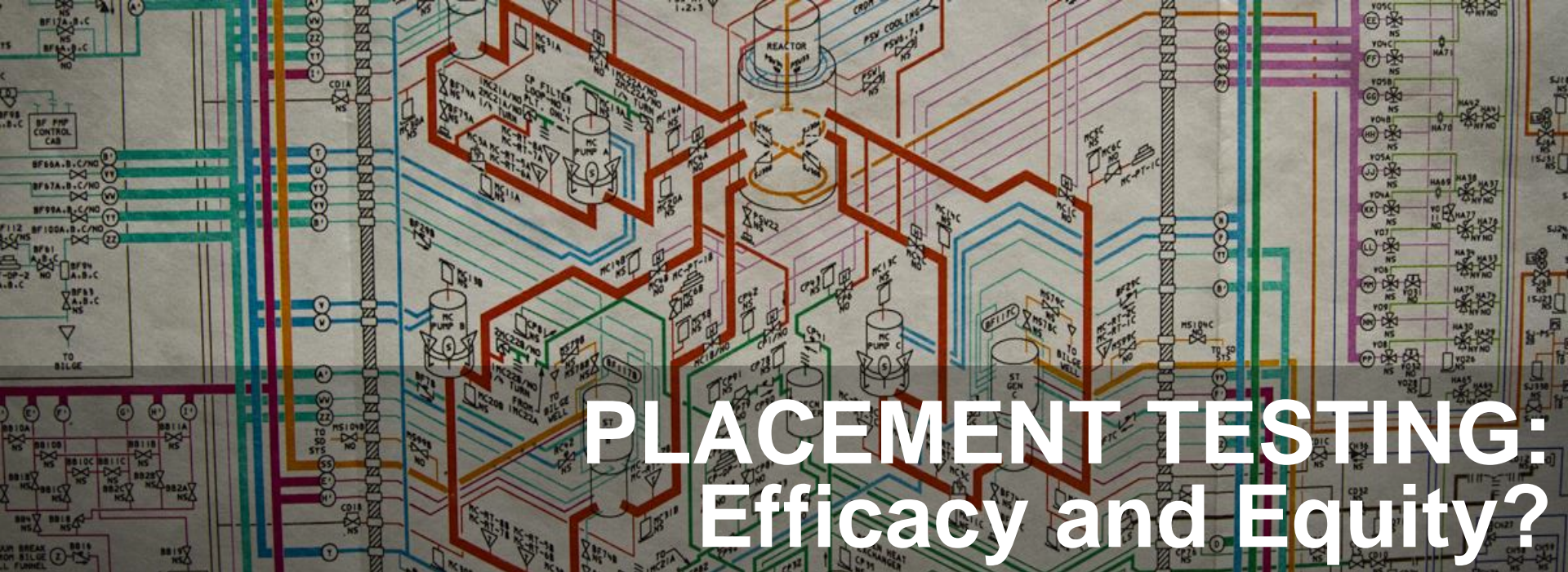
### SINGLE TEST

CCCAssess

CUT SCORES: Vary by college  
(may include enhanced multiple measures)

**?????**

Sources: Venezia et al, 2010. *A One-Shot Deal?*; Perry, M. et al, 2010. *Course-taking Patterns, Policies, and Practices in Developmental Education in the CCC.*



- + Research on community college placement tests illustrates their limitations.
- + Nationally, community college students are 19 percent more likely to require remedial math courses than university students with similar records
- + Research on SAT tests suggests similar limitations.



# MISPLACEMENT: Reasons & Responses

REASONS	RESPONSES	CA EXAMPLE
Poor alignment of curriculum	Re-design tests/align curriculum	CCCAssess, SBAC / CAASPP / EAP
Over-reliance on tests for placing students	De-emphasize tests	CCC multiple measures CCC differentiated placement
Need for better HS preparation	Strengthen high school math courses	CSU EAP/senior-year courses

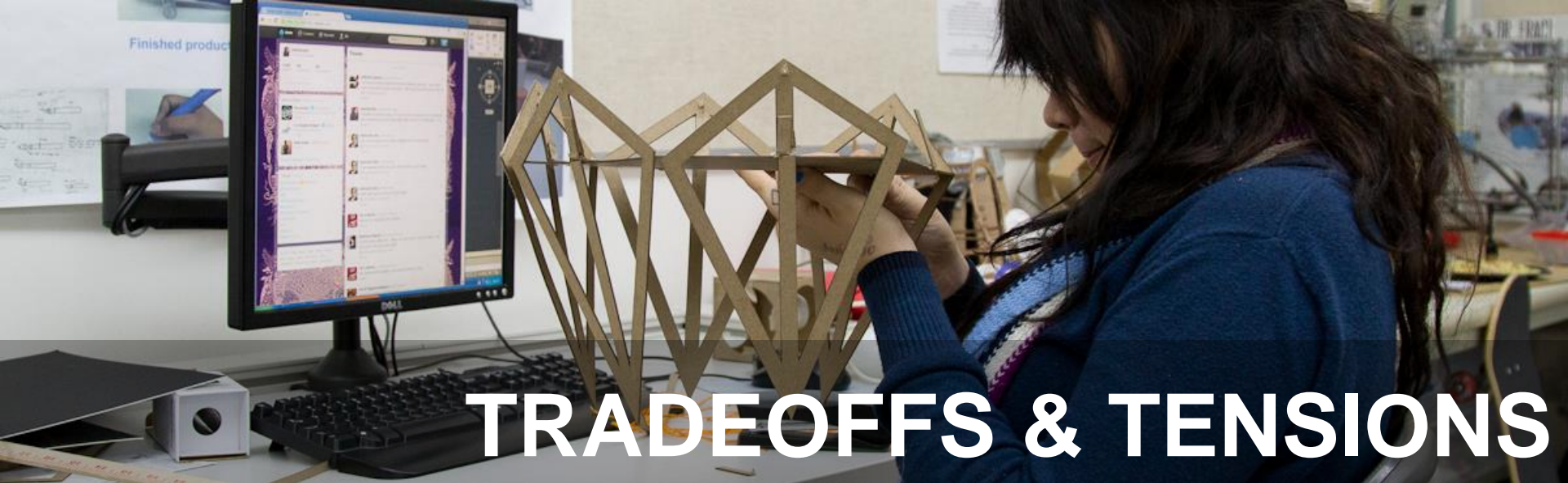
(See Burdman, 2012, *Where to Begin?*)



# RECOMMENDATION: Intersegmental Dialogue



"Intersegmental conversations are needed to deepen alignment across segments in math education."



# TRADEOFFS & TENSIONS

- + System-wide consistency vs. institutional autonomy  
(also system autonomy)
- + Efficiency vs. effectiveness
- + Supporting student progression vs. enforcing standards

(See: Jaggars, Hodara, 2013. *The Opposing Forces That Shape Developmental Education*)

# FOR MORE INFORMATION:

## **DEGREES OF FREEDOM 1:**

Diversifying Requirements for College Readiness and Graduation

## **DEGREES OF FREEDOM 2:**

Varying Routes to Math Readiness and the Challenge of Intersegmental Alignment

## **DEGREES OF FREEDOM 3:**

Probing Placement Policies at California Colleges and Universities

## **PRIOR LEARNINGWORKS REPORT:**

## **CHANGING EQUATIONS:**

How Community Colleges are Re-Thinking College Readiness in Math

## **ALSO SEE (BY PAMELA BURDMAN):**

## **WHERE TO BEGIN?**

The Evolving Role of Placement Exams for Students Starting College



[www.edpolicyinca.org](http://www.edpolicyinca.org)

[www.LearningWorksCA.org](http://www.LearningWorksCA.org)

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**LearningWorks**



# PLACEMENT TESTS: What Do We Know About Efficacy and Equity?

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Cabrillo College  
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# Improving the Accuracy of Remedial Placement

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Research Fellow, PPIC  
Research Affiliate, CCRC

Funding for this research was provided by the Bill & Melinda Gates Foundation

# Contribution of the Research

- Focus on the accuracy of the assignment mechanism—placement exam scores—which determine whether someone receives remediation (Scott-Clayton, 2012; Belfield & Crosta, 2012; Scott-Clayton, Crosta & Belfield, 2014)
- Using administrative data and a rich predictive model of college grades, this study ask the following questions:
  - How accurately do placement exams distinguish between those likely/unlikely to succeed?
  - How much could assignment accuracy be improved by incorporating information from high school transcripts into the screening process?



# What is “placement accuracy”?

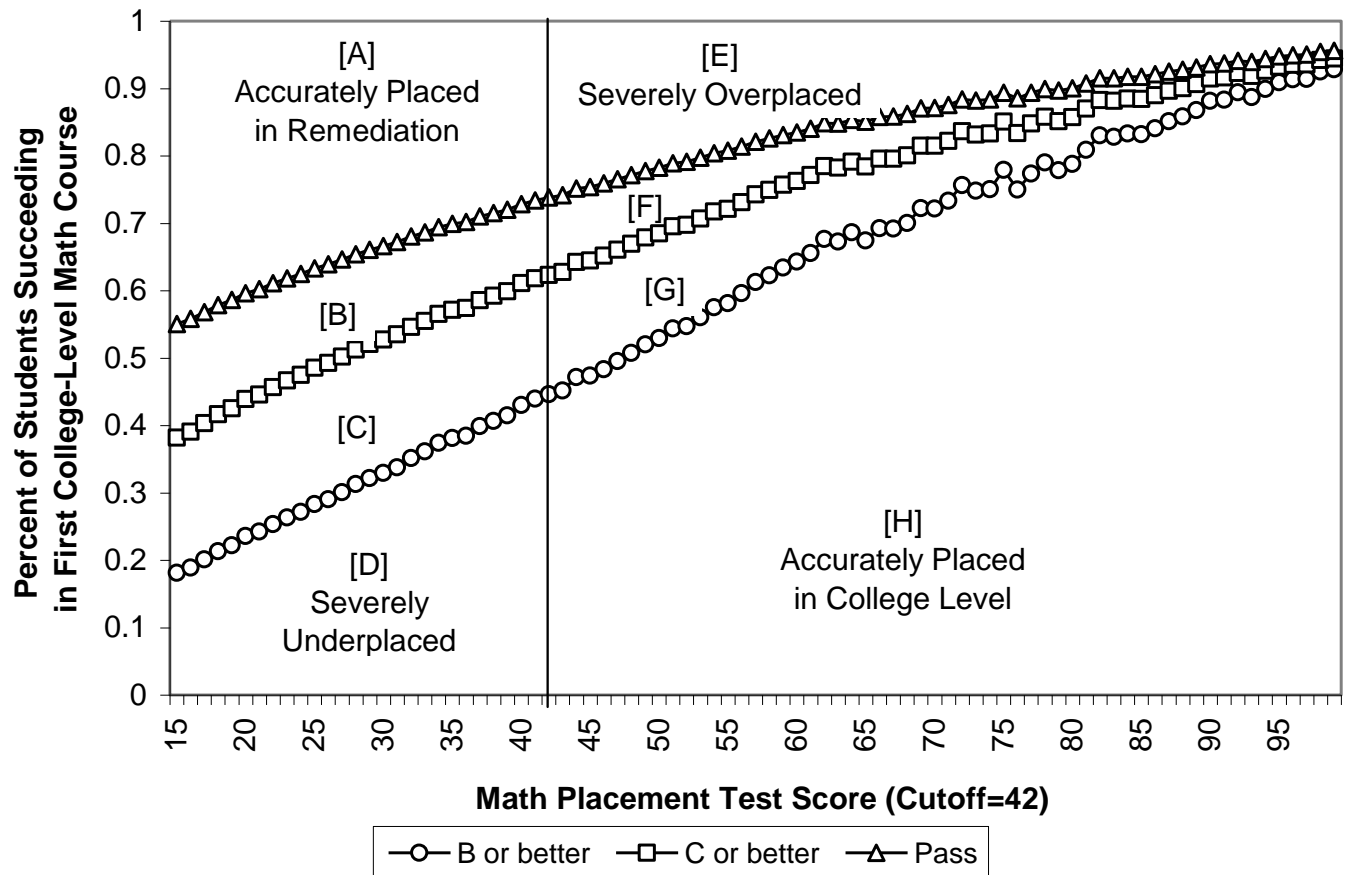
	Would succeed at college-level	Would not succeed at college-level
Placed into remediation	<b>Under-placed</b>	<b>Accurately placed</b>
Placed into college-level	<b>Accurately placed</b>	<b>Over-placed</b>

- We can't directly observe potential outcomes in the top row, but we can:
  - Estimate relationship between test scores & outcomes for those placed directly into college level using logistic regression, then
  - Predict outcomes for those placed into remediation
  - Use predicted outcomes to simulate overall accuracy & error rates under different placement rules
- Focus on placement error rates:
  - **Severe Under-Placement:** Proportion of students predicted to earn a B or better in college-level but instead placed into remediation
  - **Severe Over-Placement:** Proportion of students placed in to college-level but predicted to fail there
  - **Severe Error Rate:** Combines the severe under-placement rate with the severe under-placement rate

# Findings



# Percent Succeeding in College Math

Figure 2 (Schematic). Percent Succeeding in College-Level Math, by Math Test Score





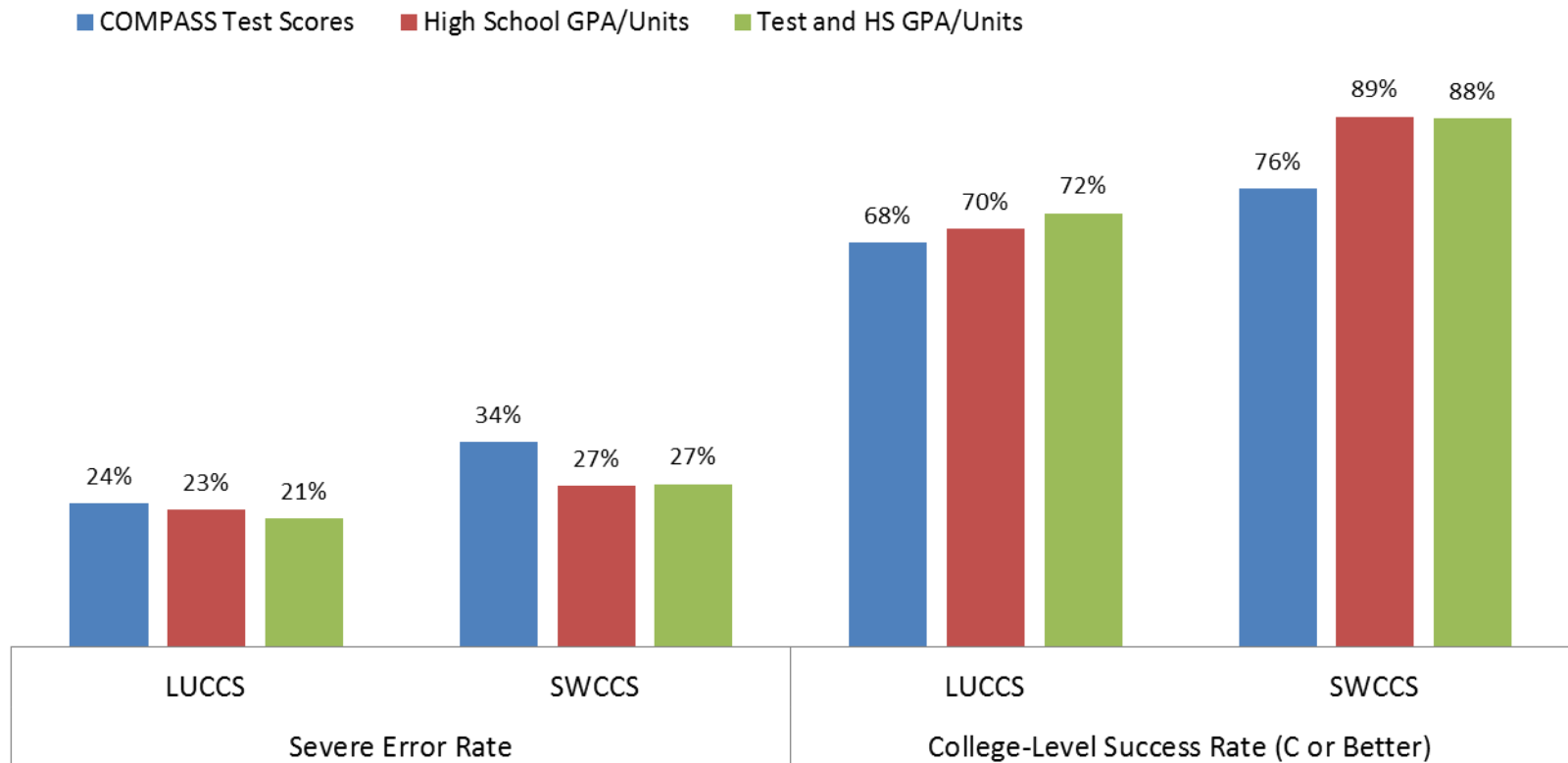
# When Using Test Scores Only Severe Under-Placement is a Particular Problem

		Placement	
		Developmental	College Level
Student Ability	Developmental		<b>Over-placed</b> (SWCCS: Math – 6%) (LUCCS: Math – 5%)
	College Level	<b>Under-placed</b> (SWCCS: Math – 28%) (LUCCS: Math – 19%)	

- Resulting Severe Error Rates:
  - SWCCS:  $34\% = 28\% + 6\%$
  - LUCCS:  $24\% = 19\% + 5\%$

# Using high school achievement can result in fewer misplacements

**Predicted Severe Error Rate (Sum of Under- and Over-Placements) and College-Level Course Success by Assessment Method**

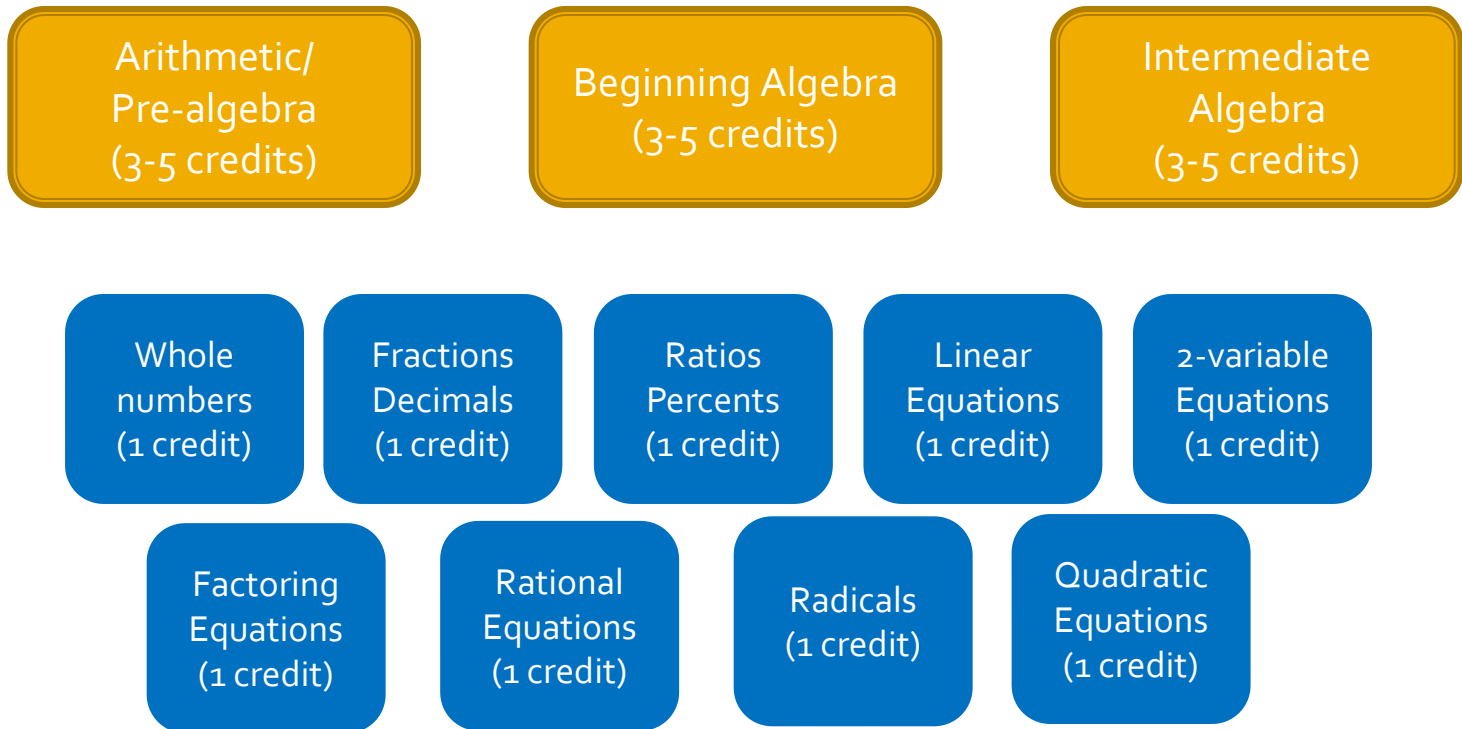


# ***Case Study:* Reforms to Assessment and Placement in the Virginia Community College System**



# The Virginia Developmental Math Reform

- Redesigned developmental math curricula into one-credit modules.

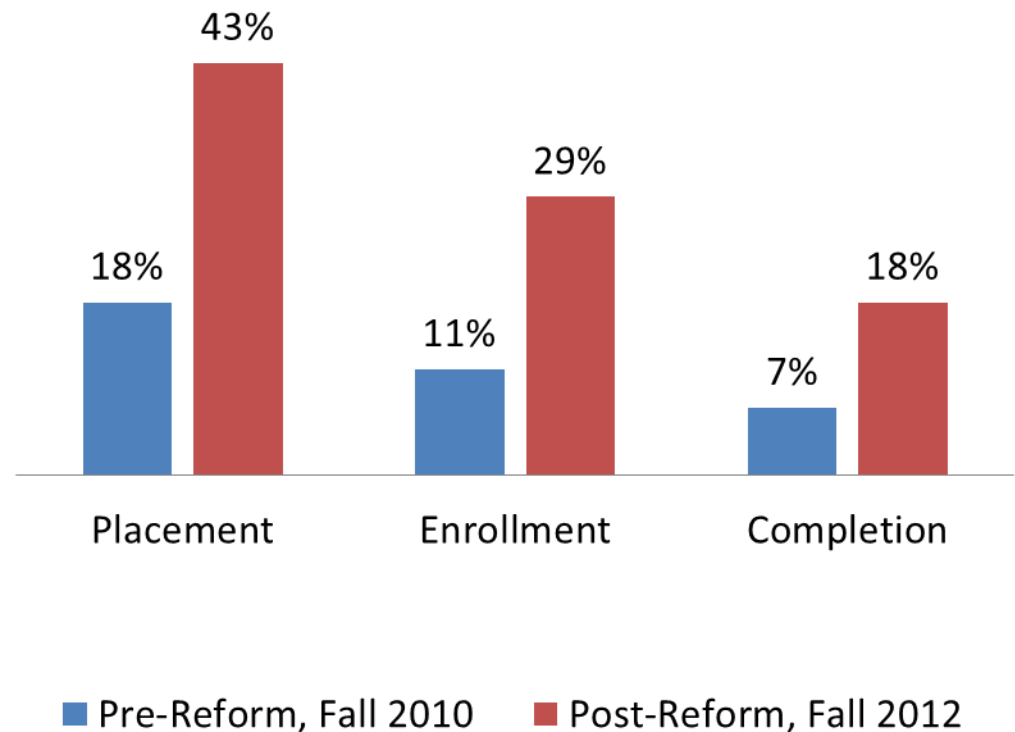


- Introduced a customized diagnostic assessment to place students into individual modules.

# More Students Placing, Enrolling and Successfully Completing College Math

- After the introduction of the VPT-Math:

- College Math **placement** more than doubled
- College Math **enrollment** more than doubled
- Among those who placed and enrolled, average **pass rates** declined from 69% to 62%
- But overall, increasing access to college math resulted in more than twice as many students **successfully completing** college math within one-year



# For more information:

Please visit us on the web at  
<http://ccrc.tc.columbia.edu>,  
where you can download presentations, reports,  
*CCRC Briefs*, and sign-up for news announcements.

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# LOST IN TRANSITION

DOCUMENTED PROBLEMS WITH ASSESSMENT AND PLACEMENT  
POLICIES AND PRACTICES IN DEVELOPMENTAL MATH SEEM TO  
DISPROPORTIONALLY AFFECT STUDENTS OF COLOR

Testing and Beyond: The Future of College Math Placement in California  
Learning Works  
Oakland, November 10, 2015

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This research was funded by a grant from the U.S. Department of  
Education's Institute of Education Sciences (IES).



# Problem Statement

- Every year about 80 percent of community college students in California are placed into preparatory mathematics. This percentage is higher than the national average.
- Community college students have widely varying initial skills levels
- Colleges have to offer classes to meet these levels and have to keep heterogeneity in the classrooms manageable
- Placing students incorrectly can reduce the likelihood that students succeed

# Literature on Inequities in Placement by Race and Ethnicity

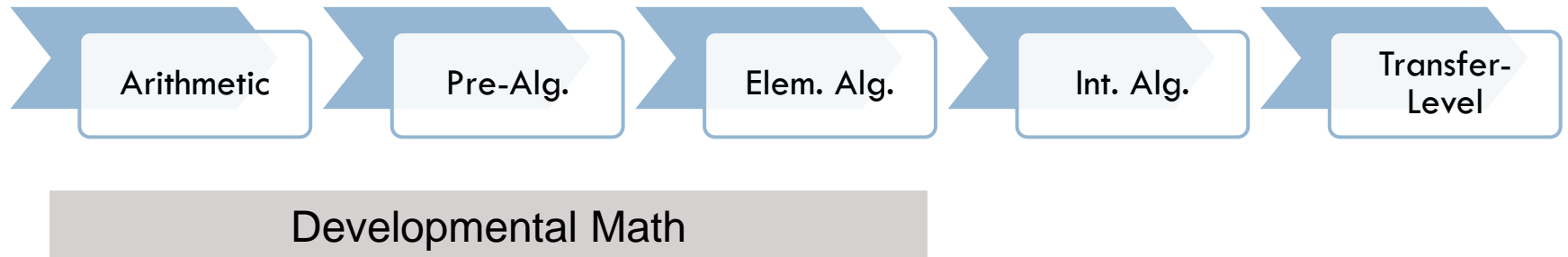
- Potential explanations for the over-representation of students of color in basic skills courses
  - Students of color on average attend lower-quality high schools (Fryer & Levitt, 2004; Ladson-Billings & Tate, 1995)
  - Students lack awareness of the A&P process and consequences of performance on tests (Bunch, Endris, Panayotova, Romero, & Llosa, 2011; Venezia, Bracco, & Nodine, 2010)
  - Commercially developed tests are not placing students correctly (Scott-Clayton, Crosta & Belfield, 2014; Melguizo et al., 2015; Ngo & Melguizo, 2015)

# Setting

Large Urban Community College District - a natural laboratory

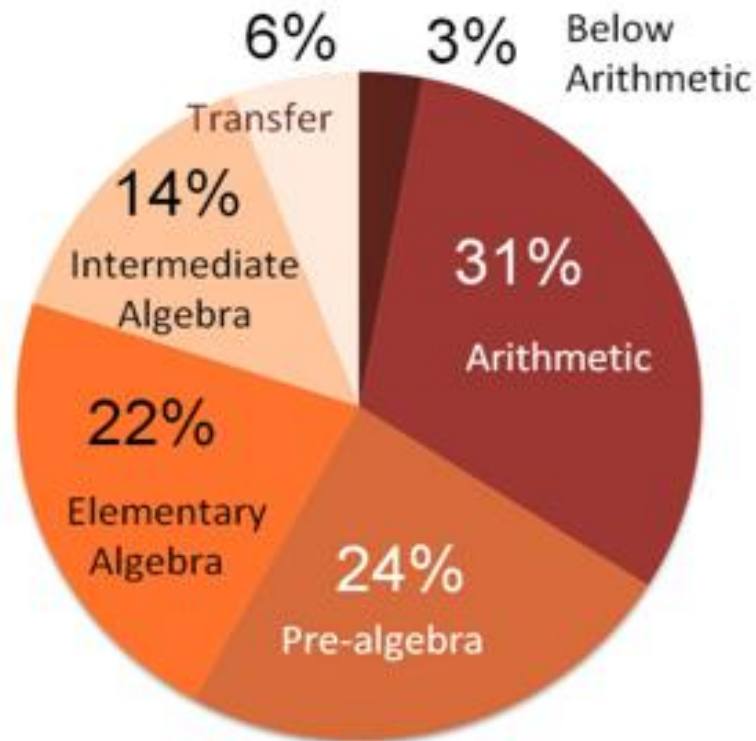
- Diverse student population that varies by college
- Nine colleges with 130,000 plus students
- “Common data system”
- Large number of observations.
- Presumption of representativeness—likely to capture the wide variation across community colleges in the United States.

# Developmental Math Sequence





# Remediation needs of LUCCD students



# How are community college students assessed and placed in math at LUCCD?



1. Student enters the assessment and placement office.



2. Student fills out requisite paperwork.



3. He or she either takes the computer adaptive test (ACCUPLACER or COMPASS) or the diagnostic placement test (MDTP).



6. Students are placed into a level of math based on their adjusted score.



5. Students' scores on the assessment sub-test are combined with any points they are awarded via multiple measures.



4. He or she fills out the background questionnaire which is used to award additional multiple measure points.



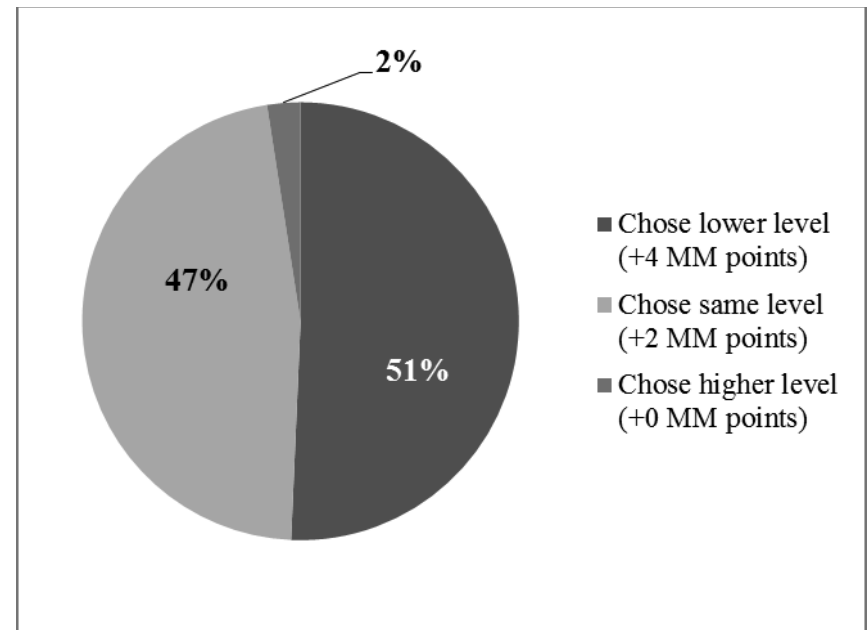
7. Students decide whether or not to enroll.



50% of students chose a test that could place them in a course below the last math course they passed in high school

Diagnostic Tests such as MDTP allow students to choose the sub-test to take instead of using a branching system as commercially developed tests

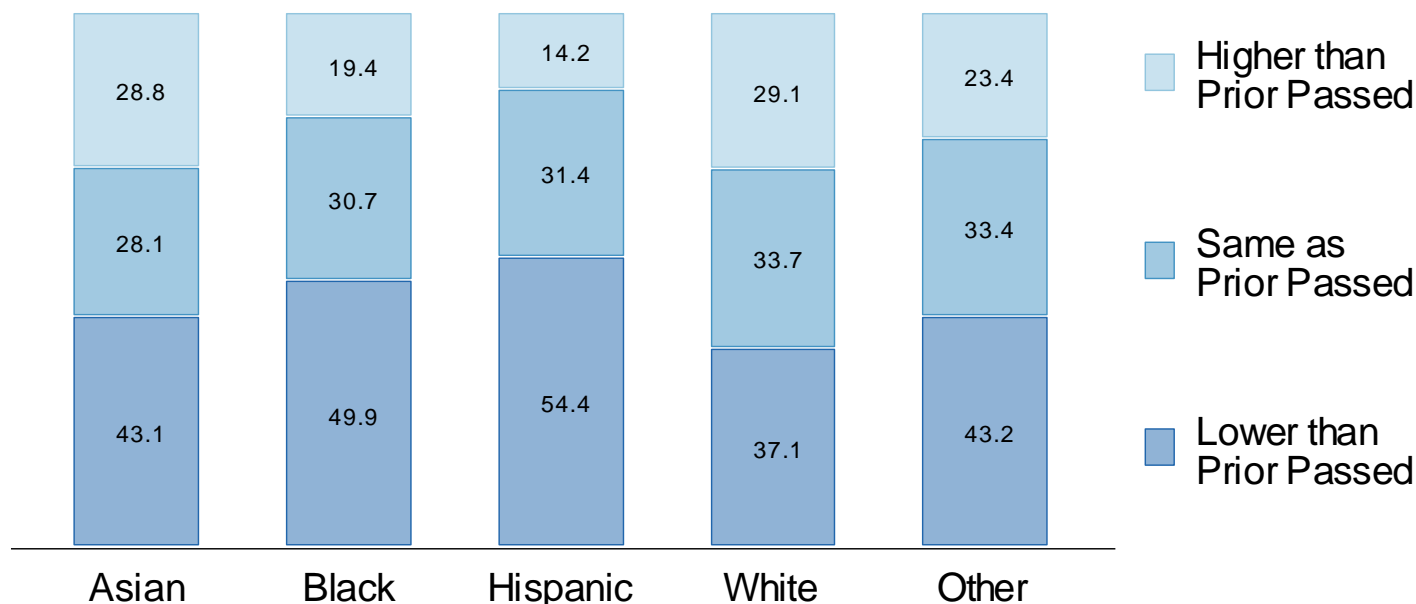
We analyzed the data for students in one community college and found that over 50% chose a sub-test which could place them at a lower-level math than the one completed in high school



A substantial proportion of students are placed in developmental math courses below the last course taken in high school

## College Math Level Placement vs. Highest Math Level Passed Prior to College

Colleges B, D, F, G, H  
(Assessed 2005-2008, First Enrolled 2005-2011)

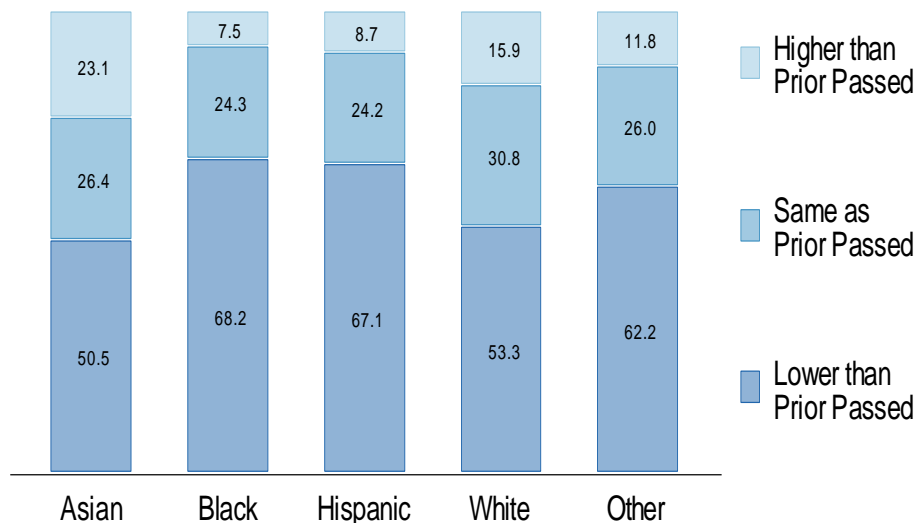


*Note.* Source: District's student background questionnaire and administrative data (Highest level math completed with a C or better?). Assumes California math sequence order ([www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf](http://www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf)): Algebra I, Geometry, Algebra II, Trigonometry, Calculus.  $\chi^2(8, n = 42334) = 1296, p < .001$  (Pearson's  $\chi^2$  test for independence among categories).

# There is substantial variation by college

## College Math Level Placement vs. Highest Math Level Passed Prior to College

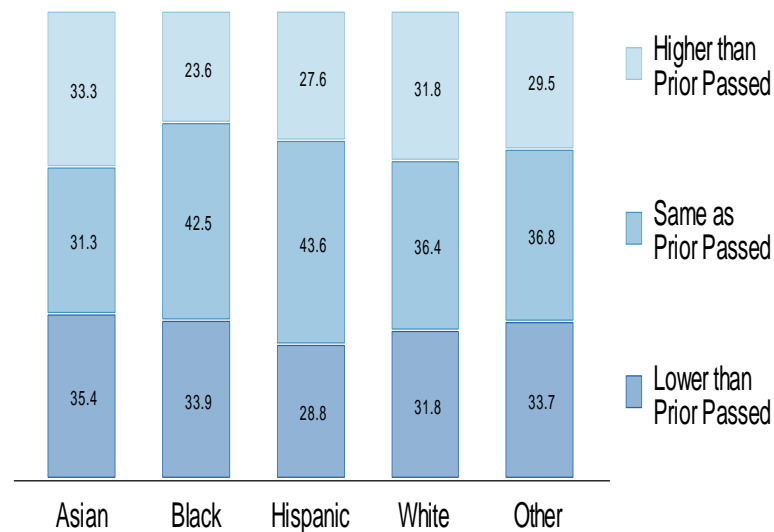
College G  
(Assessed 2005-2008, First Enrolled 2005-2011)



Note. Source: District's student background questionnaire and administrative data (Highest level math completed with a C or better?). Assumes California math sequence order ([www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf](http://www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf)): Algebra I, Geometry, Algebra II, Trigonometry, Calculus.  $\chi^2(8, n = 13371) = 387, p < .001$  (Pearson's  $\chi^2$  test for independence among categories).

## College Math Level Placement vs. Highest Math Level Passed Prior to College

College H  
(Assessed 2005-2008, First Enrolled 2005-2011)



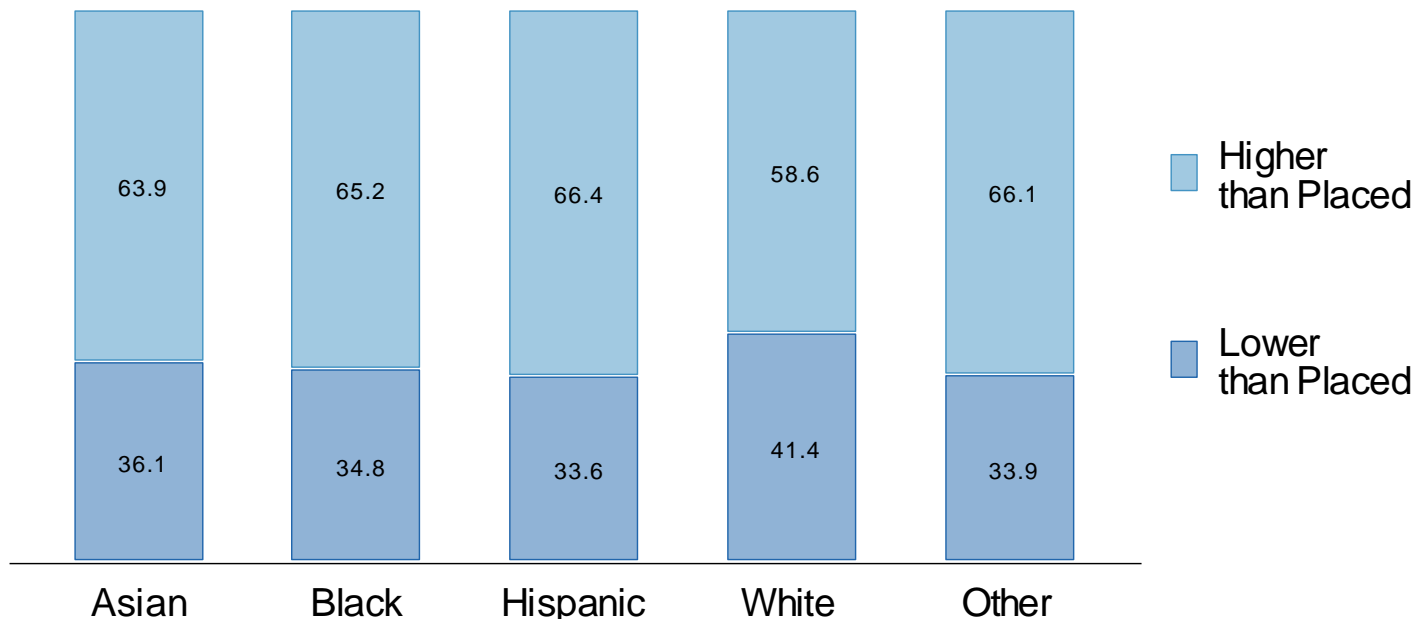
Note. Source: District's student background questionnaire and administrative data (Highest level math completed with a C or better?). Assumes California math sequence order ([www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf](http://www.cde.ca.gov/be/st/ss/documents/mathstandards.pdf)): Algebra I, Geometry, Algebra II, Trigonometry, Calculus.  $\chi^2(8, n = 8264) = 83, p < .001$  (Pearson's  $\chi^2$  test for independence among categories).



# In addition to low placements over 30% of the non-compliers attempted a lower level course

## Attempted Math Level Among Placement Non-Compliers

Colleges B, D, F, G, H  
(Assessed 2005-2008, First Enrolled 2005-2011)

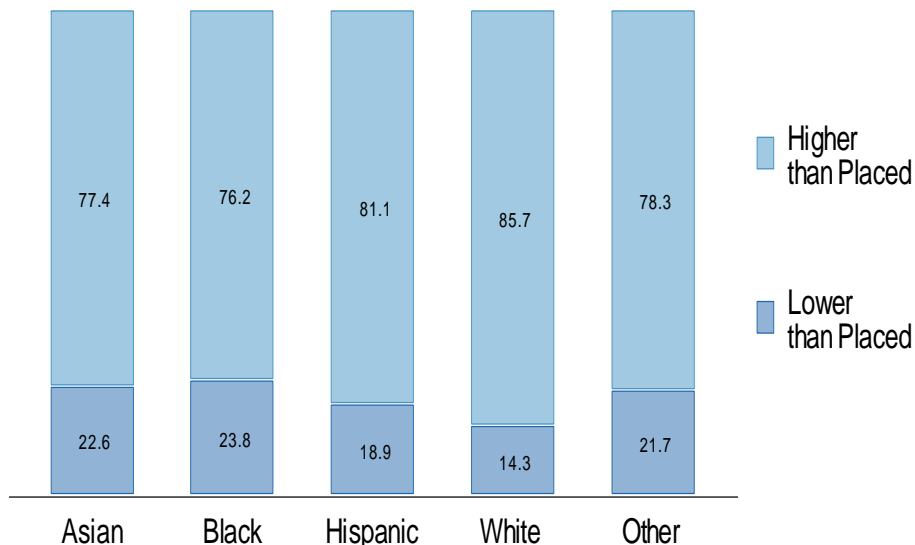


*Note.* Source: District's student background questionnaire and administrative data. Based on first math enrollment after assessment. "Higher than placed" if student enrolled in a higher level than placed. "Lower than placed" if student enrolled in a lower level than placed. Vast majority of students were in compliance with placement. Large variation among colleges. Low statistical significance level resulting from small sample size:  $\chi^2(4, n = 3385) = 12$ ,  $p < .05$  (Pearson's  $\chi^2$  test for independence among categories).

# Substantial variation by college that might be related to counseling

## Attempted Math Level Among Placement Non-Compliers

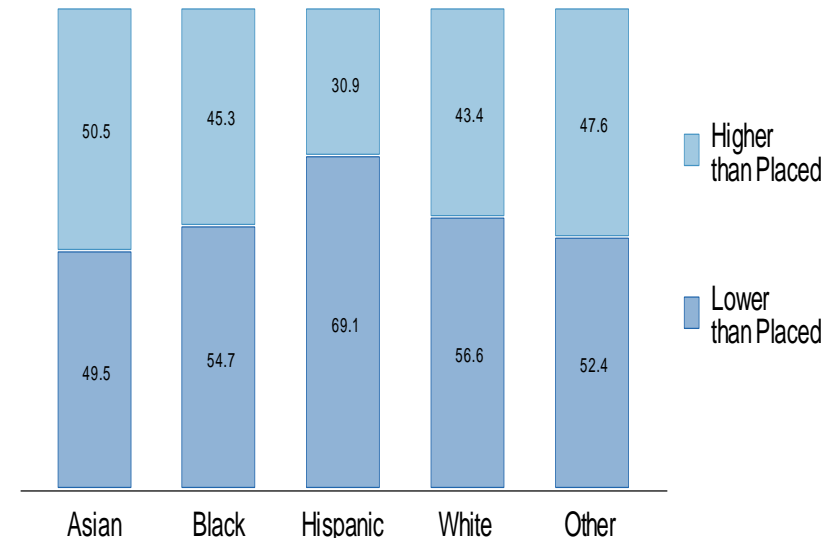
College G  
(Assessed 2005-2008, First Enrolled 2005-2011)



Note. Source: District's student background questionnaire and administrative data. Based on first math enrollment after assessment. "Higher than placed" if student enrolled in a higher level than placed. "Lower than placed" if student enrolled in a lower level than placed. Vast majority of students were in compliance with placement. Large variation among colleges. Low statistical significance level resulting from small sample size:  $\chi^2(4, n = 843) = 2$ ,  $p = .8200000000000001$  (Pearson's  $\chi^2$  test for independence among categories).

## Attempted Math Level Among Placement Non-Compliers

College H  
(Assessed 2005-2008, First Enrolled 2005-2011)

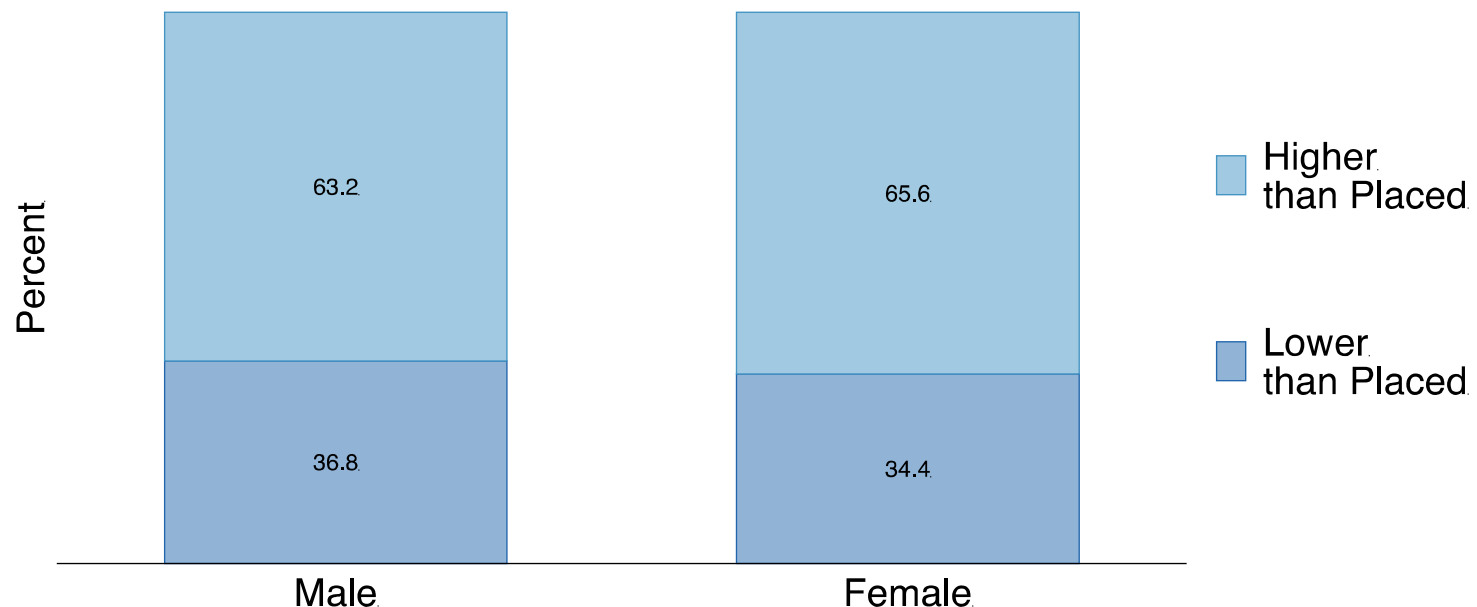


Note. Source: District's student background questionnaire and administrative data. Based on first math enrollment after assessment. "Higher than placed" if student enrolled in a higher level than placed. "Lower than placed" if student enrolled in a lower level than placed. Vast majority of students were in compliance with placement. Large variation among colleges. Low statistical significance level resulting from small sample size:  $\chi^2(4, n = 652) = 16$ ,  $p < .01$  (Pearson's  $\chi^2$  test for independence among categories).

# There were no differences in courses attempted of non-compliers by gender

## Attempted Math Level Among Placement Non-Compliers

Colleges B, D, F, G, H  
(Assessed 2005–2008, First Enrolled 2005–2011)



Source: District's student background questionnaire and administrative data. Based on first math enrollment after assessment. "Higher than placed" if student enrolled in a higher level than placed. "Lower than placed" if student enrolled in a lower level than placed. Vast majority of students were in compliance with placement. Large variation among colleges. Low statistical significance level resulting from small sample size:  $\chi^2(1, N = 3383) = 2, p = .15$  (Pearson's  $\chi^2$  test for independence among categories).

The inclusion of multiple measures can increase access w/out decreasing student success (Ngo & Kwon, 2015)

College	Academic Background			College Plans	Motivation
	HS Diploma/GED	HS GPA	Prior Math		
A			✓		
B		✓	✓	✓	
C					
D			✓		
E		✓			
F				✓	✓
G		✓	✓	✓	
H		✓			
J	✓		✓		✓

# Findings

- Only 6% of the students benefitted from multiple measures at the LUCCD
- Major benefits for African American and Latino students who could enroll in higher-level math courses
- No evidence that “boosted” students were less likely to complete the course
  - ▣ Performed at similar levels to similar-scoring and higher-scoring peers



# Conclusions

- The state's community colleges are moving in the right direction in terms of using high school transcript information to inform the assessment and placement policies and practices in developmental math.
- California colleges have been and can continue to lead the way in terms of effectively using “multiple measures” to improve placement in particular for students of color

# Other Relevant Work

- Melguizo, T., Kosiewicz, H., Prather, G., & Bos, J. (2014). How are community college students assessed and placed in developmental math? Grounding our understanding in reality. *Journal of Higher Education*, 85(5), 691-722.
- Melguizo, T., Bos, H., Ngo, F., Mills, N., & Prather, G. (2015, available online). Using a regression discontinuity design to estimate the impact of placement decisions in developmental math. *Research in Higher Education*.
- Fong, K., Melguizo, T., & Prather, G. (2015). Increasing success rates in developmental math: The complementary role of individual and institutional characteristics. *Research in Higher Education*.
- Ngo, F. & Melguizo, T. (2015, available online). How can placement policy improve math remediation outcomes? Evidence from experimentation in community colleges. *Educational Evaluation and Policy Analysis*.

Policy Briefs and Working Papers available at:

<http://www.uscrossier.org/pullias/research/projects/sc-community-college/>



THANK YOU!

Questions

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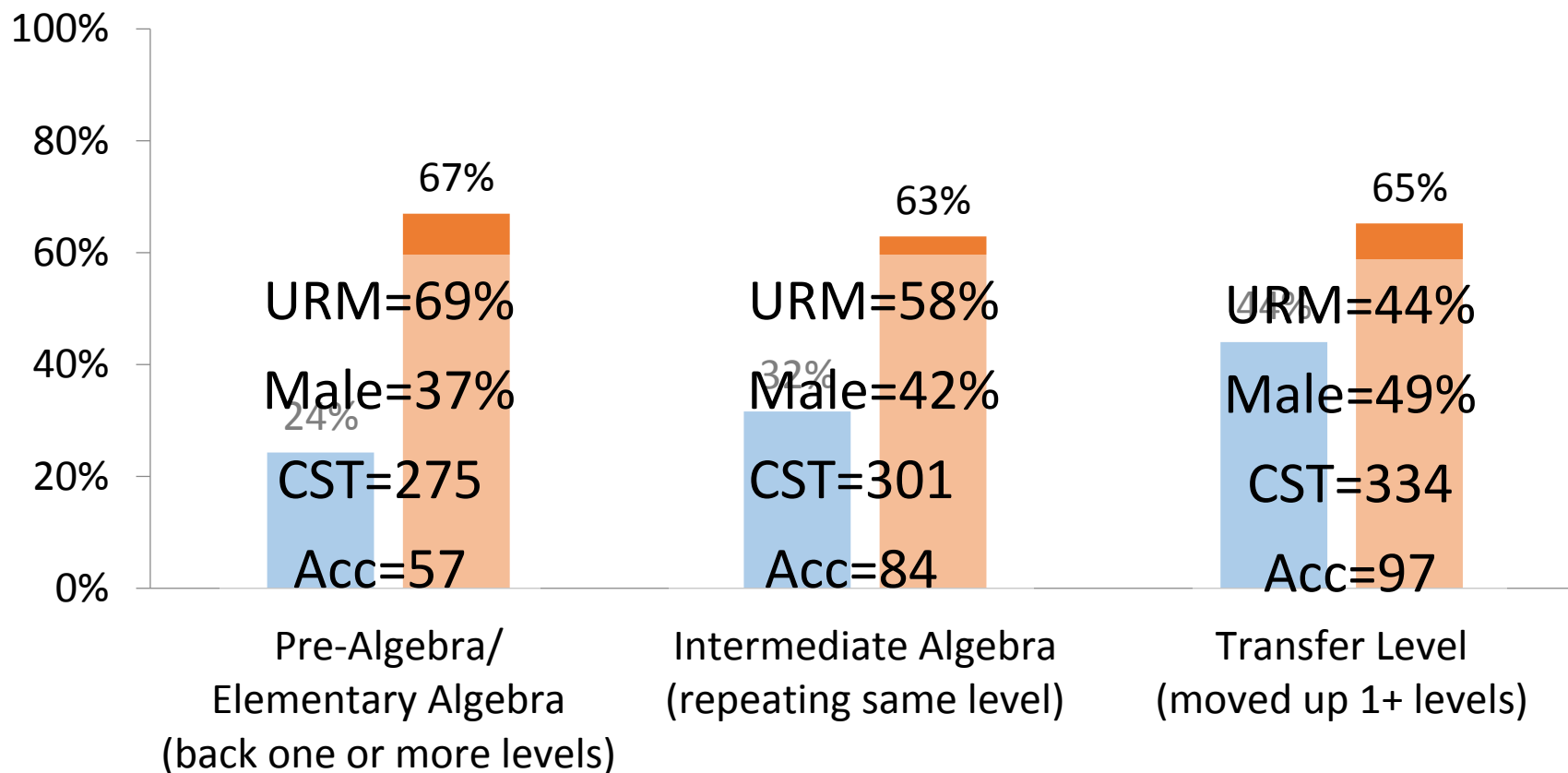
<http://www.uscrossier.org/pullias/research/projects/sc-community-college/>

# Enhanced Multiple Measures for Math Placement

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Director of Planning and Research  
Cabrillo College  
November 10, 2015

$$y = f(x)$$

# **Level of and Success (C or better) in First College Math for Students whose Last High School Course was Algebra 2 with Grade of B or Better (n=35,806)**



## **Level of First Community College (CC) Course**

- Percent enrolled in course at community college
- Success rate in course at community college



# MMAP Project Overview

- Collaborative effort of CCCCCO Common Assessment Initiative (CAI) designed to develop, pilot, and assess implementation of placement tool using multiple measures through joint efforts of Cal-PASS Plus, RP Group and now 28 CCCs
- Develop multiple measures models for English and Mathematics and, in 2015-2016, Reading and ESL
- Identify, analyze and validate multiple measures data, including high school transcript data, non cognitive variable data, and self-reported HS transcript data
- Engage pilot colleges to conduct local replications, test models and pilot their use in placement, and provide feedback
- [bit.ly/MMAP2015](http://bit.ly/MMAP2015)

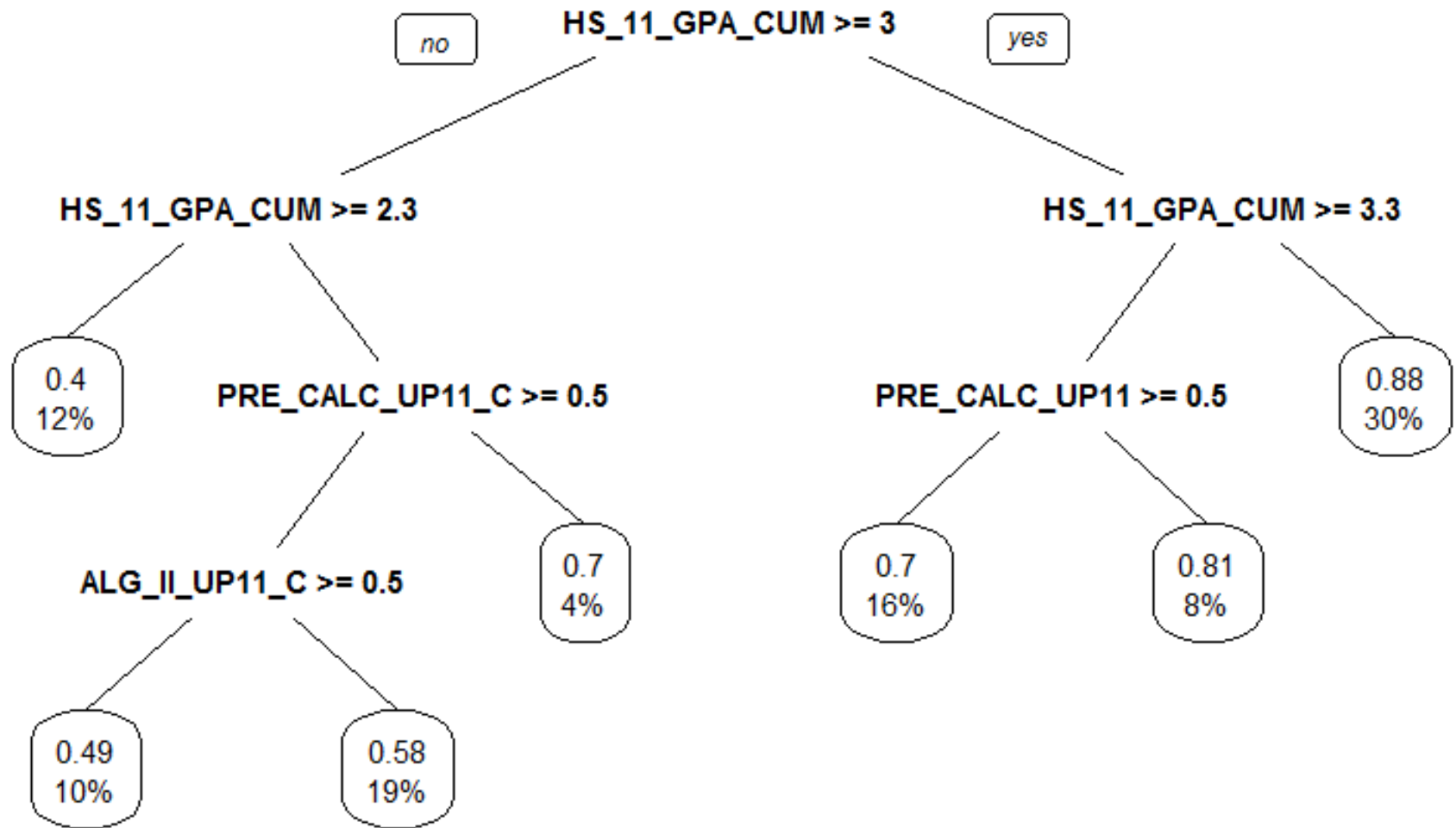
# Tests Predict Tests, Grades Predict Grades\*

Simple correlations with community college success rates  
(grade of C or better)

Math	11 <sup>th</sup> Grade GPA	Accuplacer
Transfer - STEM	0.24	0.19
Transfer – Stats	0.31	0.16
Transfer – LAM	0.26	0.09
1 level below	0.28	0.21
2 levels below	0.26	0.11
3 levels below	0.23	0.11
4 levels below	0.19	0.05

\* with some caveats for higher level math

# Statistics Tree – Direct Matriculants



# Transfer Level Placement Rules for Non-Direct Matriculants

(delay of at least one year between high school and college)

## Statistics

- Cumulative high school GPA through 11<sup>th</sup> grade  $\geq 3.0$ 
  - OR
- Cumulative high school GPA through 11<sup>th</sup> grade  $\geq 2.3$  AND C or better in high school PreCalculus

## Pre-Calculus

- HS GPA  $\geq 3.3$ 
  - OR
- HS GPA  $\geq 3$  AND Algebra II CST  $\geq 340$

# Applying Multiple Measures

## **Disjunctive Placement**

Test score

OR

High School Transcript

OR

AP score

OR

EAP

## **Conjunctive Placement**

Test score

AND

(High School Transcript

OR

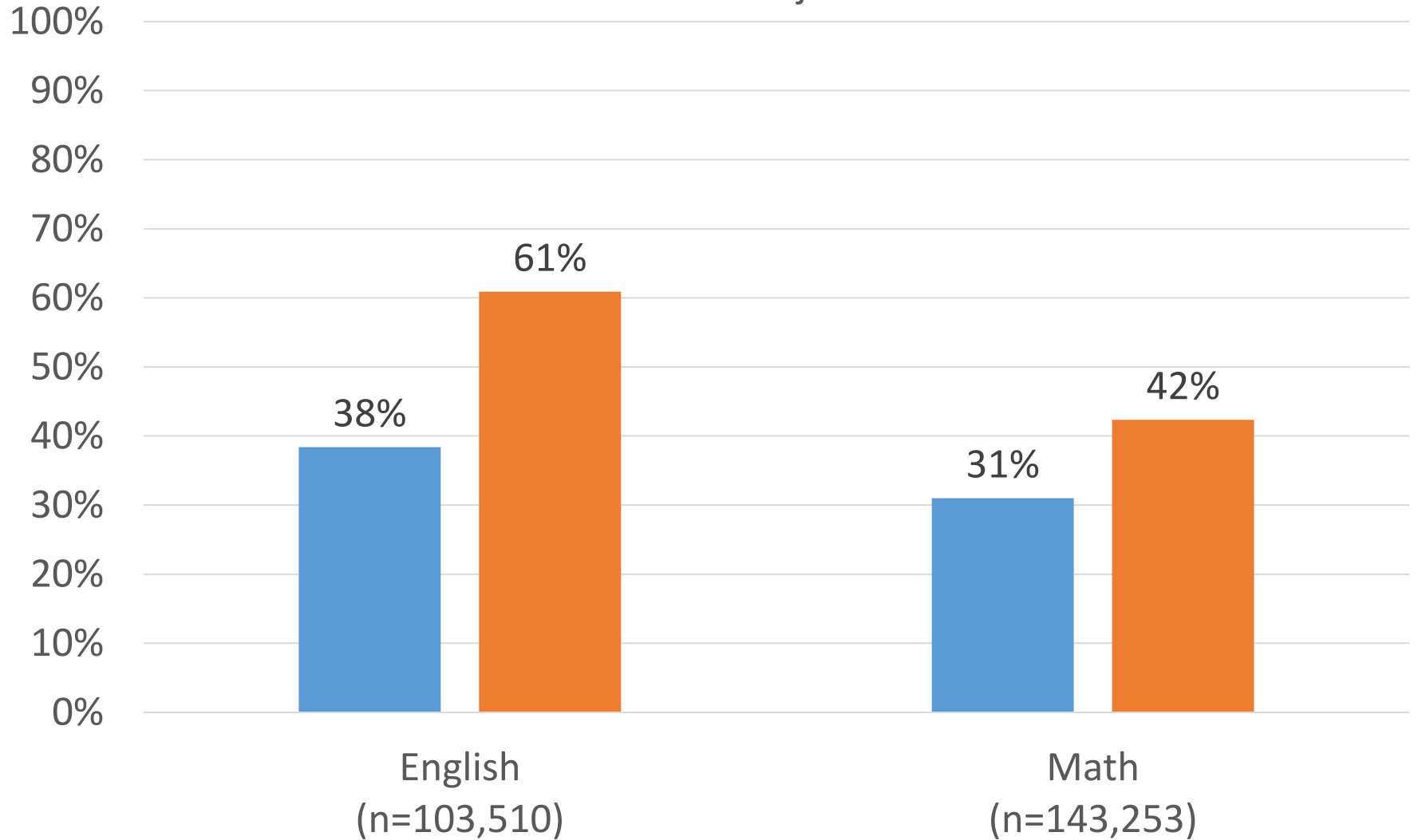
AP score

OR

EAP)

# Transfer Level Placement

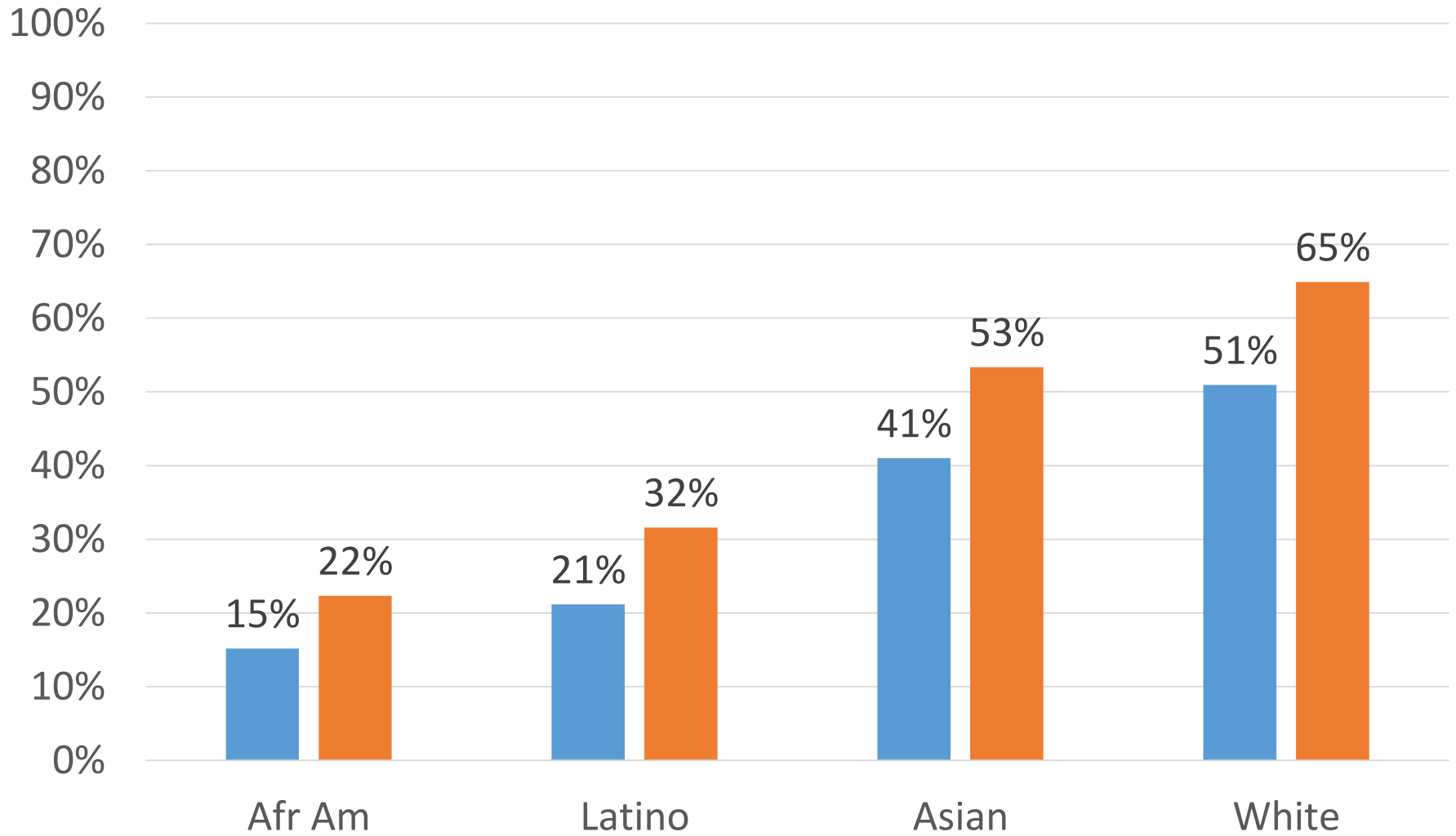
■ Current      ■ Disjunctive MM





# Transfer Level Math Placement

■ Current      ■ Disjunctive MM



# For questions

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Multiple Measures Assessment Project

<http://rpgroup.org/projects/multiple-measures-assessment-project/pilot-college-resources>

Common Assessment Initiative

<http://cccassess.org/>

# MATH READINESS:

## Seeking a Shared Definition

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WestEd

DISCUSSANTS:  
**EVELYN YOUNG SPATH**  
CSU-Bakersfield

**BRUCE YOSHIWARA**  
Pierce College (retired)



# Alignment of Math Competencies

**WestEd Analysis of the Common Core, ICAS, CSU, and CCC Standards**

# Comparing Descriptions of Standards and Competencies

- **Common Core State Standards Clusters, by Grade**
- **Intersegmental Committee for the Academic Senate (ICAS) Statements of Competencies**
- **California State University Entry Level Mathematics Examination (ELM) Topics List**
- **California Community Colleges' Common Assessment Initiative (CCCAssess) Assessment Competencies**

# Degrees of Consistency

## Pre-High School

- Common Core, ELM, and CCCAssess focus on the same core set of standards
- Both college tests are more focused on basic math skills and number sense than ICAS

## High School

- Common Core, ICAS, ELM, and CCCAssess all put a heavy emphasis on algebra and functions
- Differences emerge in geometry and statistics



# Areas of Inconsistency

## Geometry

- Common Core and ICAS focus on a broader range of topics than the college tests
- ELM tests geometry concepts in more contexts than CCCAssess (geometric theorems in conjunction with the coordinate plane and algebra, compared to application of volume formulas and trigonometry)

## Statistics

- Common Core and ICAS focus on a broader range of topics than the college tests
- The statistics standards for ICAS, ELM, and CCCAssess do not align
- ELM tests more statistics concepts than CCCAssess



# Ongoing Discussion

## CCCAssess

- The test is still under development

## ELM

- CSU plans to re-evaluate the ELM beginning in 2016
- CSU also plans to update its quantitative reasoning requirement over the next 2-3 years

# BREAKOUT DISCUSSIONS:

## Math Readiness

**ORANGE** | toward entrance

Facilitator: KATHY BOOTH  
WestEd

**GREEN** | toward windows

Facilitator: ELISHA SMITH ARRILLAGA  
Career Ladders Project

# ENHANCING PLACEMENT:

## Using High School Transcripts

LONG BEACH

**ROBERT TAGORDA**

Long Beach Unified School District

**LAUREN SOSENKO**

Long Beach City College

BAKERSFIELD

**VICKIE SPANOS**

Kern High School District

**JANET FULKS**

Bakersfield College

# Promise Pathways: Multiple Measures at Long Beach City College

Lauren Sosenko

Director of Institutional Research

lsosenko@lbcc.edu

November 10, 2015



# LBCC's Promise Pathways: Background

Promise Pathways is a first year experience program for students matriculating directly from high school

- Alternative assessment using multiple measures
- Prescriptive scheduling emphasizing full-time enrollment and early completion of basic skills courses
- Priority registration
- Achievement coaches

Note: Students may now get alternative placement without signing up for Promise Pathways

# Alternative Assessment

- Analysis revealed high school performance dramatically predicts success in college courses.
- Traditional placement ignored high school performance relying only on standardized assessment exam (Accuplacer).
- Devised a new assessment model that leveraged the predictive utility of multiple measures of student achievement.

Built upon partnerships





## Critical faculty voice



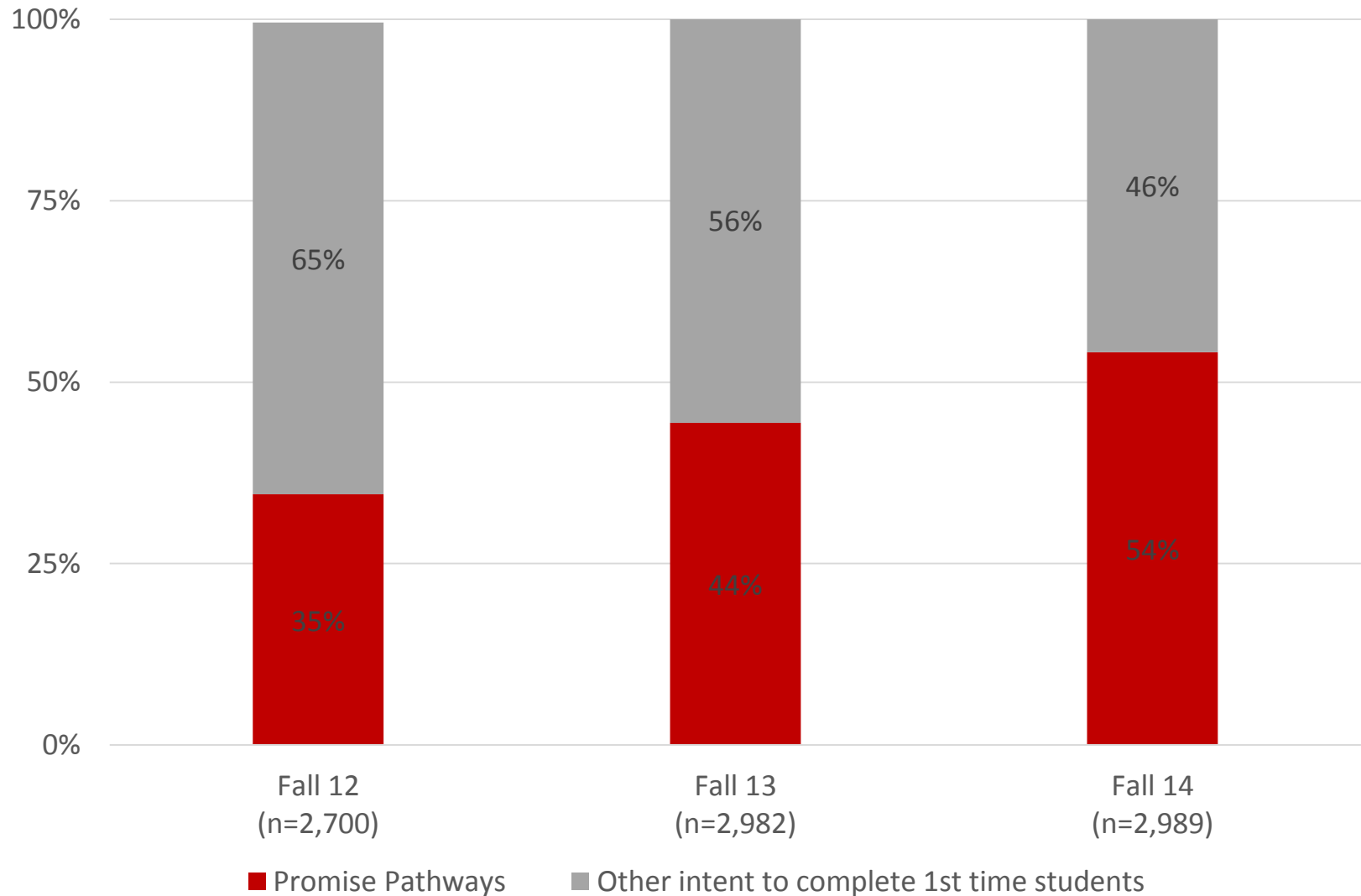
# Math Placement Criteria

Math alternative placement criteria has stayed relatively stable over the four cohort years. Students' alternative placement is based upon:

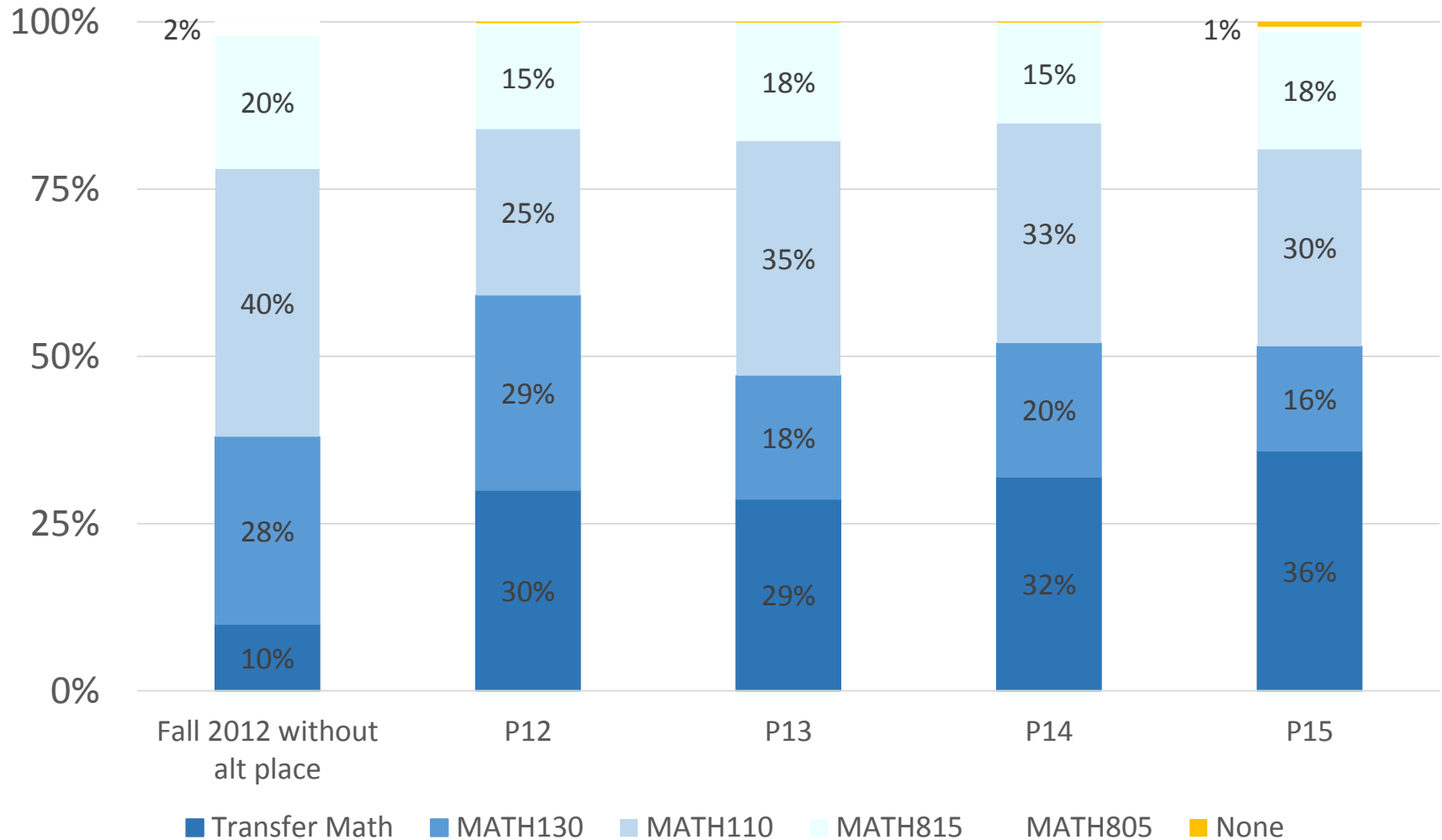
- high school GPA,
- highest-level math course in high school,
- grade in the highest-level math course, and
- California State Test (CST) proficiency level

*Used highest score: Accuplacer assessment results or the alternative placement score*

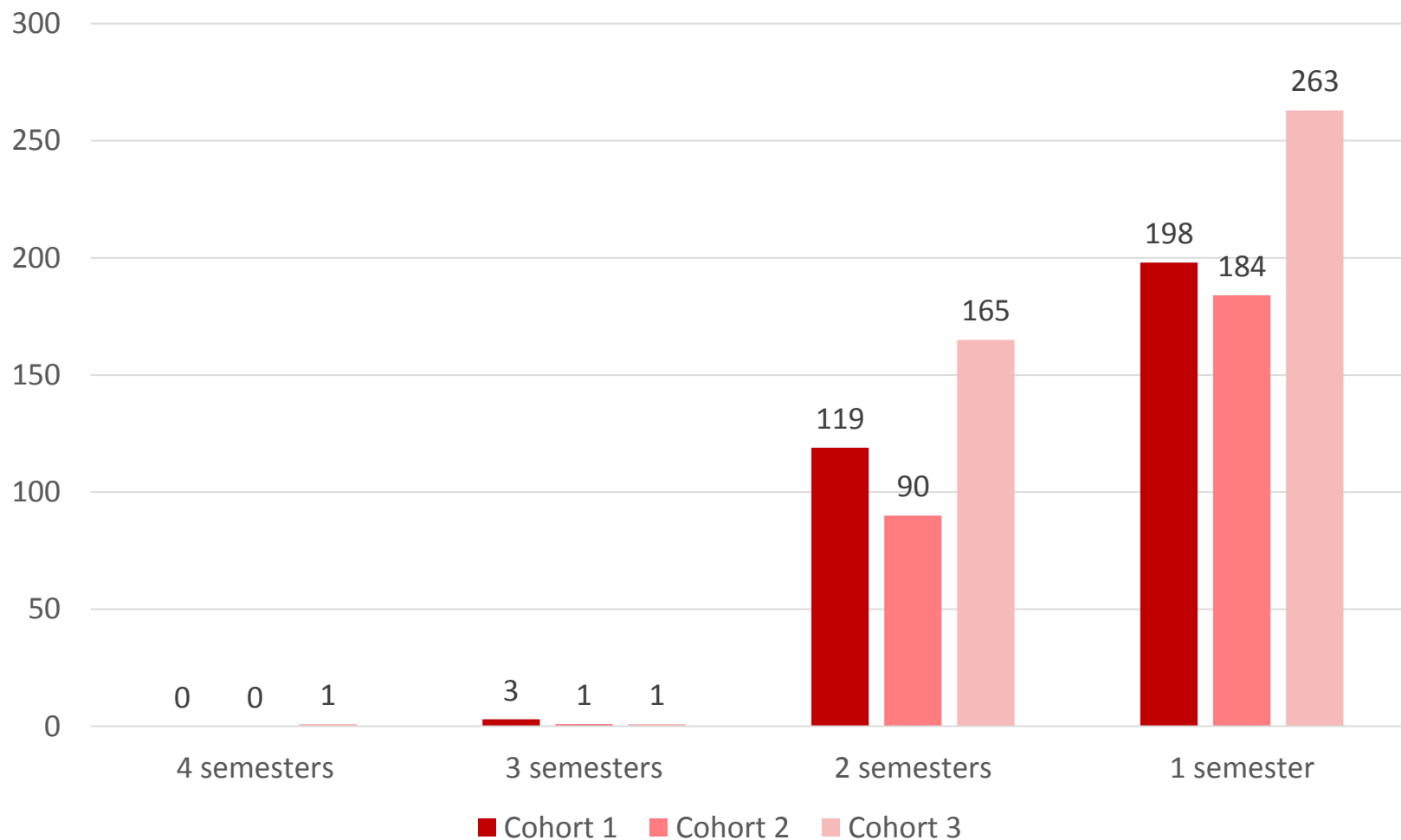
# % of all 1<sup>st</sup> time intent to complete students participating in alternative placement by fall term



# Transfer math placements are slightly rising



# Number of students moved via alternative placement by the number of semesters in math



# How can we best study the Promise Pathways outcomes?

## Matched comparison group looks like Promise Pathways group

- LBUSD students from fall 2011, 2010, and 2009
- HS GPA
- English CST proficiency
- Algebra II in HS
- # of units attempted at LBCC during 1<sup>st</sup> term (at least 9 units)



Cohort 1 – 785

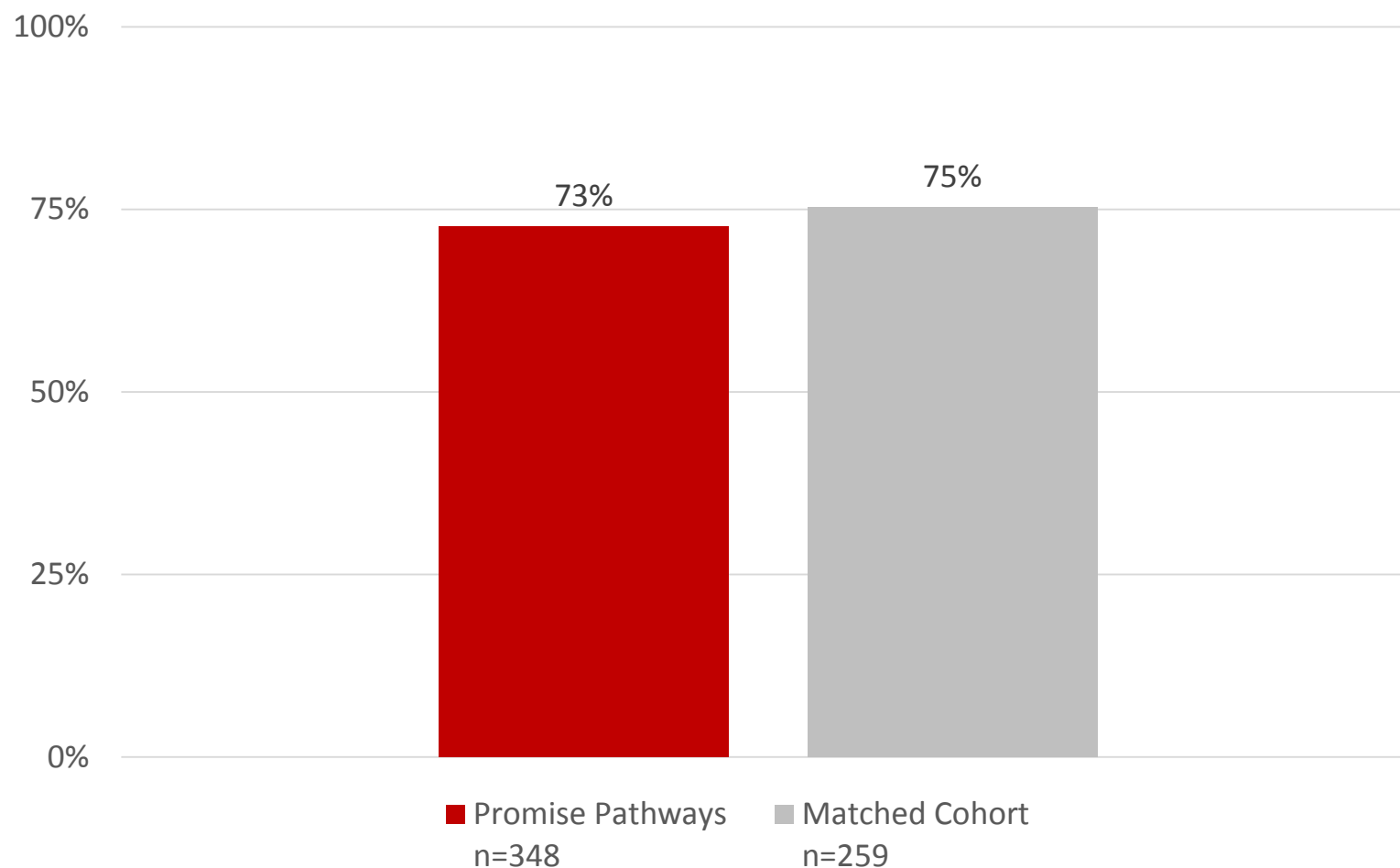
Cohort 2 – 891

Cohort 3 – 998

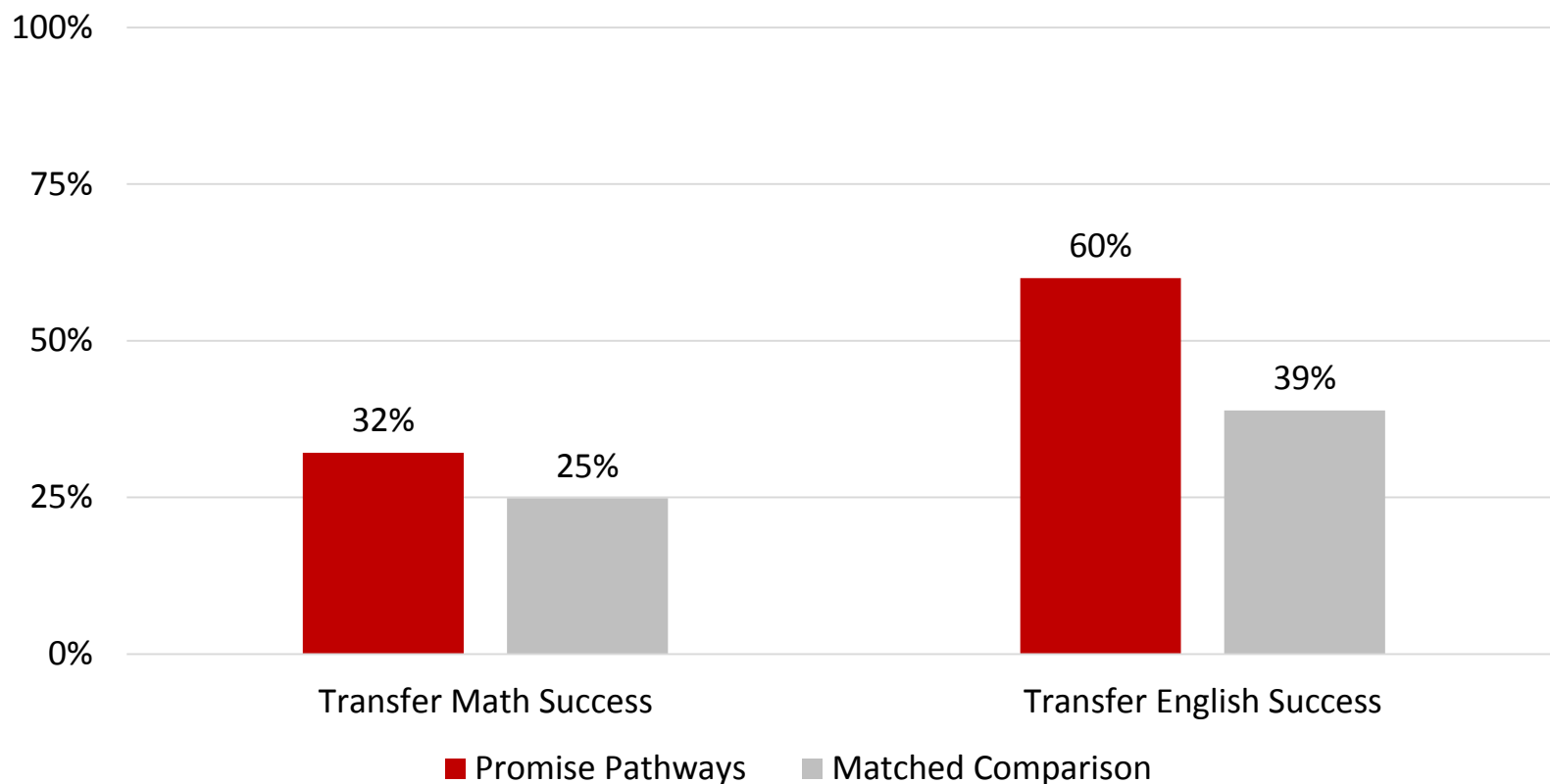
*Only LBUSD students due to  
data availability*



Promise Pathways students successfully complete transfer-level math at similar rates as similar students

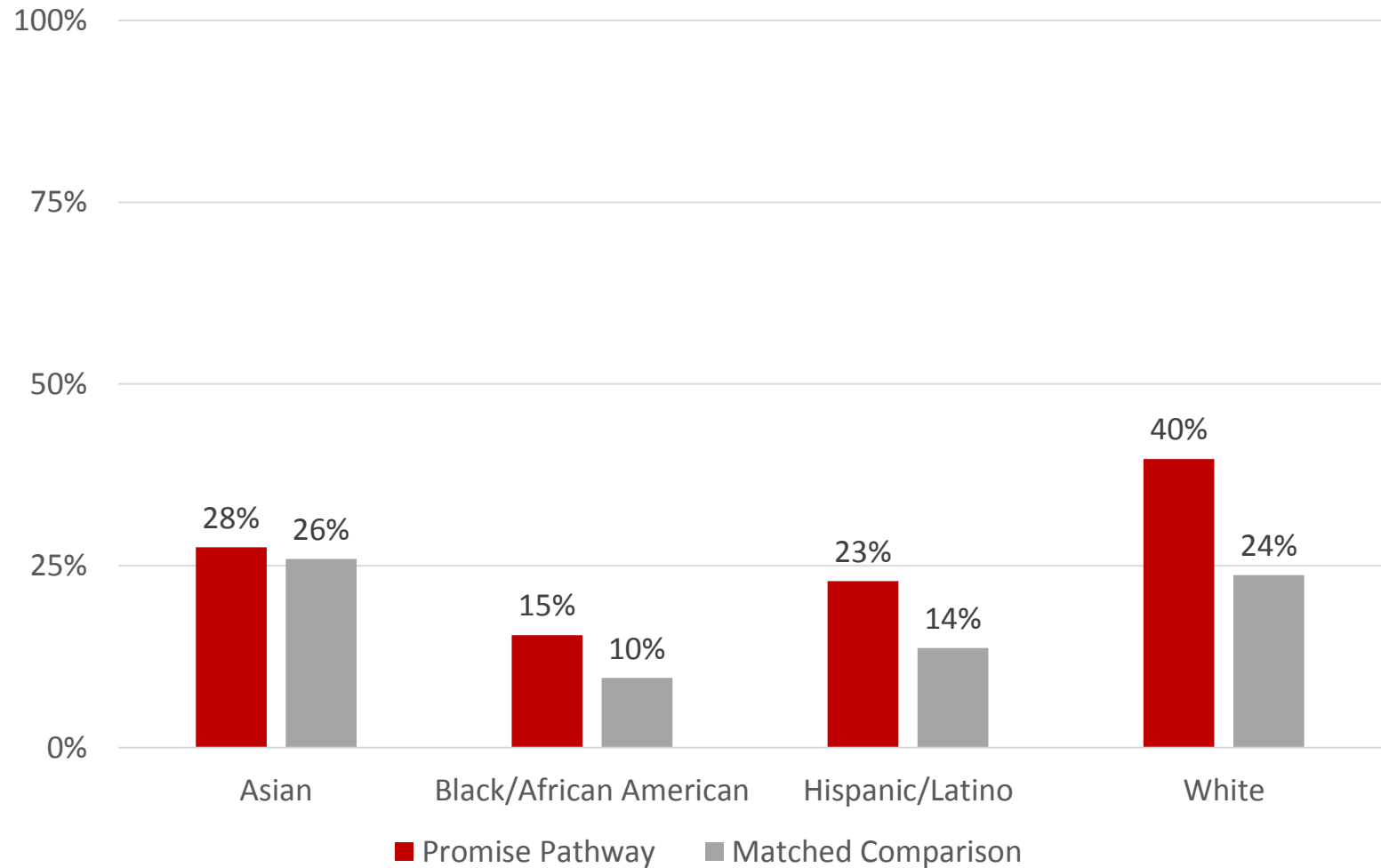


# % Promise Pathway and matched comparison students who successfully completed transfer-level courses in math and English within three years

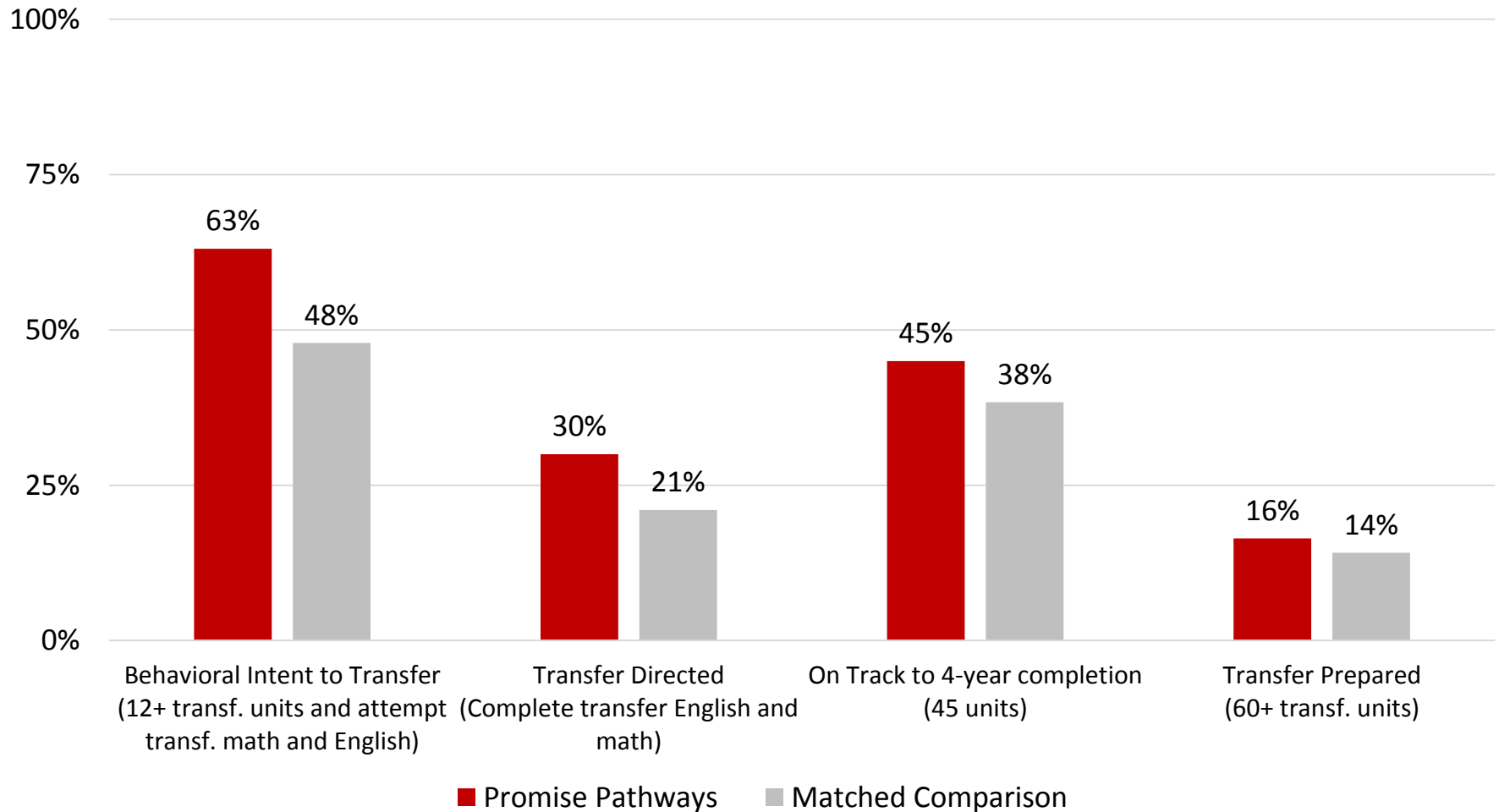




% of Promise Pathway and matched comparison students who successfully completed transfer-level courses in math within three years by ethnicity



By the end of their 3<sup>rd</sup> year, Pathway students are more successful in achieving milestones than similar students



# SEIZING THE 12TH GRADE:

## Supporting Math Readiness

EAP SENIOR YEAR MATH COURSE

**JOHN MONTGOMERY**

Roseville Joint Union High School District

**PAUL NEAL**

Sierra College

**RAVIN PAN**

Sacramento State University

SOUTH LOS ANGELES (SLAM) PROJECT

**ROBERT BOSLEY**

Santee Education Complex, LAUSD

**KRISTIN WEBSTER**

CSU Los Angeles

# EAP Senior Year Mathematics Course

- Origin
- Content
  - Problem solving
  - Linear
  - Quadratic
  - Systems of Equations and Inequalities
  - Exponential
  - Logarithm
  - Absolute Value and Piecewise
  - Math of Finance
- Scaling Up

# Participating Schools

<u>Participating District</u>	<u>Participating High School</u>
Placer Union High	Del Oro High School
Western Placer	Lincoln High School
Roseville Joint Union	Antelope Creek High School
	Granite Bay High
	Oakmont High
	Roseville High
	Woodcreek High
Rocklin Unified	Whitney High School

# High School EAP Data

**Students who took the EAP Math course and enrolled at Sierra College :**

	2013-2014	2014-2015
Placer Union`	22	17
Rocklin Unified	5	19
Roseville Joint Union	1	22
Western Placer Unified	5	2

# Preliminary Outcomes Data

## Course Success Rate at Sierra College

		STEM Math	Non-STEM Math	Overall
2013-14	EAP Course Completers	50%	64%	56%
	Non-EAP Students	55%	74%	61%
2014-15	EAP Course Completers	64%	73%	69%
	Non-EAP Students	55%	74%	61%
Summer '15	EAP Course Completers	67%	88%	79%
	Non-EAP Students	60%	76%	66%

STEM math course = College Algebra, Trigonometry, Int Algebra, *Pre-Calculus*, *Calculus I or II*

Non-STEM math course = Statistics, Concepts of Mathematics, *Modern Business Mathematics*

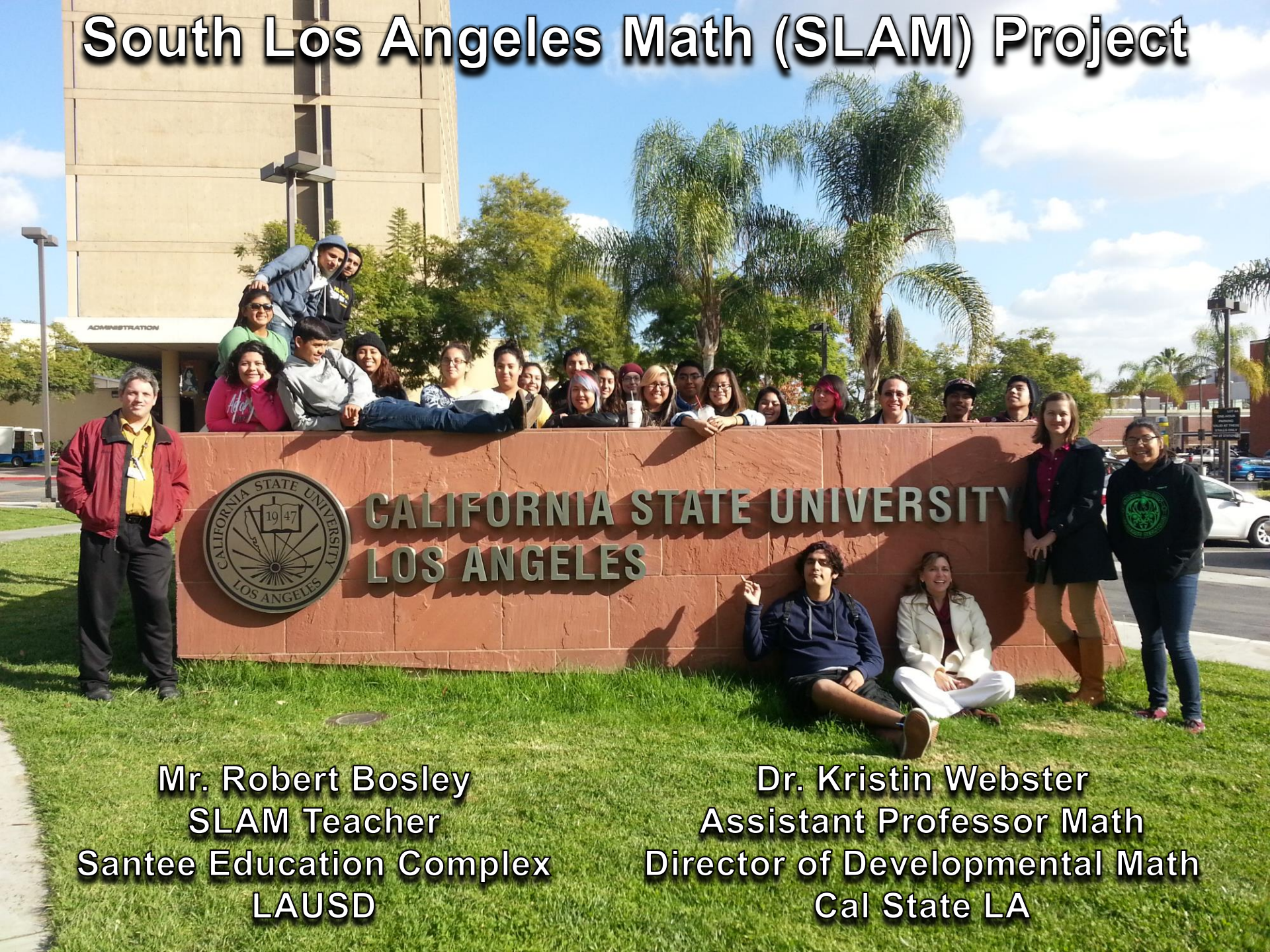
(italicized courses were added in year two)

# Persistence Rates at Sierra College

- On average, students enrolled in a course at Sierra College had a 74% persistence rate (i.e. persistence from first to second semester).
- Students who **completed** the EAP Math course **and enrolled** in a math course at Sierra College had a 95% persistence rate.
- Students who **completed** the EAP Math course and **did not enroll** in a math course, but still enrolled in a course at Sierra College, had a 96% persistence rate.



# South Los Angeles Math (SLAM) Project

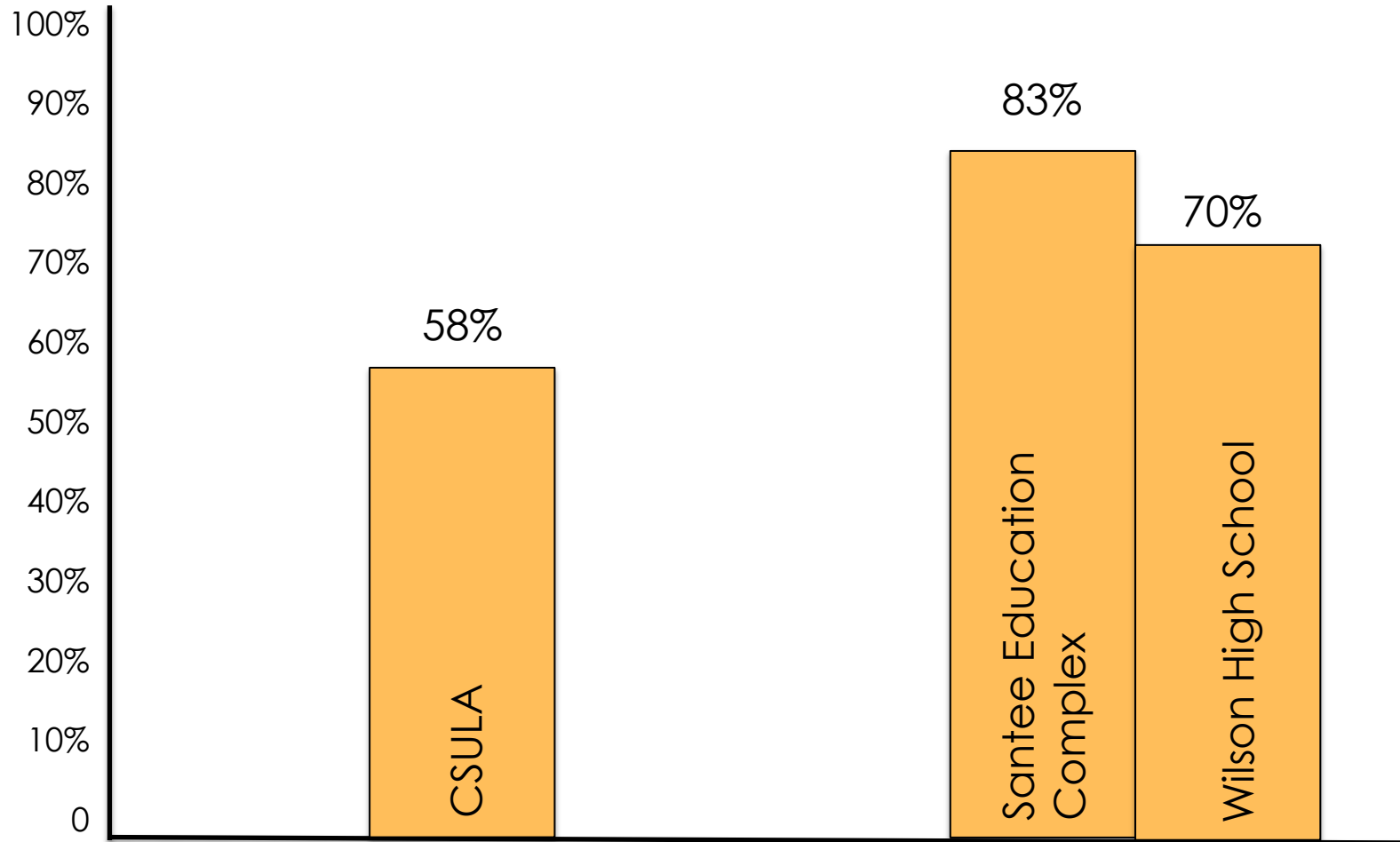


**Mr. Robert Bosley**  
SLAM Teacher  
Santee Education Complex  
LAUSD

**Dr. Kristin Webster**  
Assistant Professor Math  
Director of Developmental Math  
Cal State LA



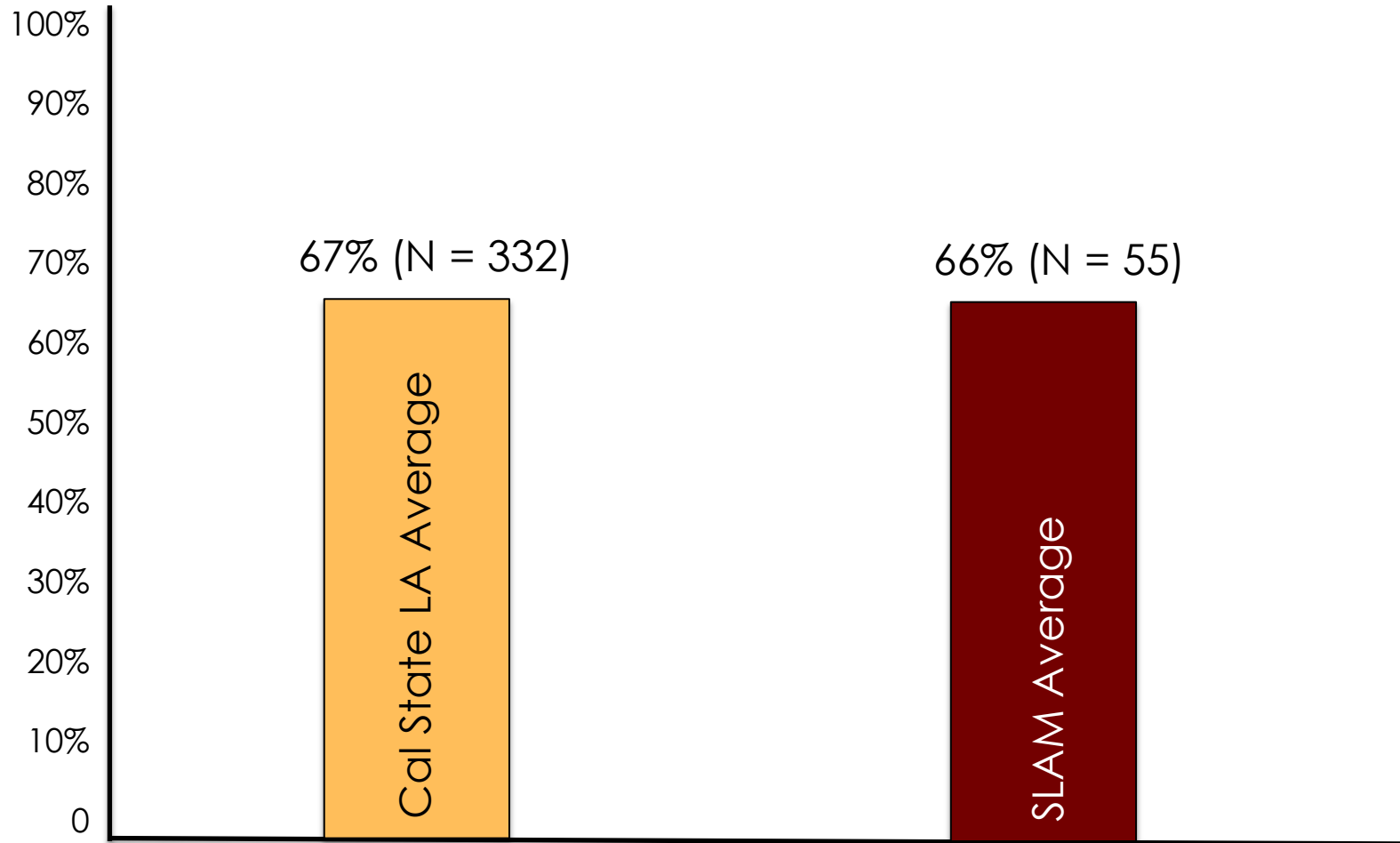
# Math Remediation Rates\*



\*Regular Incoming CSU Freshman, Fall 2013. Obtained from CSU Proficiency Reports  
<http://asd.calstate.edu/performance/proficiency.shtml>

# SLAM (MATH 109) Pass Rates

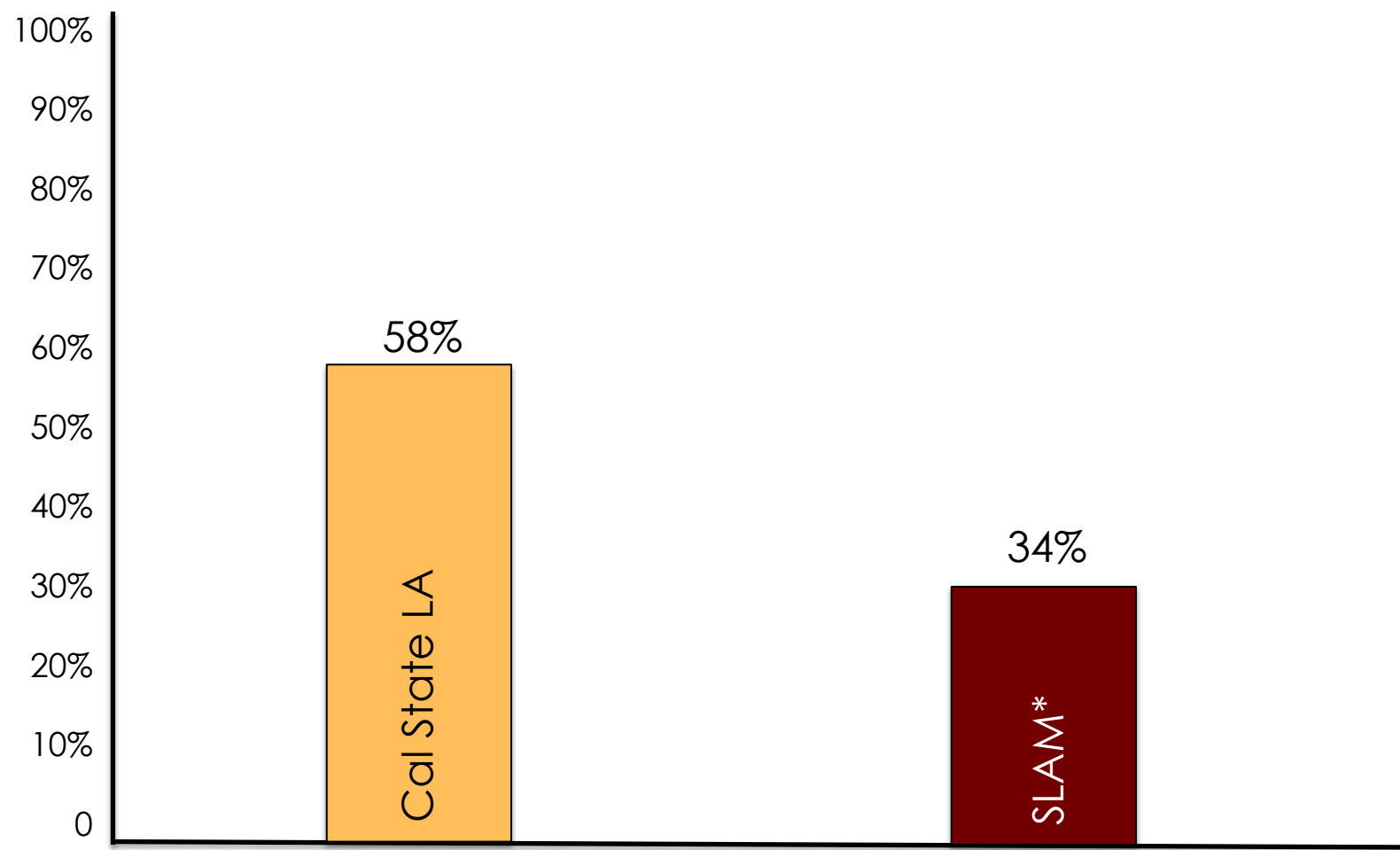
Concurrent\* Cal State LA vs SLAM Students



\*Aggregate pass rates for fall 2013 and fall 2014.

# Remediation Rates

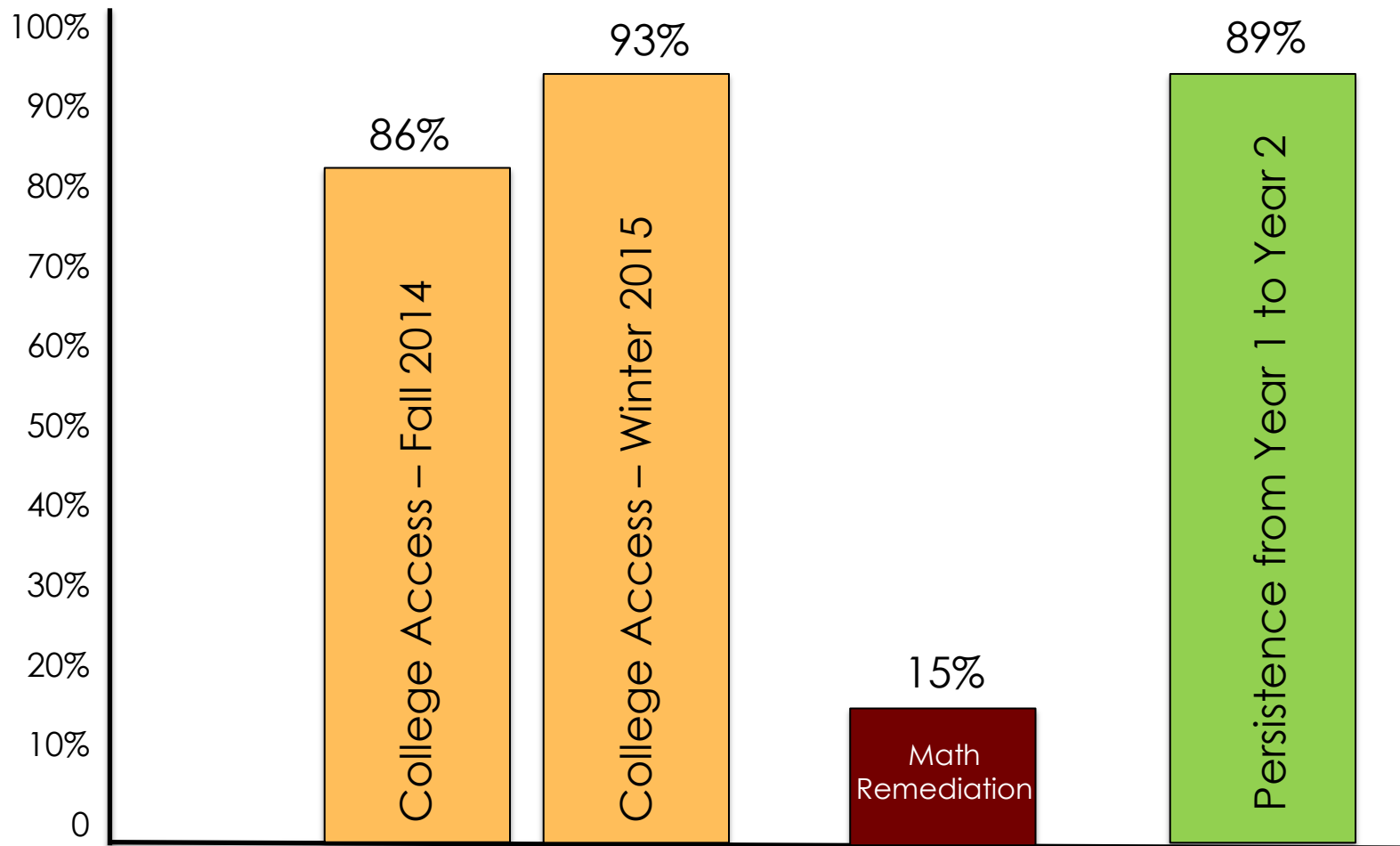
Cal State LA vs SLAM Students\*



\*Maximum possible remediation rate based on pass rate of MATH 109. Placement test data not included.

# SLAM Cohort 1

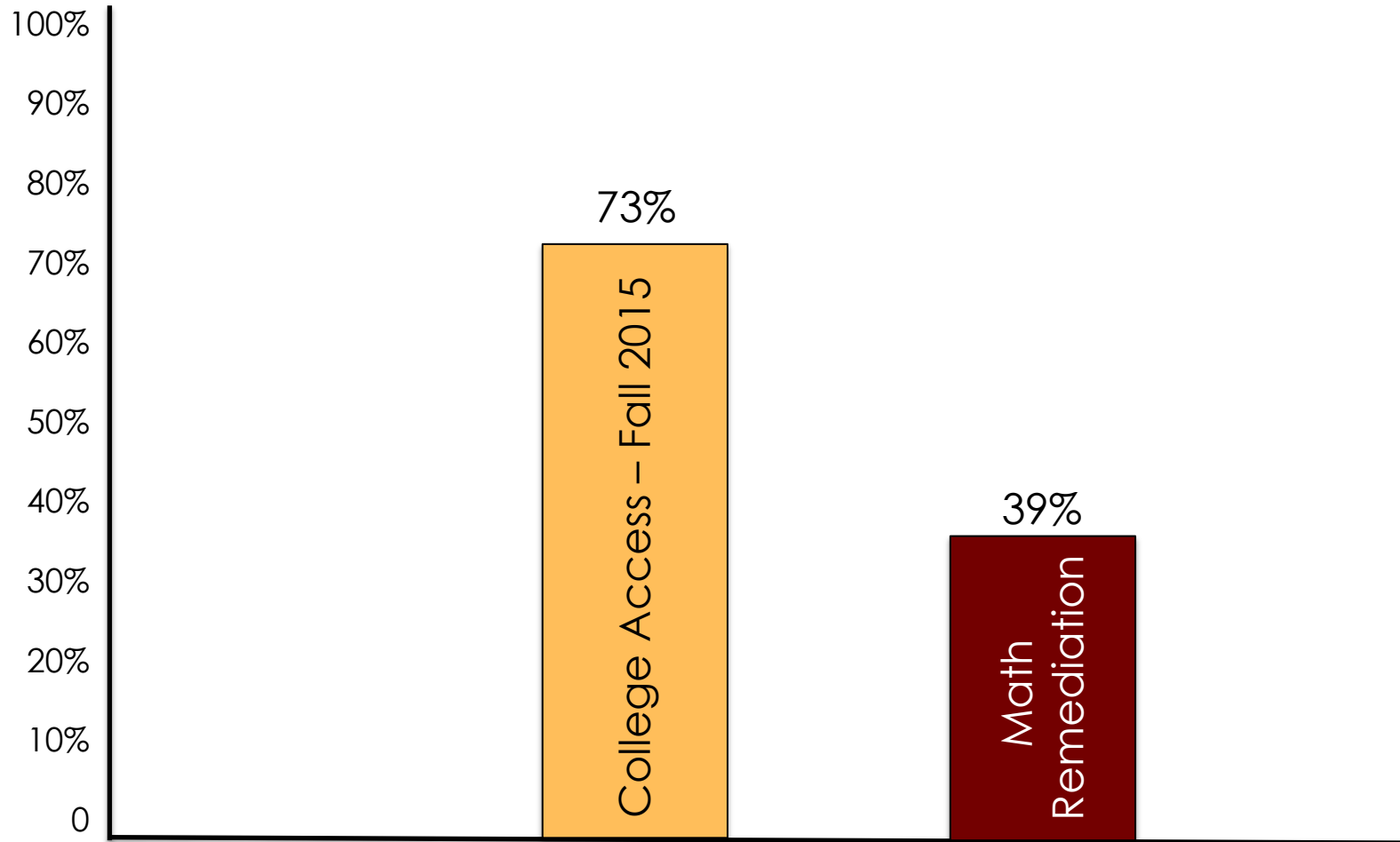
Actual College Access and Remediation Rates with  
Preliminary Persistence Rates\*



\*Persistence rate based on survey data with 93% of students reporting. NSC data available in late November.

# SLAM Cohorts 2 & 3

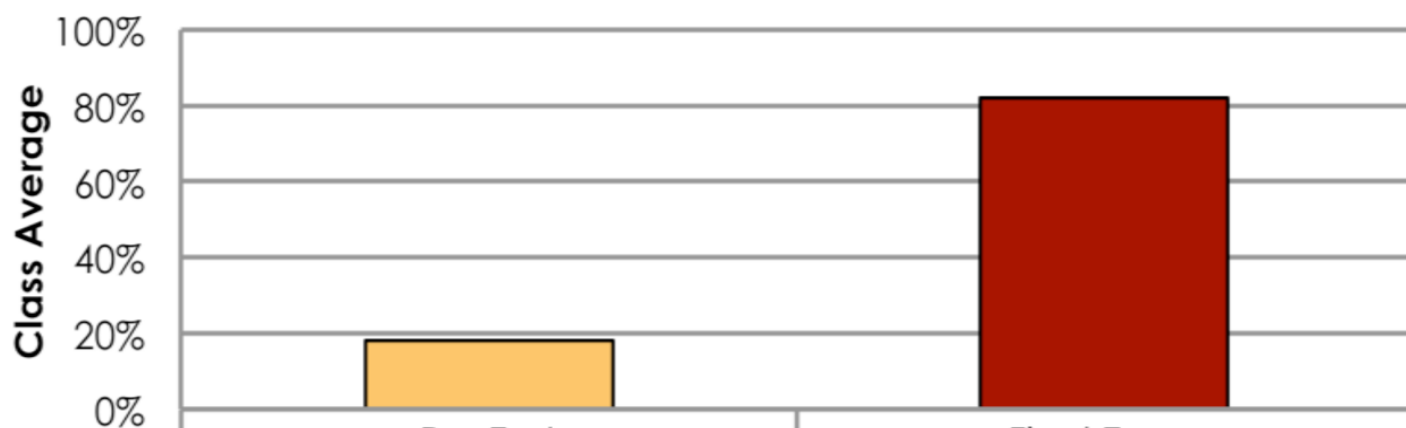
Preliminary College Access\* & Remediation Rates\*\*



\*Minimum matriculation rate based on survey data with 83% of students reporting. NSC data available in late November.

\*\*Maximum possible remediation rate based on pass rate of MATH 109. Placement test data not included.

### Change in Mathematical Practices (Aggregate)



Aggregate Mathematical  
Practices Performed

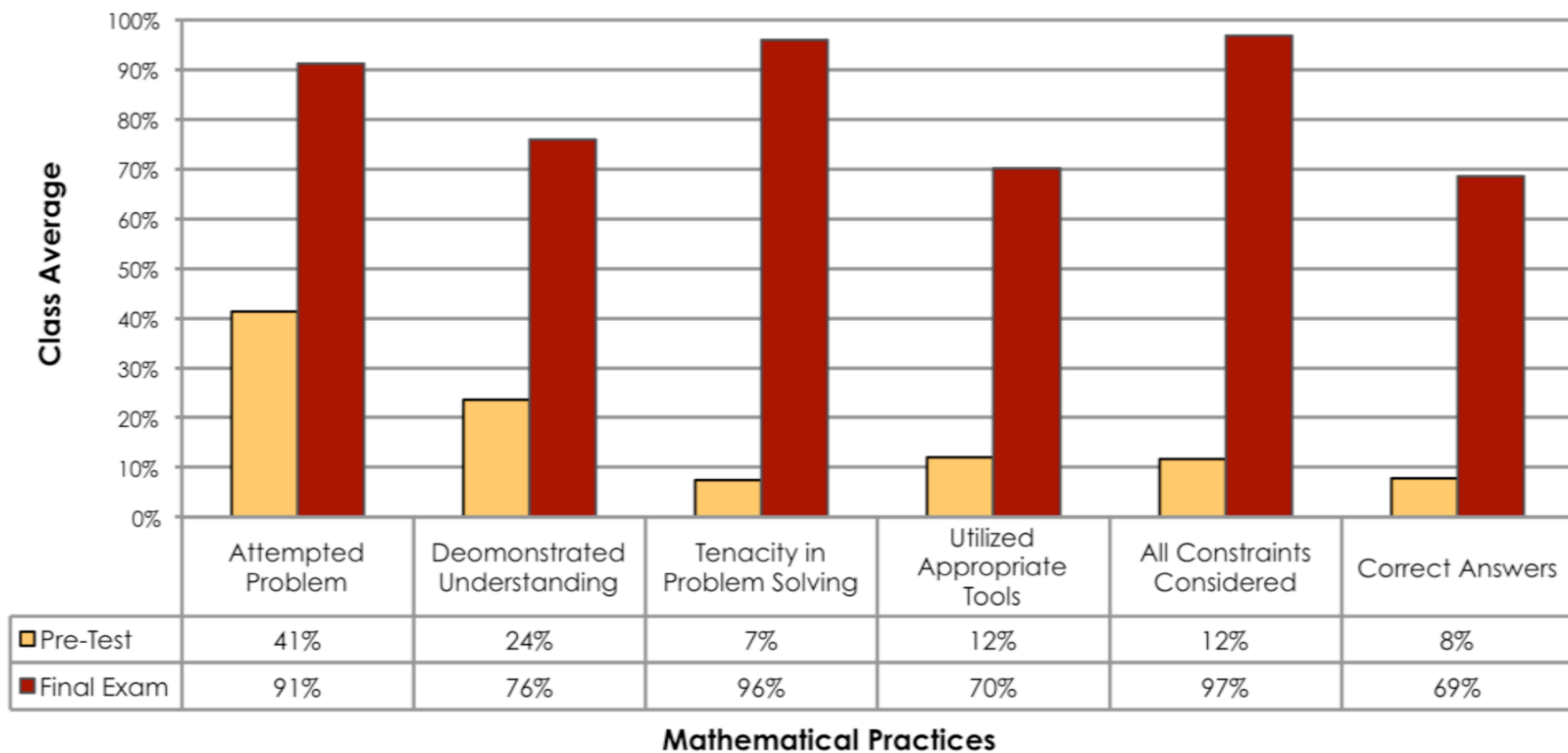
Pre-Test

Final Exam

18%

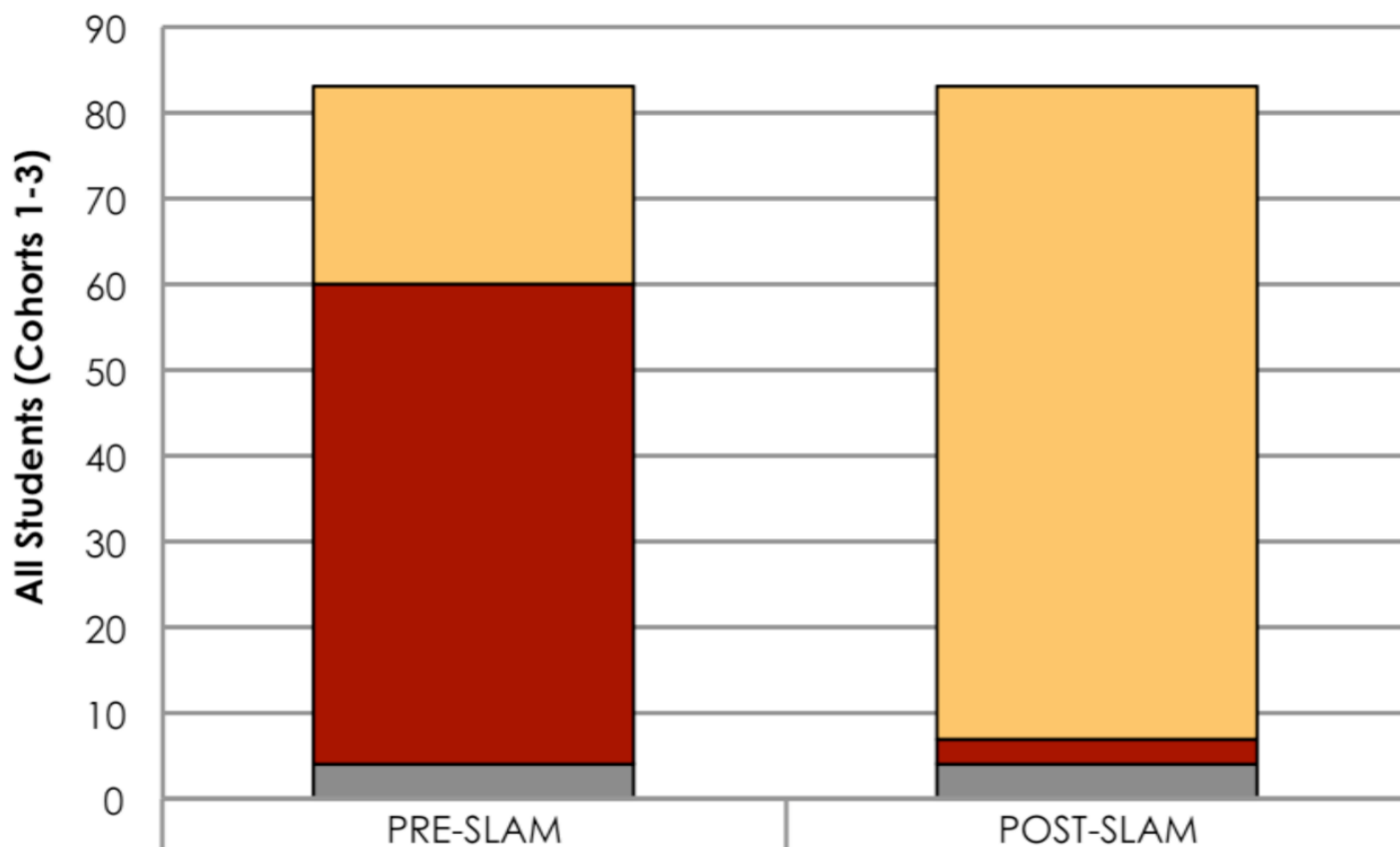
82%

## Change in Mathematical Practices from Pre-Test to Final Exam





## Students' Change in Self-Perception of College Readiness



Ready for College	23	76
Not Ready for College	56	3
Undecided/No Response	4	4

# ALIGNING OPPORTUNITIES:

## An Intersegmental Dialogue

**PHYLLIS BRAXTON**

Los Angeles Harbor College

**ROBERT GOULD**

UCLA

**KATE STEVENSON**

Cal State Northridge

**PHIL TUCHER**

Oakland Unified School District

# MOVING FORWARD: Next Steps

**THANK YOU** for your participation in

## **Testing and Beyond: The Future of College Math Placement**

Please share  
your feedback and recommendations!

[www.LearningWorksCA.org](http://www.LearningWorksCA.org)

