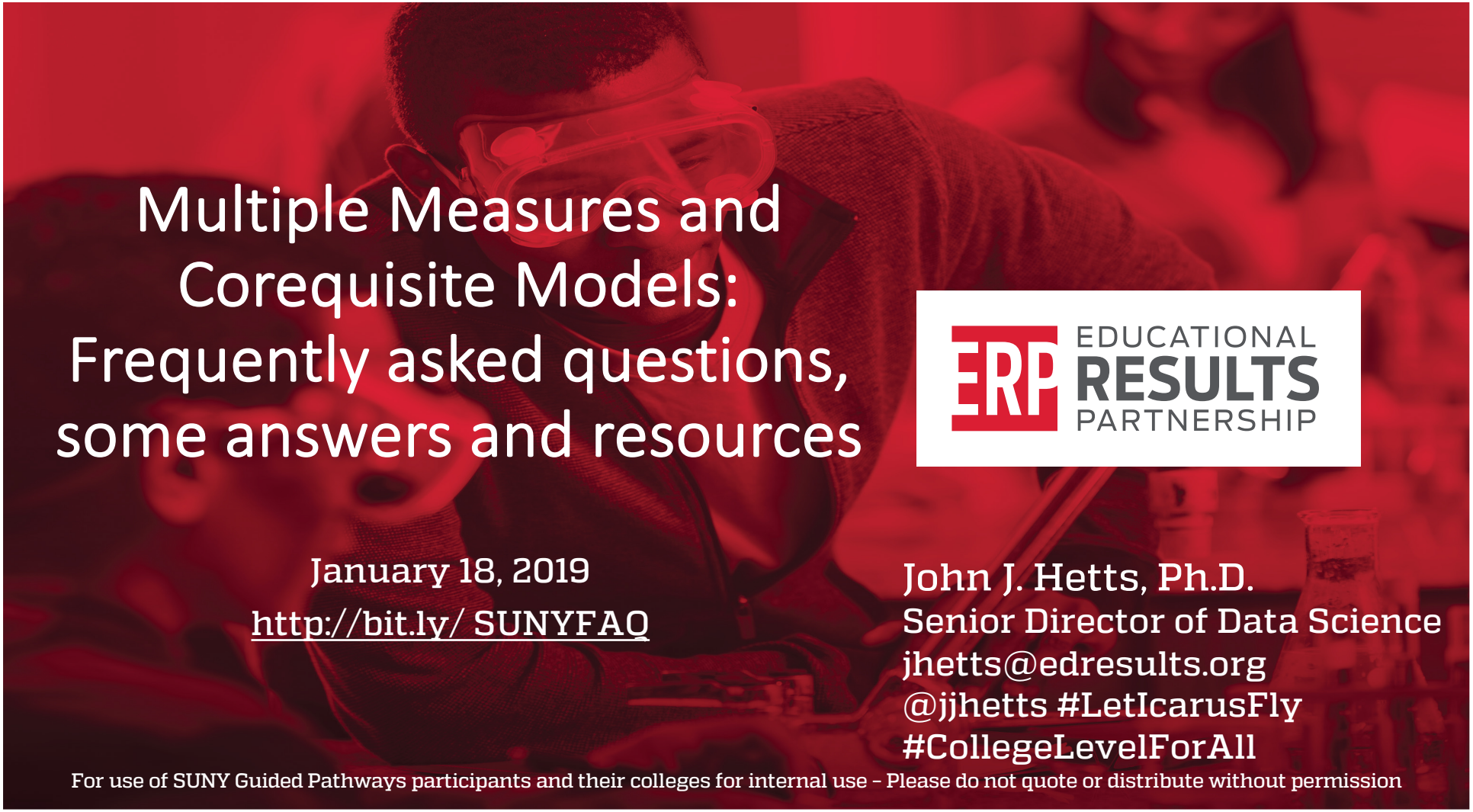
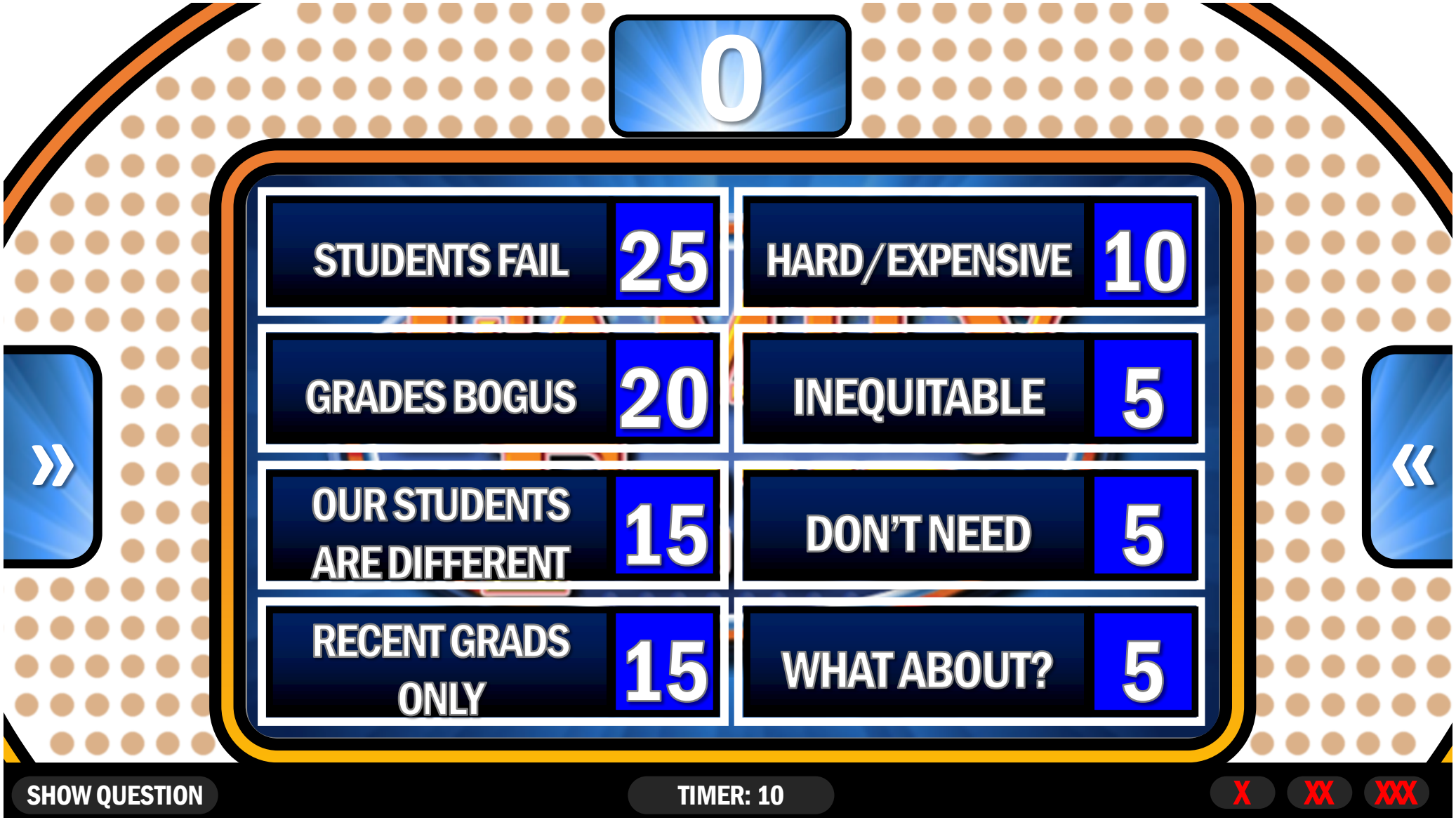


# Multiple Measures and Corequisite Models: Frequently asked questions, some answers and resources

January 18, 2019

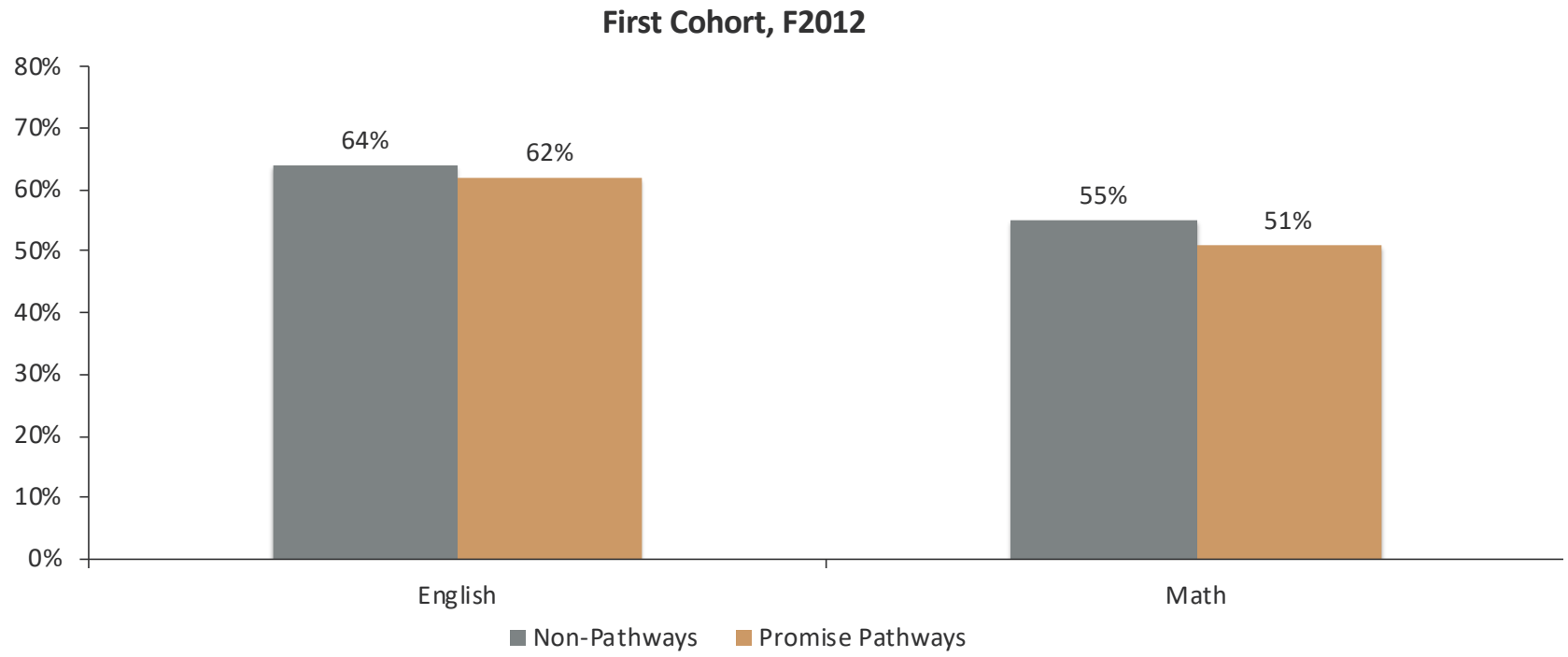
http://bit.ly/ SUNYFAQ

John J. Hetts, Ph.D.
Senior Director of Data Science
jhetts@edresults.org
@jjhetts #LetIcarusFly
#CollegeLevelForAll


0
STUDENTS FAIL
25
HARD/EXPENSIVE
10
GRADES BOGUS
20
INEQUITABLE
5
OUR STUDENTS ARE DIFFERENT
15
DON'T NEED
5
RECENT GRADS ONLY
15
WHAT ABOUT?
5
SHOW QUESTION
TIMER: 10
X
XX
XXX

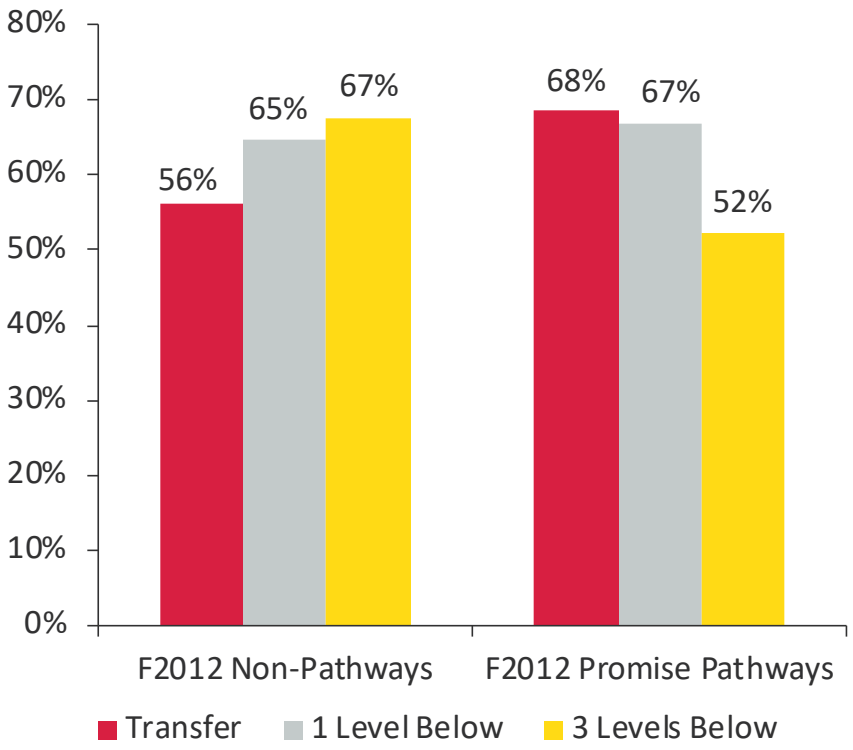
# Do students succeed in these formats? Is it just California?

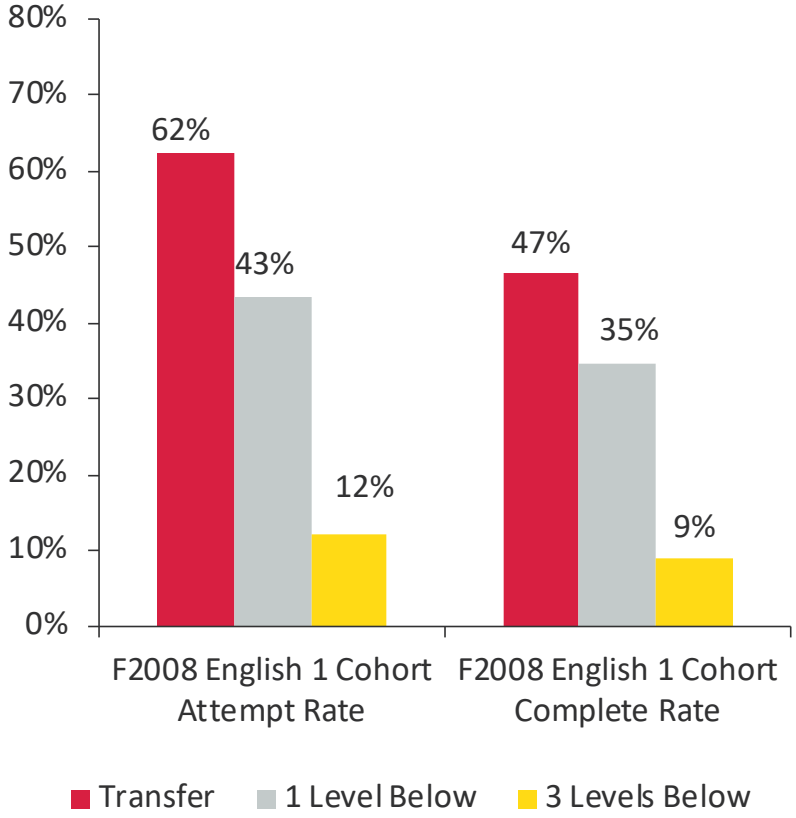
# Comparison against traditional sequence: LBCC success rates in transfer-level courses



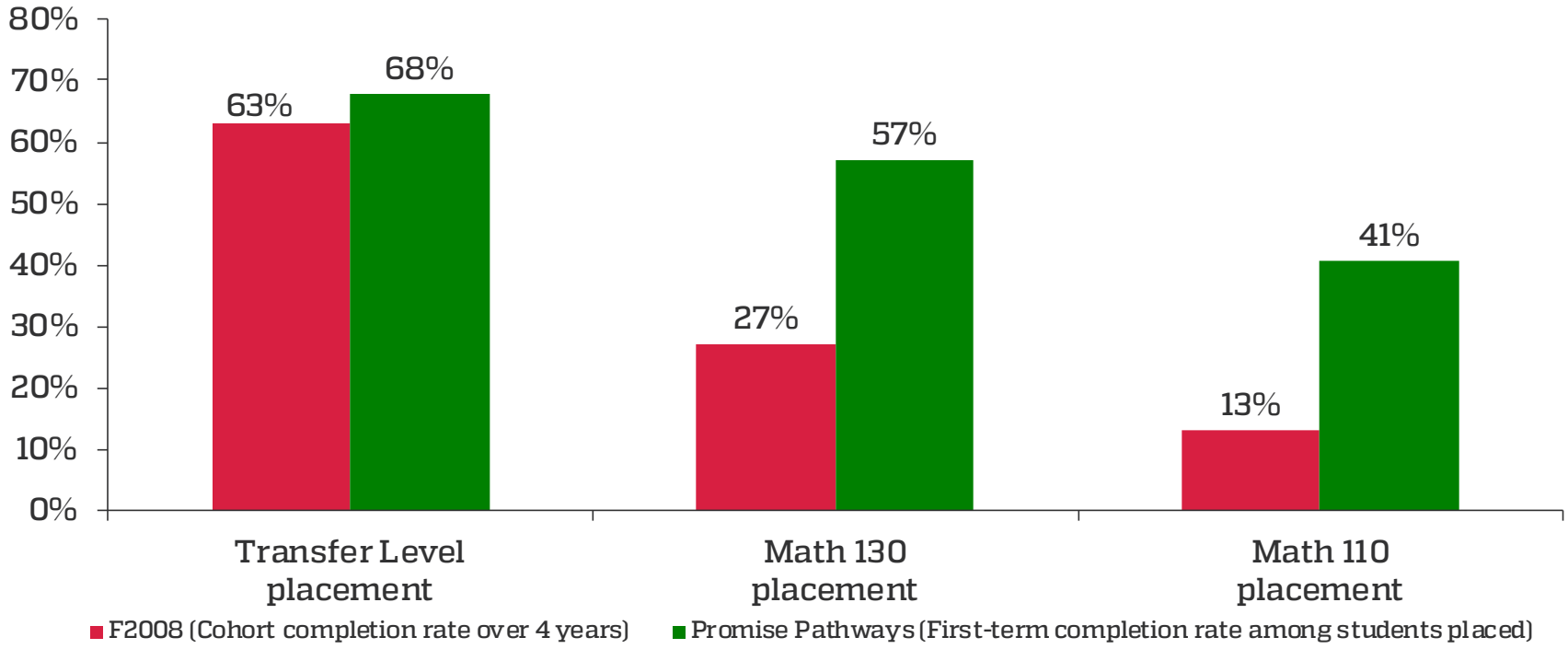

*Neither of these differences approach significance, p >.30*

# LBCC Cohort 1 English 1 Success Rates in College English by Original Placement (vs. 6 year completion)

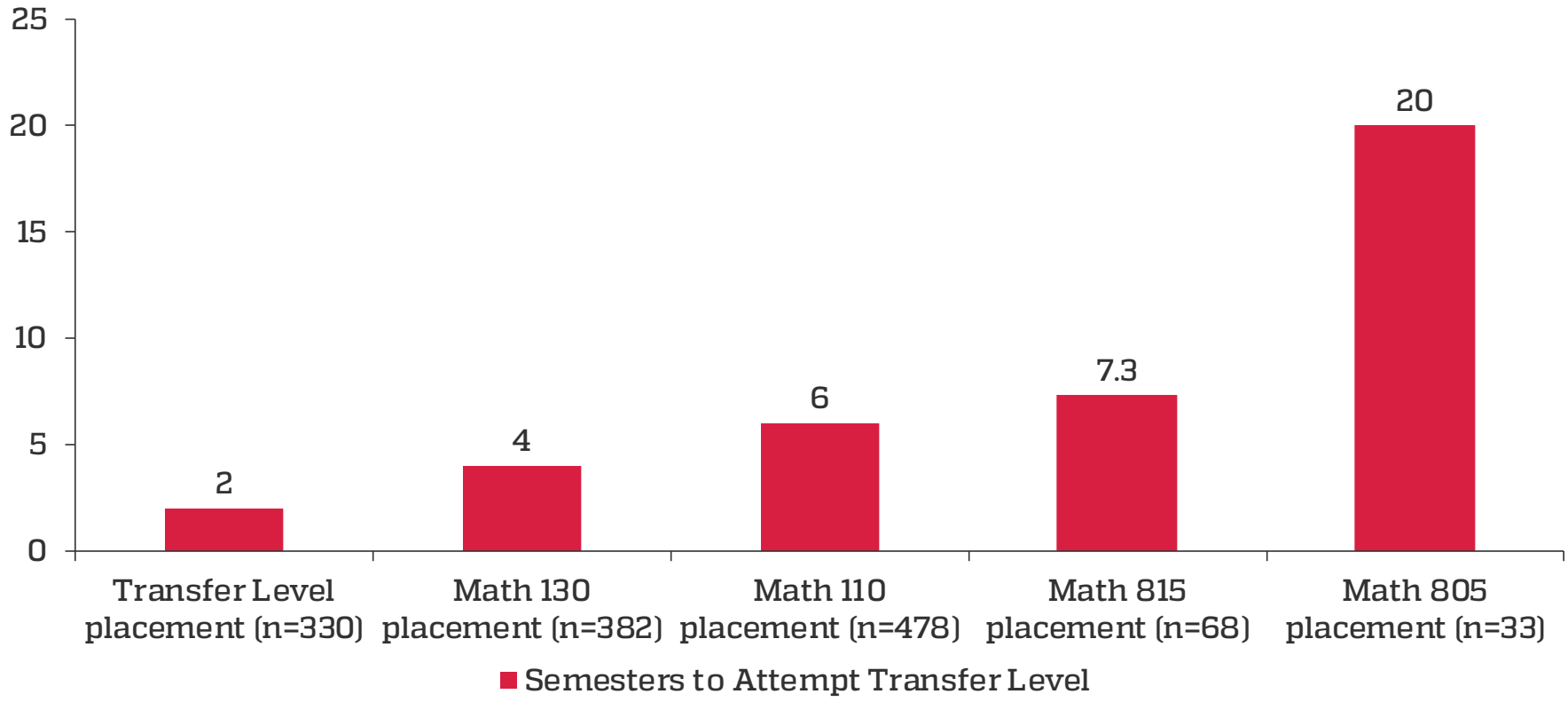


# Cohort completion rates for Transfer-Level Math: F2008 First time students vs. Promise Pathways (by Test Placement)

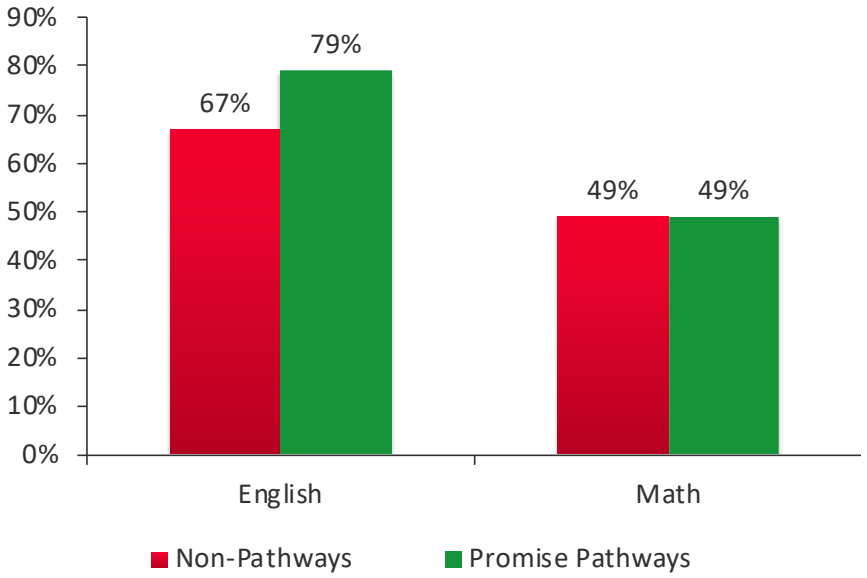


# F2012 Non-Pathways Students in Transfer Math: Semesters to Reach Transfer (by Accuplacer placement, OF STUDENTS THAT ATTEMPT)

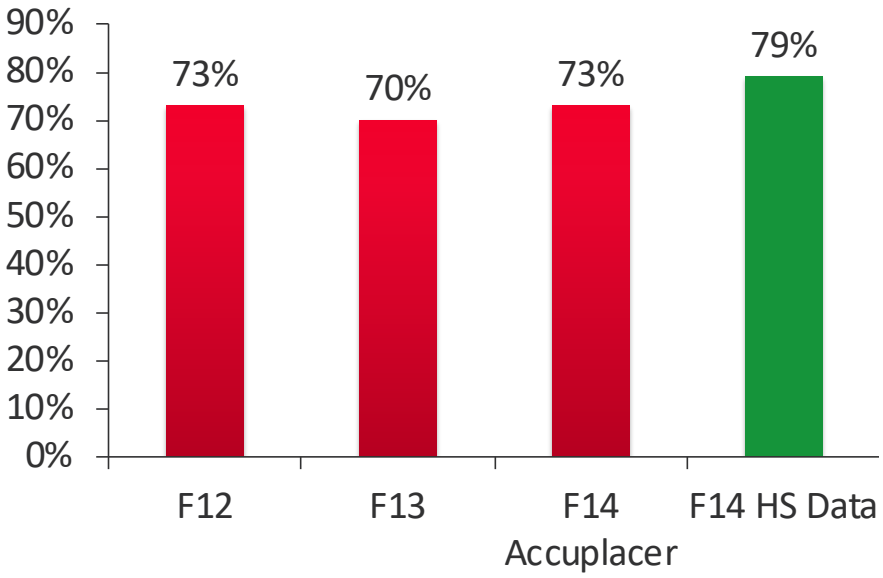


# Maintains or improves success rates in transfer-level courses: CA

## Fall 2014 LBCC

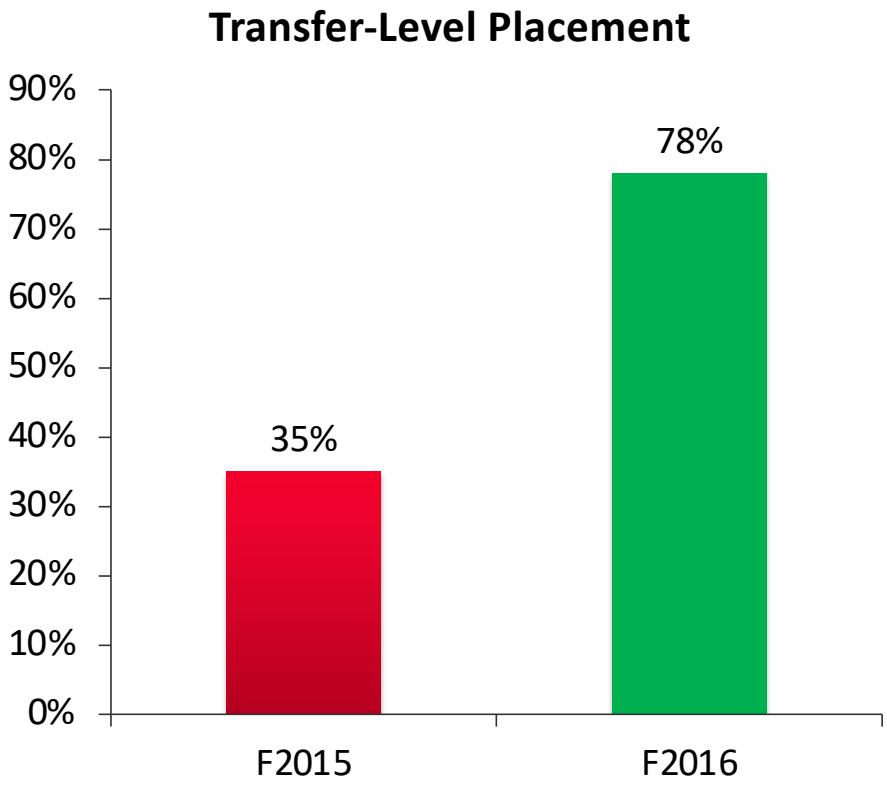


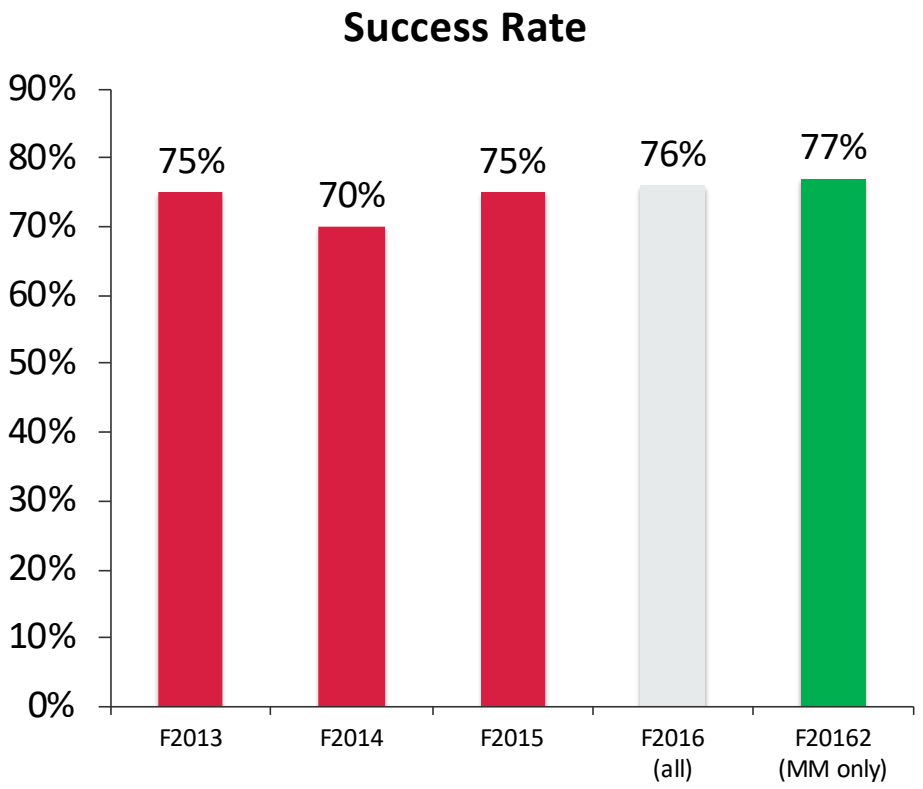

## F2014 Sierra College: English




http://bit.ly/MultipleMeasuresRP

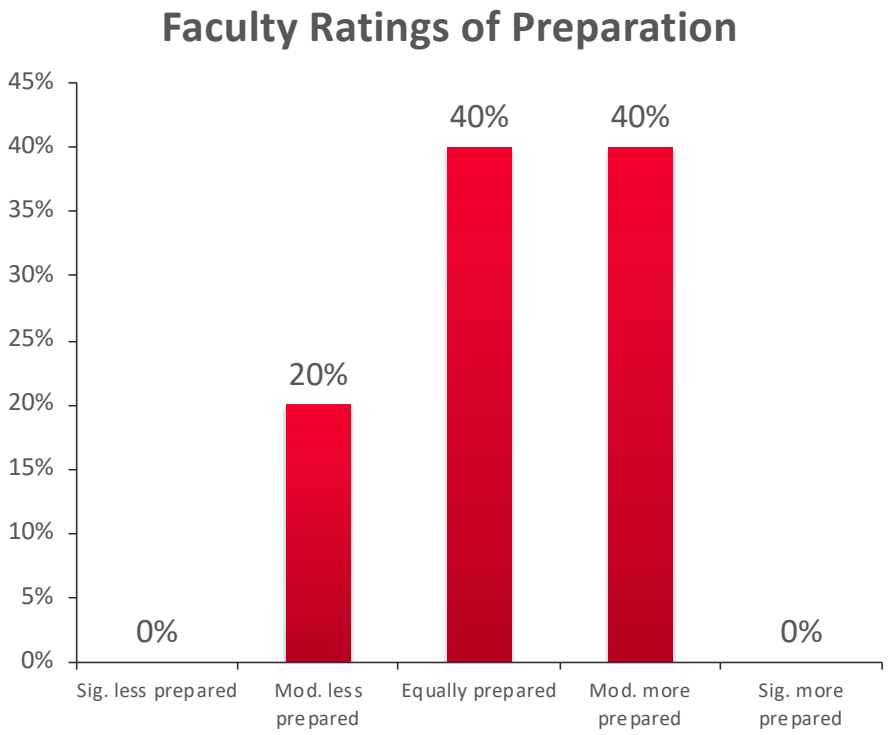
# Las Positas F2016 results: English

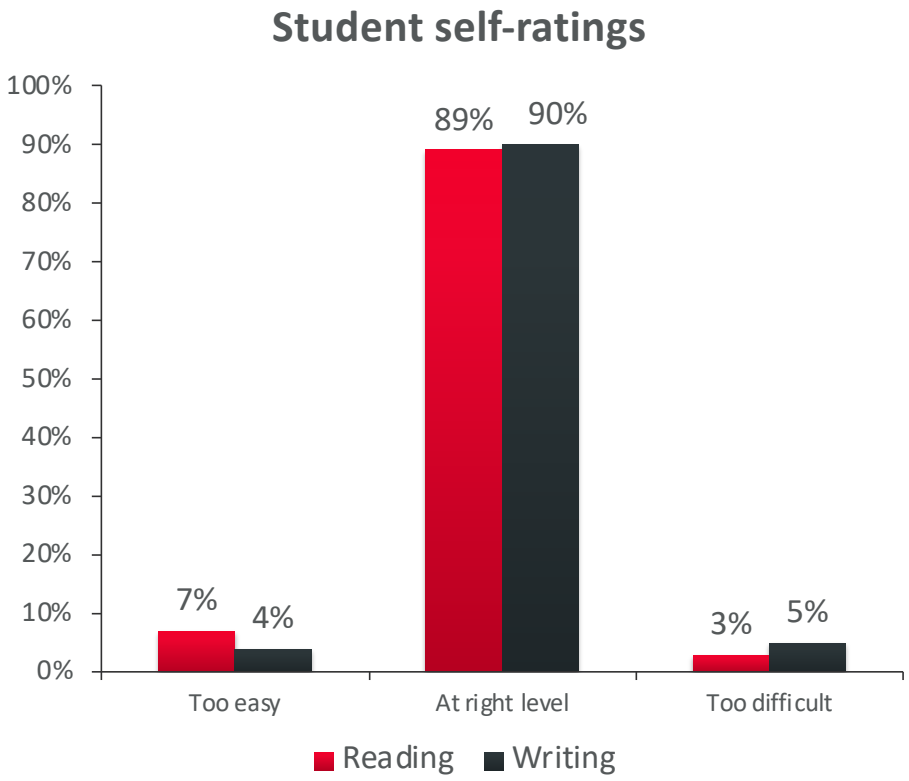



*Used student self-reported HSPGA ≥2.5 within 10 years of high school

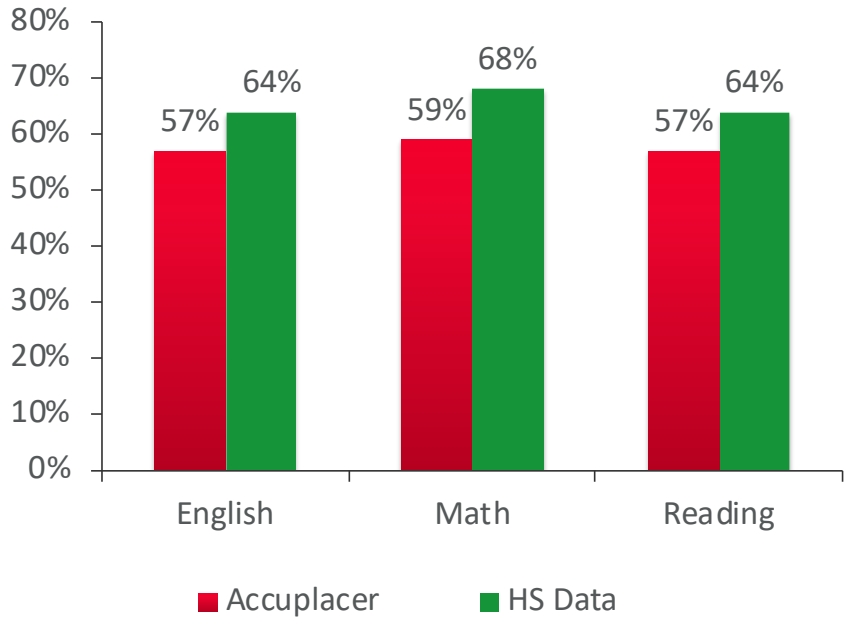
# Were they prepared?



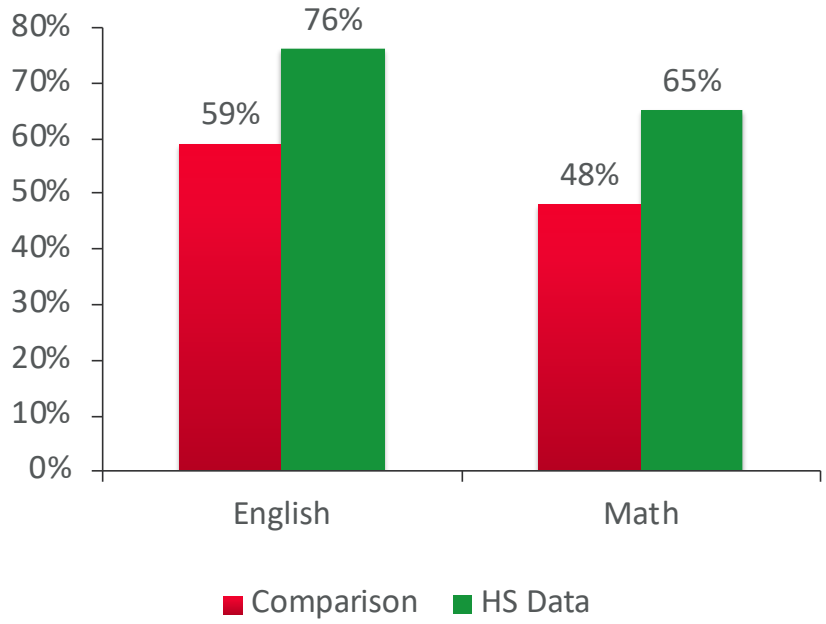
# College-level course completion, recent national examples at scale: http://bit.ly/CCCSEMM

## Ivy Tech 2014-2015




*Rules used for English and Math: HSGPA >=2.6*

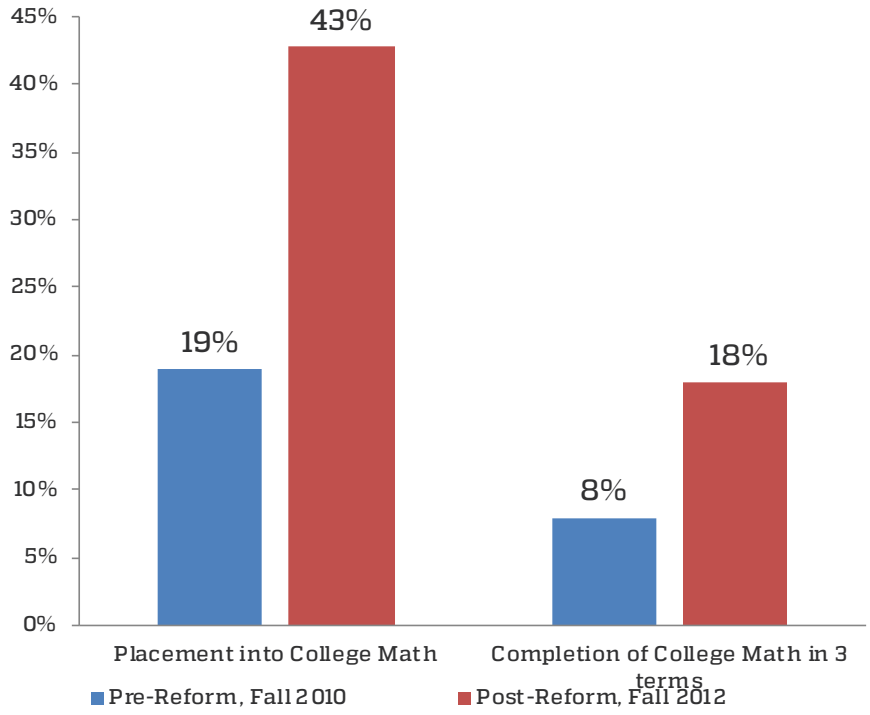
## Davidson County CC 2013-2015




*Rules used for English and Math: HSGPA >=2.6 and college directed (completion of four years of mathematics including one year beyond Algebra 2)*

# Developmental Math Reform – Virginia Community College System

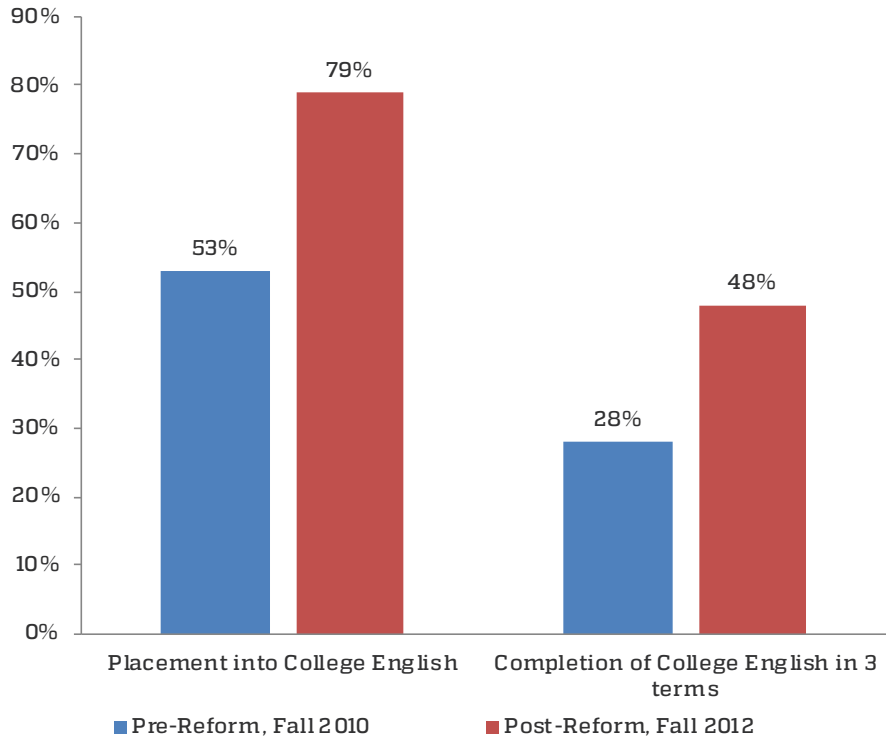
- Intentionally increased percentage assigned to college-level courses
- (Also, below college-level introduced new assessment instrument, redesigned remedial math into modular setup, increased alignment of math to educational goals)



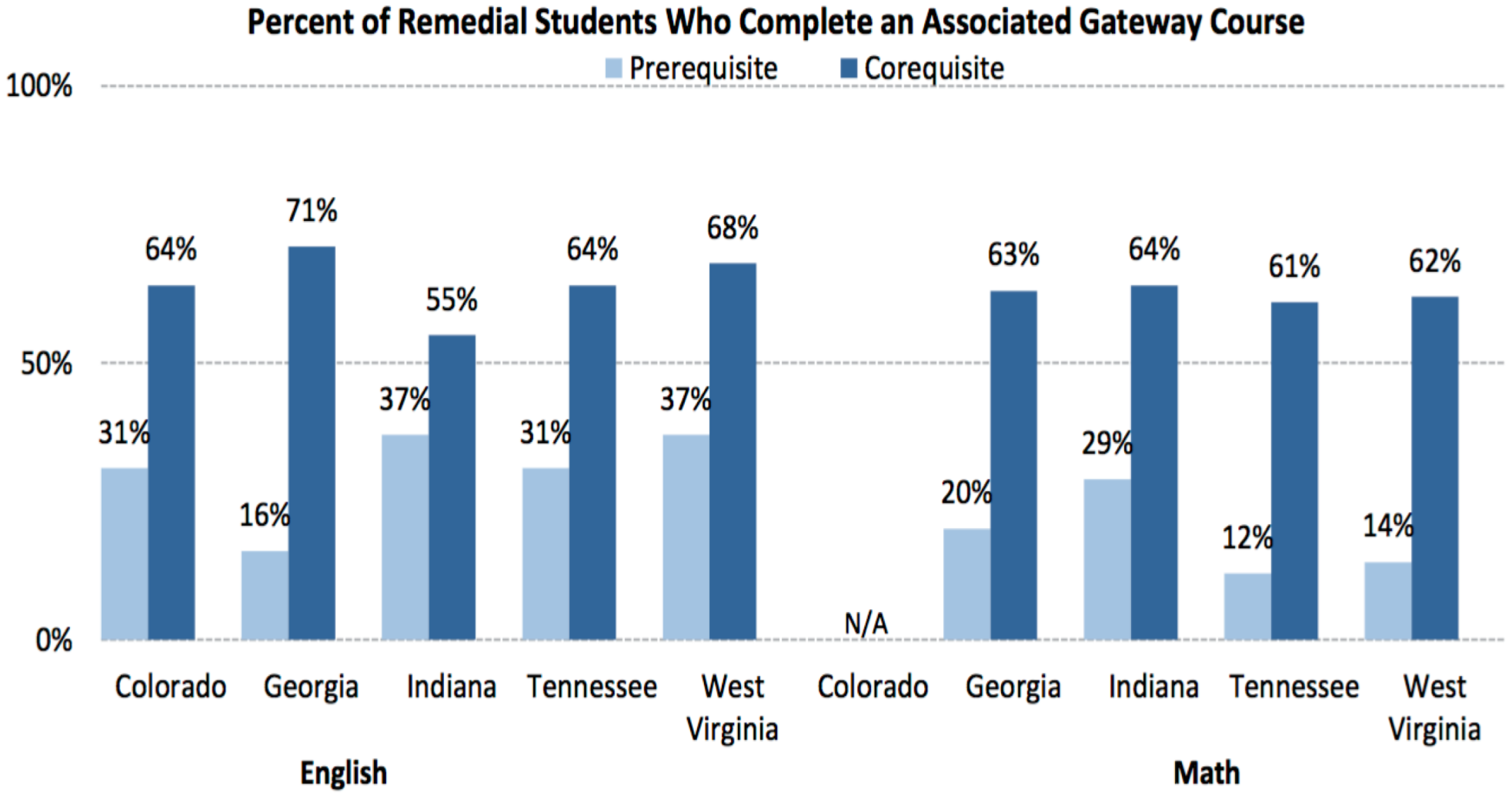

http://bit.ly/Kalamkarian2015 (Kalamkarian, Raufman, & Edgecombe, 2015) and http://bit.ly/Rodriguez2014 (Rodriguez, 2014)

# Developmental English Reform – Virginia Community College System

- Intentionally increased percentage assigned to college-level courses (43% to 58%) and increased assignment into corequisite college-level courses (10% to 23%)




http://bit.ly/Kalamkarian2015 (Kalamkarian, Raufman, & Edgecombe, 2015) and http://bit.ly/Rodriguez2014 (Rodriguez, 2014)




(In two years for prerequisite models, in first year for corequisites)

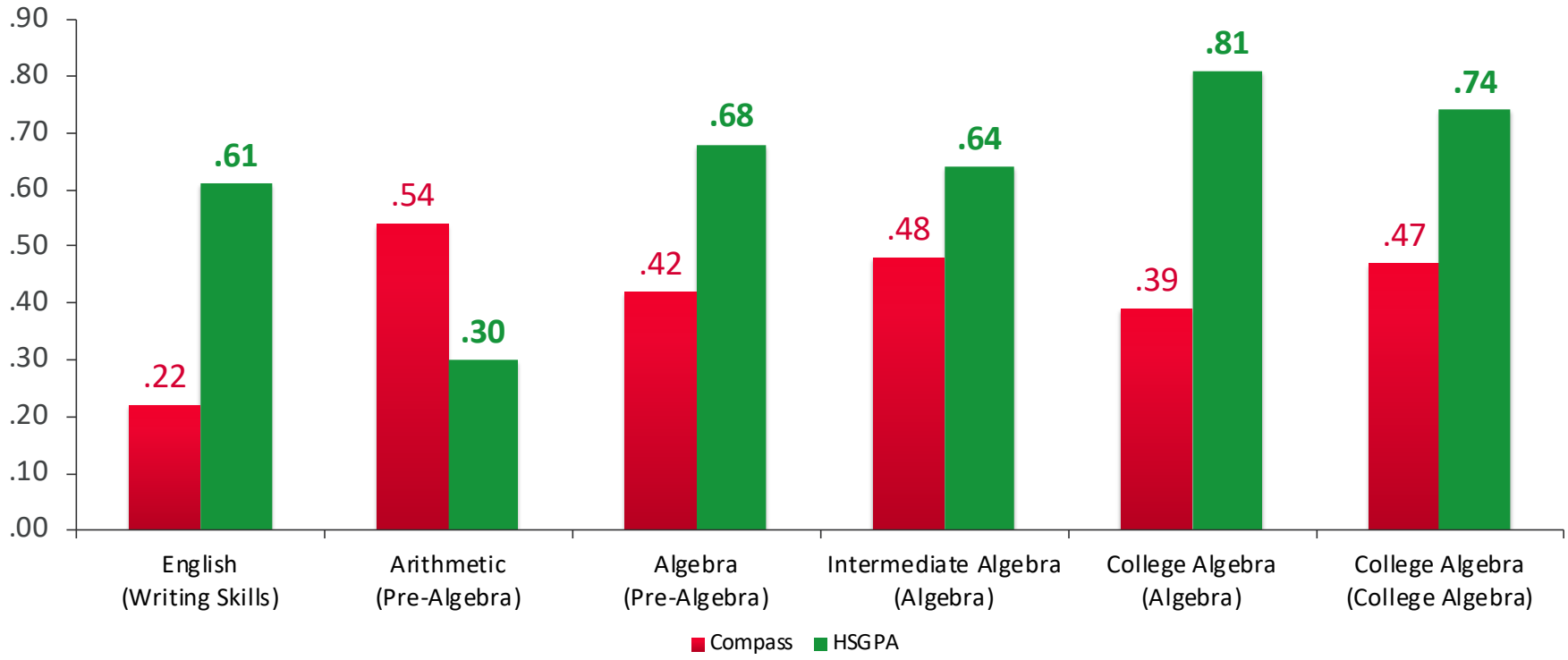
http://bit.ly/CCABridgeBuilders

# Can we trust grades? What about grade inflation and social promotion?

# Concerns about grade inflation and social promotion do not fit evidence

- Concern posits that there should be little to no predictive utility of HS grades for college performance because HS grades unrelated to actual performance/capacity
  - If everyone gets As and Bs, that would mean no variation to predict outcomes
- Yet, predictive utility strongly observed
  - Stronger than standardized tests
  - Even by standardized test companies

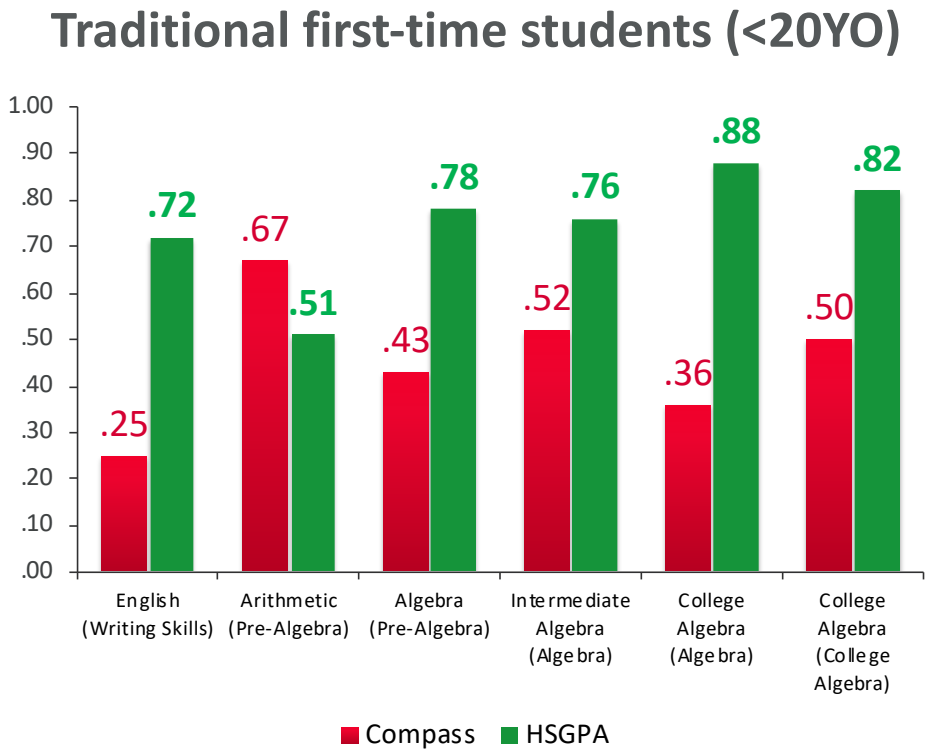
# Even the standardized test companies find grades are stronger predictors: Self-Reported HSGPA vs. Compass

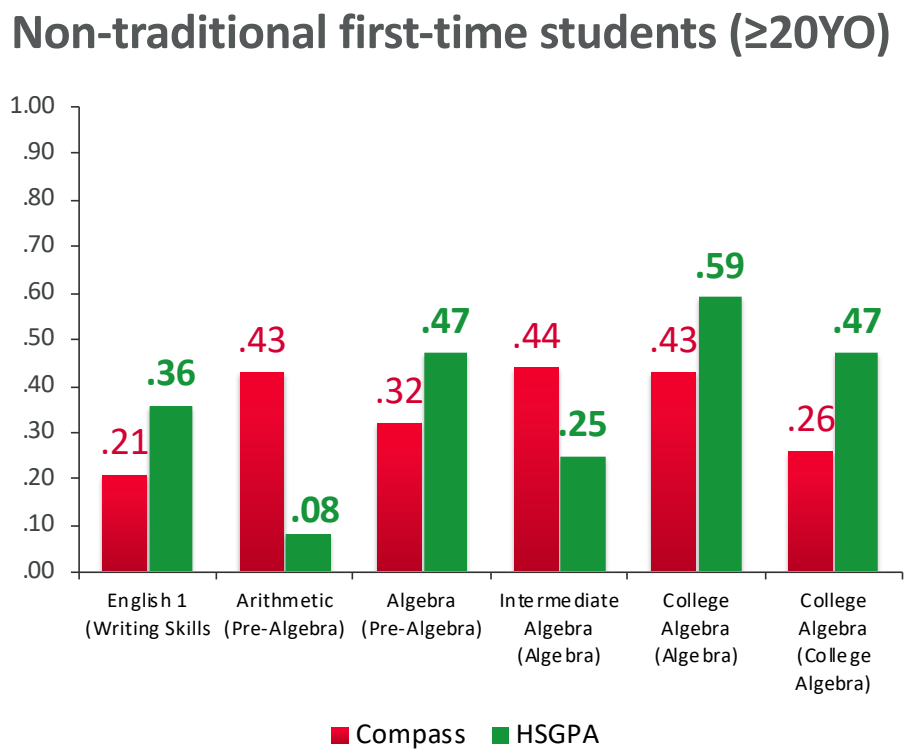



Standardized logistic regression coefficients of HSGPA and test (in parentheses) for each course (Table 5) http://bit.ly/COMPASSValidation

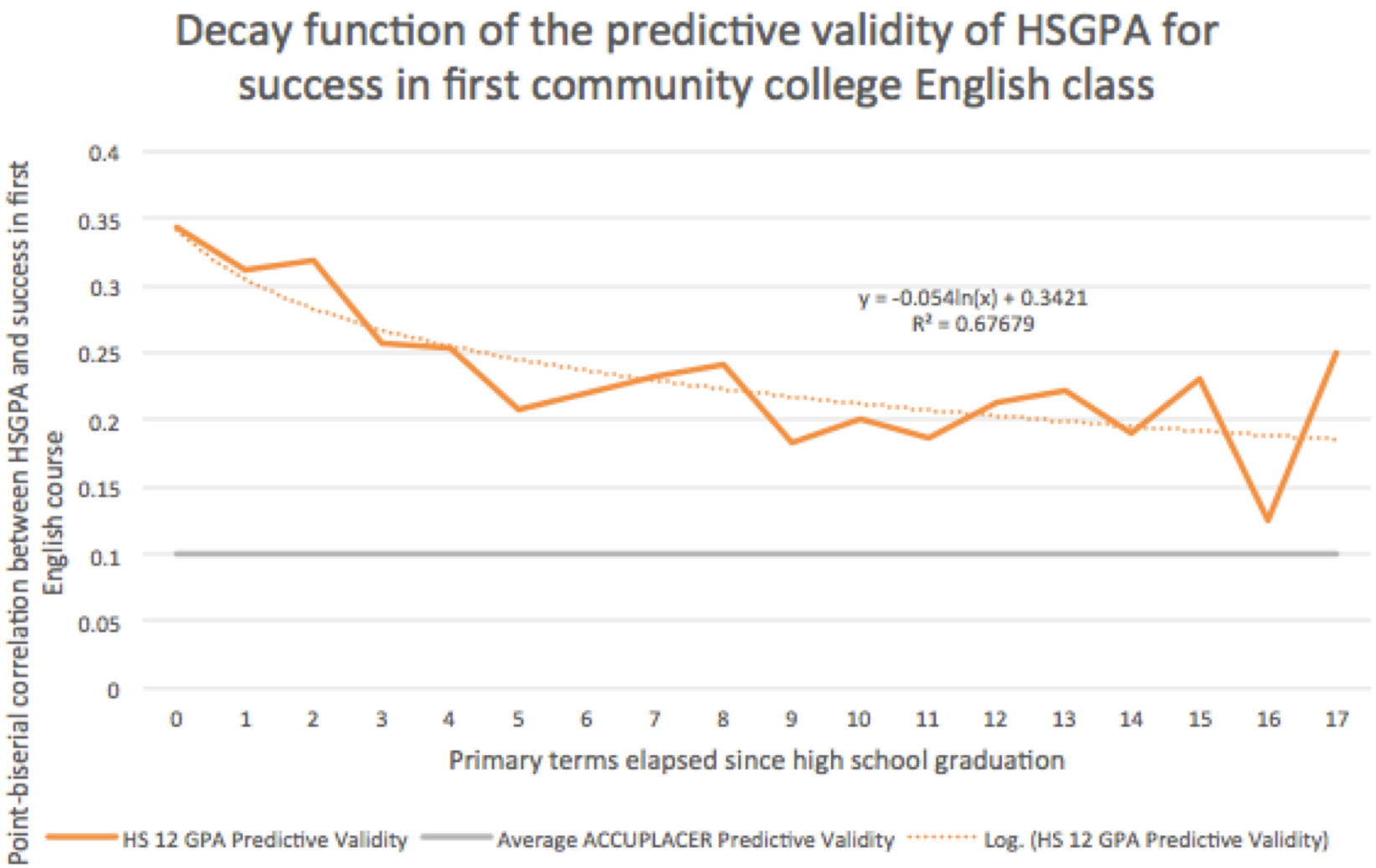
# High School GPA is as or more predictive than tests for far longer than people think

# Utility of Self-Reported HSGPA vs. Compass for non-traditional students

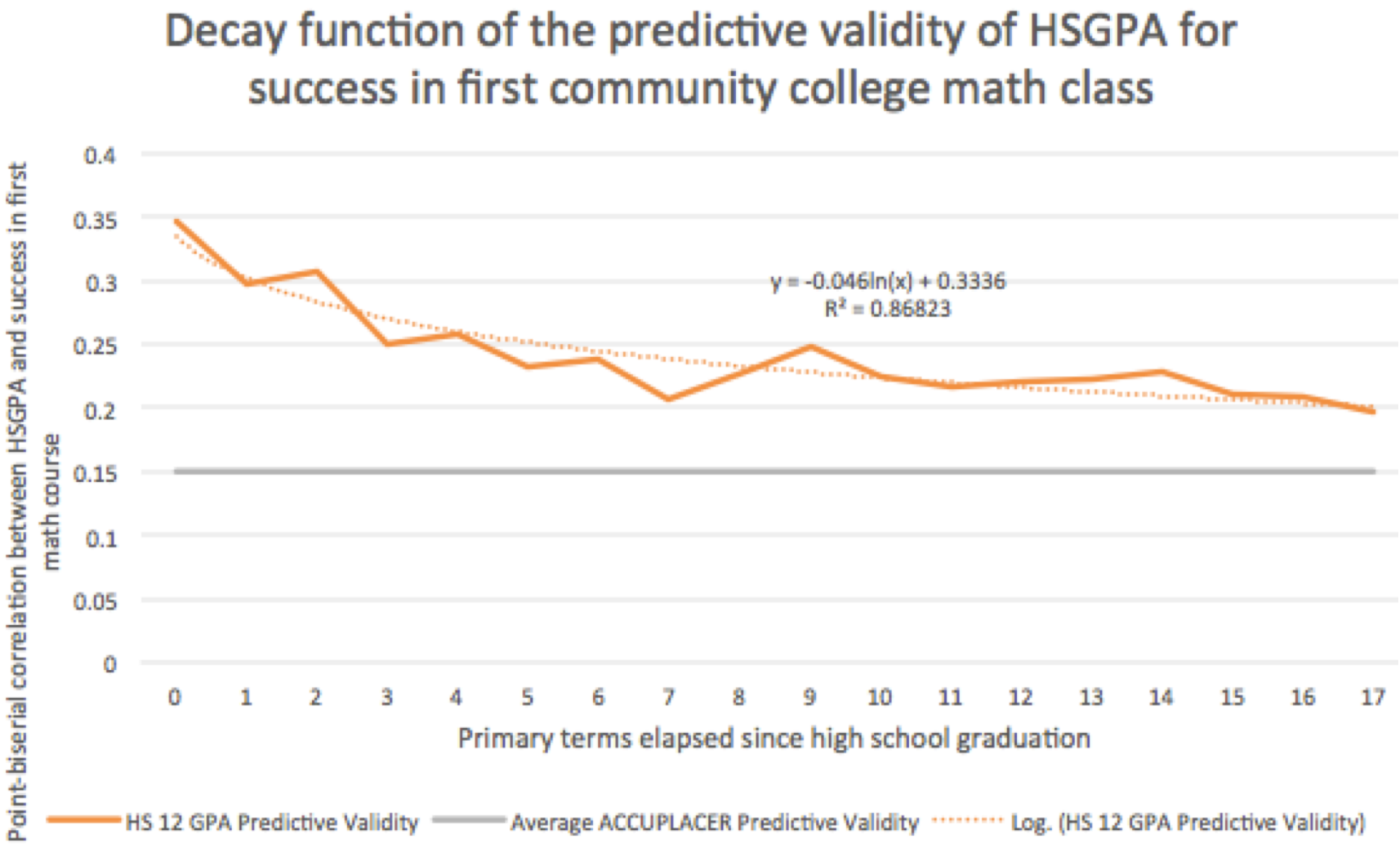



Logistic regression coefficients of HSGPA and test (in parentheses) for each courses (Table 5) http://bit.ly/COMPASSValidation




Hayward et al (in preparation). Decay Function of the Predictive Validity of High School GPA




Hayward et al (in preparation). Decay Function of the Predictive Validity of High School GPA

# It doesn’t have to be hard or expensive

# Free resources to get started

- Multiple Measures Assessment Project (free)
  - **Main website: bit.ly/MMAP2018**
  - **Pilot college resources: bit.ly/ResourcesMMAP**
    - Webinars: bit.ly/WebinarsMMAP
      - bit.ly/ImplementMMAP
    - Provision of statewide model placement recommendations bit.ly/MMAPRecs
    - Placement matrix for local data or transcript-based implementation: http://bit.ly/MMAPPlacementMatrix
    - Summary paper: bit.ly/Bahr2017
    - Additional supplemental tools, resources (NCVs, questionnaires, exercises)

# Up to 11th grade transcript available (formerly Direct Matriculant)

| Highest math course taken in high school[2] \ Total non-weighted GPA[1] | GPA ≥ 3.6 | GPA ≥ 3.4 | GPA ≥ 3.3 | GPA ≥ 3.2 | GPA ≥ 3.0 | GPA ≥ 2.9 | GPA ≥ 2.8 | GPA ≥ 2.6 | GPA ≥ 2.4 | GPA ≥ 2.3 | GPA ≥ 2.0 | GPA < 2.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Calculus 1 (C or better)[3]** | Calc | Calc | Calc | Calc | Pre-Calc | Pre-Calc | Pre-Calc | Pre-Calc | Stats | Stats | Pre-Alg | Arith |
| **Calculus 1 (enrolled)[4]** | Calc | Calc | Calc | Calc | Pre-Calc | Pre-Calc | Pre-Calc | Pre-Calc | Stats | Stats | Pre-Alg | Arith |
| **Pre-Calculus (C+ or better)** | Calc | Calc | Calc | Calc | Trig | Col Alg | Stats | Stats | Stats | Stats | Pre-Alg | Arith |
| **Pre-Calculus (C or better)** | Calc | Calc | Calc | Calc | Trig | Col Alg | Stats | Stats | Stats | Stats | Pre-Alg | Arith |
| **Trigonometry (C or better)** | Calc | Pre-Calc | Trig | Trig | Trig | Alg 2 | Alg 2 | Alg 1 | Alg 1 | Pre-Alg | Pre-Alg | Arith |
| **Algebra 2 (B or better)** | Pre-Calc | Pre-Calc | Trig | Trig | Trig | Alg 2 | Alg 2 | Alg 1 | Alg 1 | Pre-Alg | Pre-Alg | Arith |
| **Algebra 2 (C or better)** | Pre-Calc | Pre-Calc | Col Alg | Col Alg | Stats | Alg 2 | Alg 2 | Alg 1 | Alg 1 | Pre-Alg | Pre-Alg | Arith |
| **Algebra 1 (C or better)** | GE Math | GE Math | GE Math | Stats | Stats | Alg 2 | Alg 2 | Alg 1 | Alg 1 | Pre-Alg | Pre-Alg | Arith |
| **All other** | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Pre-Alg | Pre-Alg | Arith |

**Legend**

| | |
|---|---|
| Calc | Calculus 1 |
| Pre-Calc | Pre-Calculus |
| Trig | Trigonometry, College Algebra, GE Math, Statistics |
| Col Alg | College Algebra, GE Math, Statistics |
| GE Math | GE Math, Statistics |
| Stats | Statistics |
| Alg 2 | Intermediate Algebra |
| Alg 1 | Elementary Algebra |
| Pre-Alg | Pre-Algebra |
| Arith | Arithmetic |

[1] Refers to the total non-weighted GPA. Do not include weighted, academic, term-based, or yearly GPA.
[2] Highest math course taken in high school by increasing difficulty.
[3] Grade received in course.
[4] Student enrolled in Calculus 1 (no grade requirement).

# Up to 12th grade transcript available (formerly Non-Direct Matriculant)

Total non-weighted GPA[1]
CST scores[2]

Last Math course taken in high school[3]

| | GPA ≥ 3.5 | GPA ≥ 3.3 | GPA ≥ 3.2 | GPA ≥ 3.1 | GPA ≥ 3.0 and Algebra 2 CST ≥ 340 | GPA ≥ 3.0 | GPA ≥ 2.9 | GPA ≥ 2.8 | GPA ≥ 2.6 | GPA ≥ 2.5 and Algebra 2 CST ≥ 302 | GPA ≥ 2.5 | GPA ≥ 2.3 | GPA ≥ 2.1 and Algebra 1 CST ≥ 302 | GPA ≥ 2.1 | GPA < 2.1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Calculus 1 (C or better)[4]** | Calc | Calc | Calc | Calc | Pre-Calc | Pre-Calc | Trig | Trig | Stats | Alg 2 | Alg 2 | Alg 1 | Alg 1 | Pre-Alg | Arith |
| **Calculus 1 (enrolled)[5]** | Calc | Calc | Calc | Calc | Pre-Calc | Trig | Trig | Trig | Stats | Alg 2 | Alg 2 | Alg 1 | Alg 1 | Pre-Alg | Arith |
| **Pre-Calculus (C or better)** | Calc | Pre-Calc | Trig | Trig | Pre-Calc | Trig | Trig | Trig | Stats | Alg 2 | Alg 2 | Alg 1 | Alg 1 | Pre-Alg | Arith |
| **Trigonometry (C or better)** | Calc | Pre-Calc | Col Alg | Col Alg | Pre-Calc | Col Alg | GE Math | Alg 1 | Alg 1 | Alg 2 | Alg 1 | Alg 1 | Alg 1 | Pre-Alg | Arith |
| **Statistics (C or better)** | Pre-Calc | Pre-Calc | Col Alg | Col Alg | Pre-Calc | Col Alg | GE Math | Alg 1 | Alg 1 | Alg 2 | Alg 1 | Alg 1 | Alg 1 | Pre-Alg | Arith |
| **Algebra 2 (C or better)** | Pre-Calc | Pre-Calc | Col Alg | Stats | Pre-Calc | Stats | Alg 2 | Alg 1 | Alg 1 | Alg 2 | Alg 1 | Alg 1 | Alg 1 | Pre-Alg | Arith |
| **Algebra 1 (C or better)** | GE Math | GE Math | GE Math | Stats | Stats | Stats | Alg 2 | Alg 1 | Alg 1 | Alg 2 | Alg 1 | Pre-Alg | Alg 1 | Pre-Alg | Arith |
| **All other** | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Alg 1 | Pre-Alg | Pre-Alg | Pre-Alg | Arith |

[1] Refers to the total non-weighted GPA. Do not include weighted, academic, term-based, or yearly GPA.
[2] California Standardized Test (CST) score in Math. Current MMAP rules do not include Smarter Balanced test scores.
[3] Highest math course taken in high school by increasing difficulty.
[4] Grade received in course.
[5] Student enrolled in Calculus 1 (no grade requirement).

**Legend**

| | |
|---|---|
| Calc | Calculus 1 |
| Pre-Calc | Pre-Calculus |
| Trig | Trigonometry, College Algebra, GE Math, and Statistics |
| Col Alg | College Algebra, GE Math, and Statistics |
| GE Math | GE Math and Statistics |
| Stats | Statistics |
| Alg 2 | Intermediate Algebra |
| Alg 1 | Elementary Algebra |
| Pre-Alg | Pre-Algebra |
| Arith | Arithmetic |

# Up to 11th grade transcript available

(Formerly Direct Matriculant)

| Last English course taken in high school[2] / Total non-weighted GPA[1] | GPA ≥ 2.6 | GPA ≥ 2.3 | GPA ≥ 2.0 | GPA ≥ 1.4 | GPA < 1.4 |
|---|---|---|---|---|---|
| **No requirement[3]** | **Transfer** | One-below | Two-below | Three-below | Four-below |

[1] Refers to the total non-weighted GPA. Do not include weighted, academic, term-based, or yearly GPA.
[2] Last English course taken in high school.
[3] No English course-taking requirement.

**Legend**

| | |
|---|---|
| **Transfer** | Transfer level English |
| One-below | One level below transfer |
| Two-below | Two levels below transfer |
| Three-below | Three levels below transfer |
| Four-below | Four levels below transfer |

# Up to 12th grade transcript available

(Formerly Non-Direct Matriculant)

| Last English course taken in high school[3] / Total non-weighted GPA[1] CST scores[2] | GPA ≥ 2.6 | GPA ≥ 2.2 | GPA ≥ 1.8 *and* CST ≥ 288 | GPA ≥ 1.8 | GPA ≥ 1.7 | GPA ≥ 1.5 *and* CST ≥ 268 | GPA < 1.7 |
|---|---|---|---|---|---|---|---|
| **12th grade English (C or better)[4]** | **Transfer** | One-below | Two-below | Two-below | Three-below | Three-below | Four-below |
| **12th grade English (D or better)** | **Transfer** | Two-below | Two-below | Two-below | Three-below | Three-below | Four-below |
| **All other** | **Transfer** | Three-below | Three-below | Three-below | Three-below | Three-below | Four-below |

[1] Refers to the total non-weighted GPA. Do not include weighted, academic, term-based, or yearly GPA.
[2] California Standardized Test (CST) score in English. Current MMAP rules do not include Smarter Balanced test scores.
[3] Last English course taken in high school.
[4] Grade received in course.

# Self-reported HSGPA as potential alternative

- Ease of immediate implementation at very low to no cost (possibly savings)
- UC, CSU, & others uses self-report in admissions, verifying after admission
  - 2008: 9 campuses, 60000+ students. No campus had >5 discrepancies b/w reported grades and transcripts: bit.ly/SRHSGPA
- College Board: Shawn & Matten, 2009: "Students are quite accurate in reporting their HSGPA", r(40,299) = .73: bit.ly/CBSRGPA
- ACT brief found SR HSGPA to be highly correlated with students actual GPA: ACT, 2013: *r*(1978) = .84 bit.ly/ACTSRGPA
  - Also, don't forget that they found self-reported HSGPA to be a much better predictor than their own test (COMPASS)

# GPA vs. Self-reported HSGPA

| HSGPA Level | N | Mean HSGPA | | Mean diff. |
|---|---|---|---|---|
| | | Actual | Self-reported | |
| 3.50–4.00 | 599 | 3.79 | 3.75 | –.04 |
| 3.00–3.49 | 451 | 3.24 | 3.23 | –.01 |
| 2.50–2.99 | 408 | 2.81 | 2.76 | –.05 |
| 2.00–2.49 | 265 | 2.24 | 2.35 | .11 |
| 1.50–1.99 | 172 | 1.77 | 2.04 | .27 |
| 0.00–1.49 | 85 | 1.03 | 1.85 | .82 |
| Total | 1,980 | 2.95 | 3.02 | .07 |

- ACT, 2013: http://bit.ly/ACTSRGPA

# GPA vs. Self-reported HSGPA

| School-Reported HSGPA | Self-Reported HSGPA: A (*n* = 13,658) | A– (*n* = 10,214) | B+ (*n* = 8,066) | B (*n* = 5,671) | B– (*n* = 1,704) | C+ (*n* = 675) | C (*n* = 261) | C– (*n* = 48) |
|---|---|---|---|---|---|---|---|---|
| A (*n* = 14,825) | **78%** | 32% | 8% | 3% | 1% | 2% | 3% | 2% |
| A– (*n* = 10,547) | 17% | **45%** | 34% | 14% | 4% | 2% | 3% | 4% |
| B+ (*n* = 7,795) | 4% | 17% | **39%** | 35% | 16% | 7% | 4% | 8% |
| B (*n* = 4,796) | 1% | 4% | 17% | **35%** | 40% | 29% | 18% | 17% |
| B– (*n* = 1,649) | 0% | 1% | 2% | 10% | **28%** | 36% | 32% | 15% |
| C+ (*n* = 550) | 0% | 0% | 1% | 2% | 9% | **19%** | 28% | 29% |

- College Board, 2009: http://bit.ly/CBSRGPA

Under-reporting was 2-4X as common as over-reporting.

# Local data sharing agreements

- Some districts may be more amenable to engaging in direct data sharing
  - *bit.ly/DataSharingTemplate*
  - Matching challenges
  - Data security/transmission/management
  - Students likely lose out on placement opportunities if they attend any other college in system

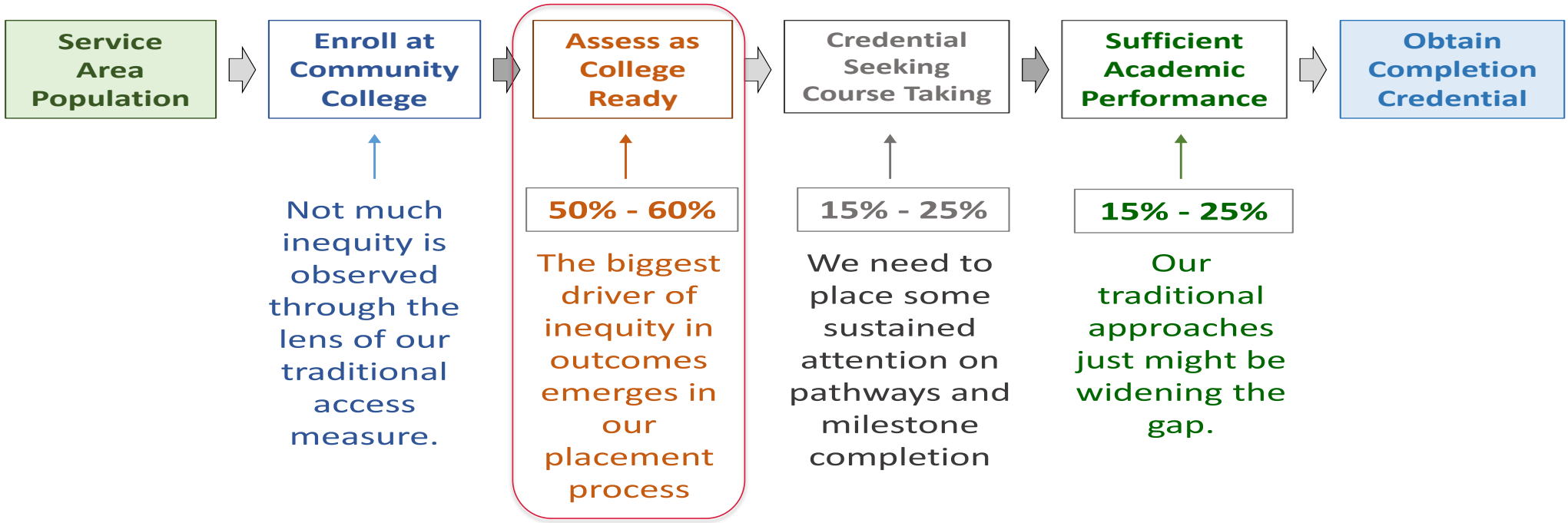
# Local transcript review

- **One high-touch backup strategy for students from K-12 districts with missing data or for out of state students**
  - **Can be resource intensive but tools to support use**
  - **Challenge of transcript review for hundreds of students**
  - **MMAP visual crosswalk available**
    - bit.ly/MMAPCrosswalk
  - **College-developed resources**
    - College of Alameda tool and presentation
      - bit.ly/AlamedaExcelTool and bit.ly/AlamedaToolPresentation
    - Sierra College Placement Tool: bit.ly/SierraPlacementTool
    - Diablo Valley Placement Tool: bit.ly/DVCPlacementTool

# What about equity considerations?

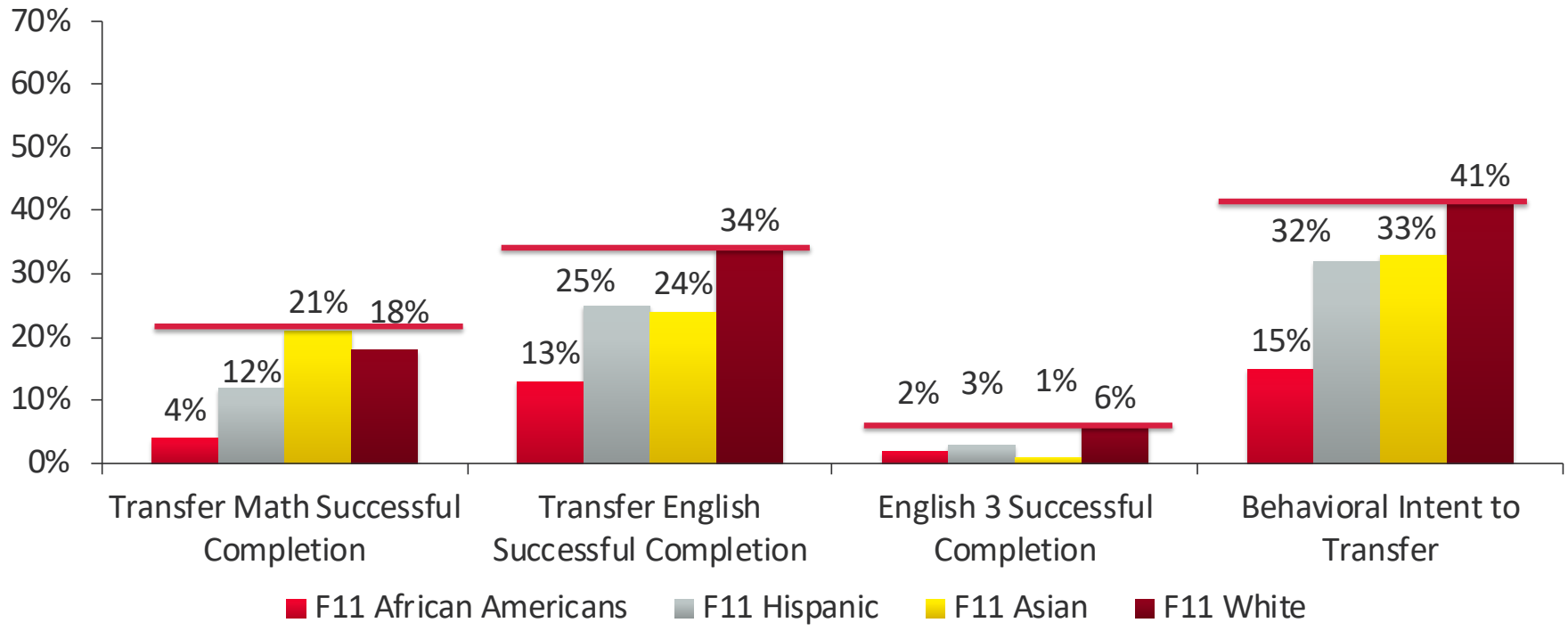

# Quantifying the contribution to inequity in completion (preliminary findings)

## Preliminary findings from one large California District




Stoup, 2015. Using Data to Identify Emergent Inequities and the Effective Practices to Address Them. Presentation to the 2015 Strengthening Student Success Conference. Paper forthcoming. bit.ly/STOUP2015

# Potential equity impact: LBCC F2011 Baseline Equity Gaps for 2-year rates of achievement



# Equity Impact: F2012 2-year rates of achievement

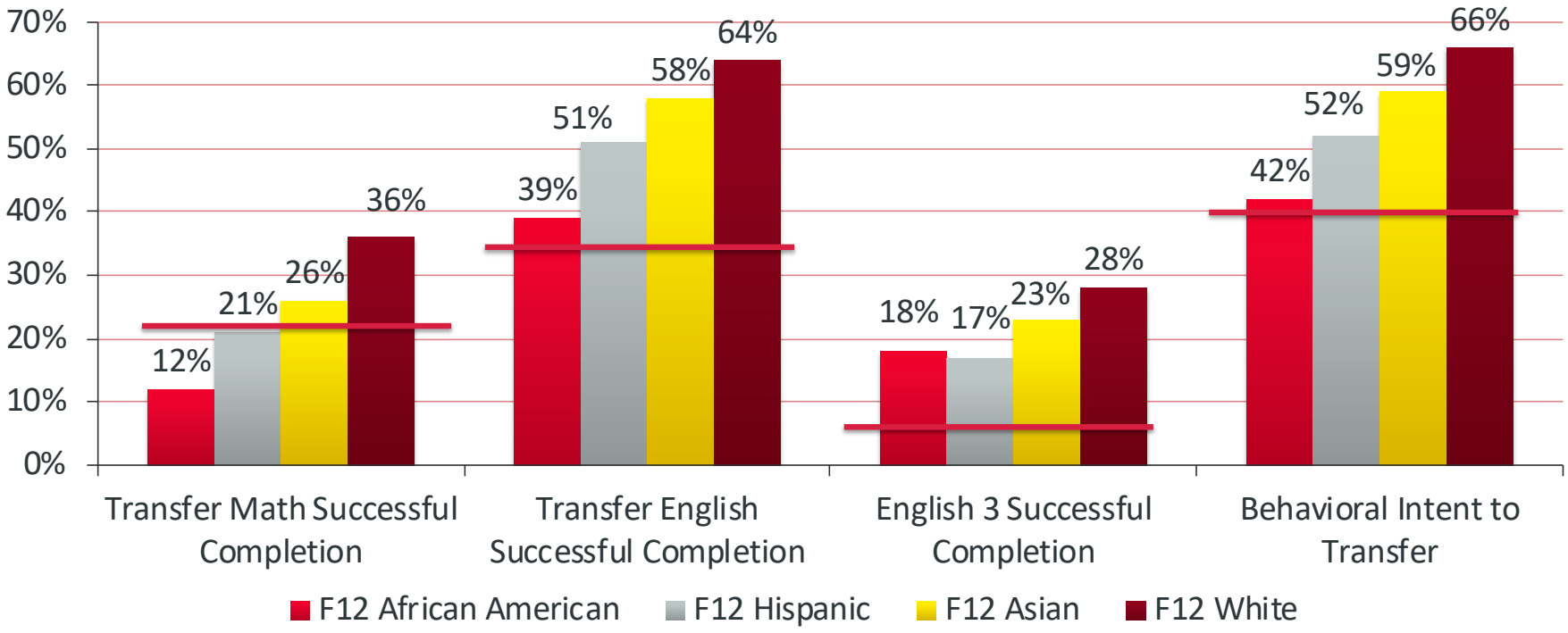
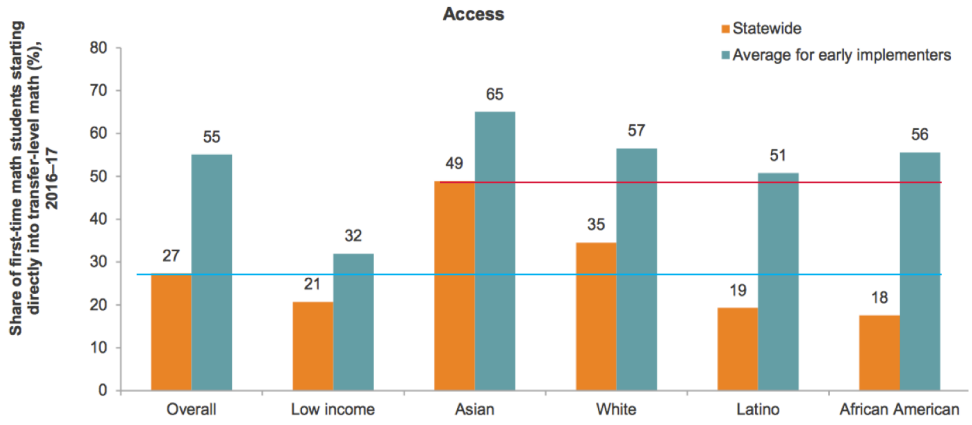


FIGURE 6

Access to and completion of transfer-level math courses have increased for all groups and equity gaps are smaller at earl implementers



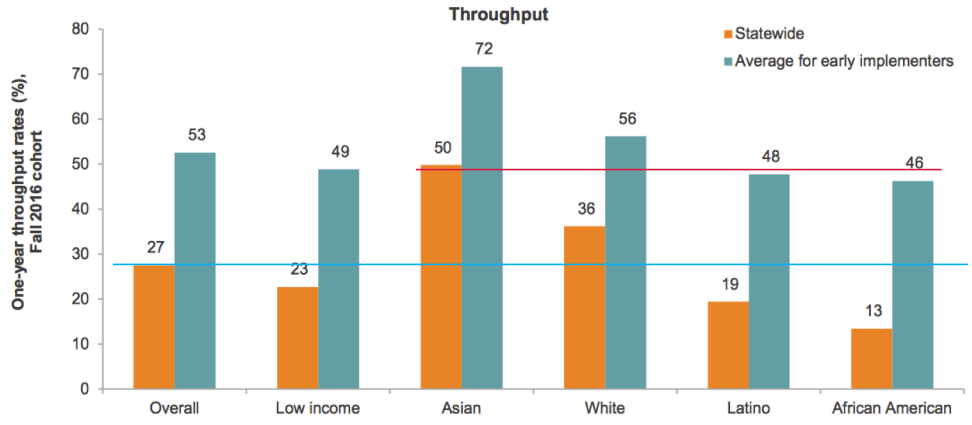
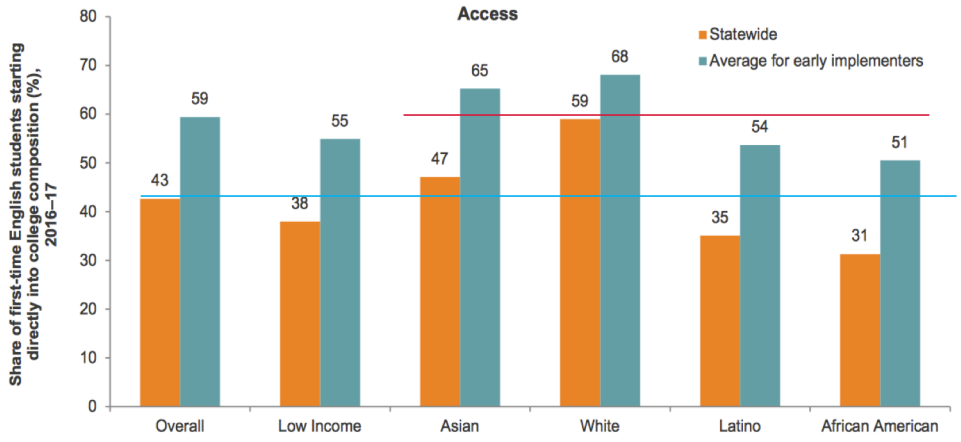
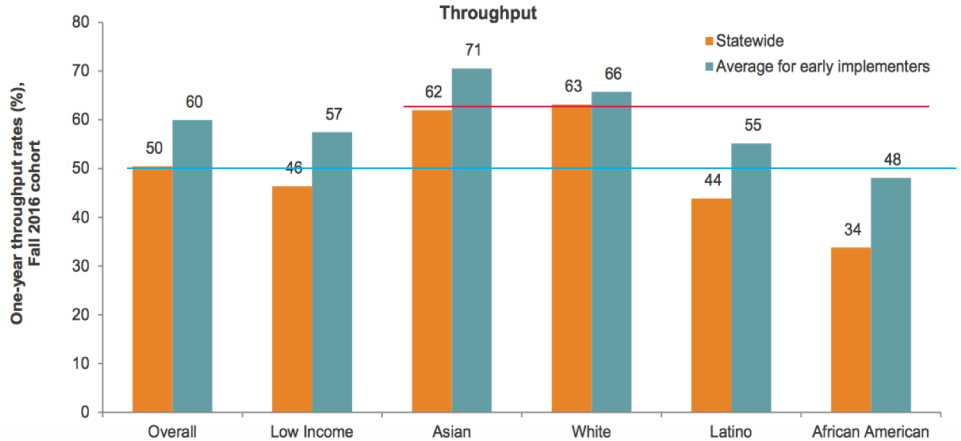




FIGURE 7

Access and throughput in transfer-level English are higher than the state average, but the differences are less marked



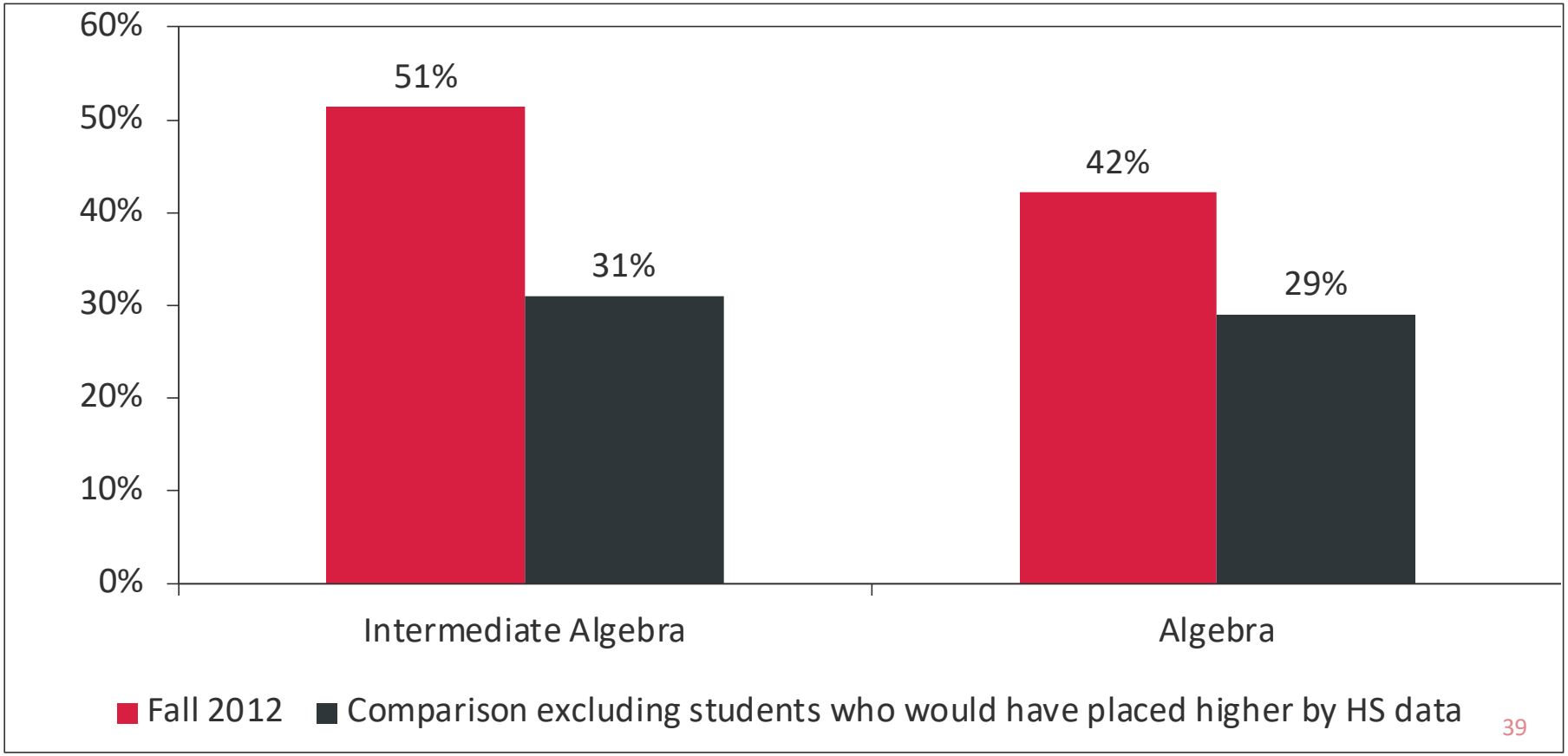




http://bit.ly/PPICEarlyEvidence

**We don’t need to do this? Our approach is working fine.**

# ARE OUR SUCCESS RATES IN DEVELOPMENTAL COURSES AS HIGH AS WE THINK THEY ARE?

# LBCC Success Rates in Intermediate Algebra and Algebra

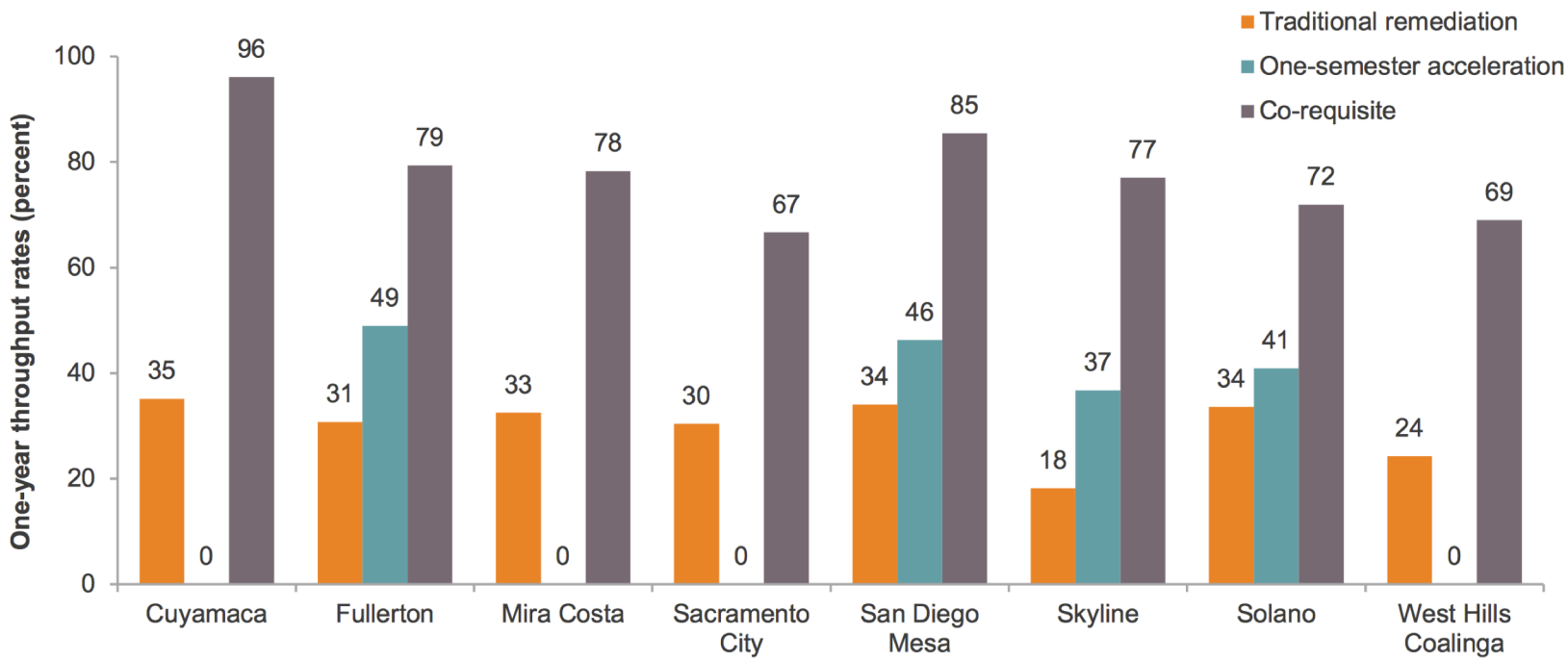


# AREN'T OUR COMPRESSION/ONE LEVEL BELOW ACCELERATION COURSES ACHIEVING A GREAT DEAL

# One semester acceleration vs. corequisite

**FIGURE 4**

Co-requisite students completed college composition at more than twice the rate of students who started in traditional remediation

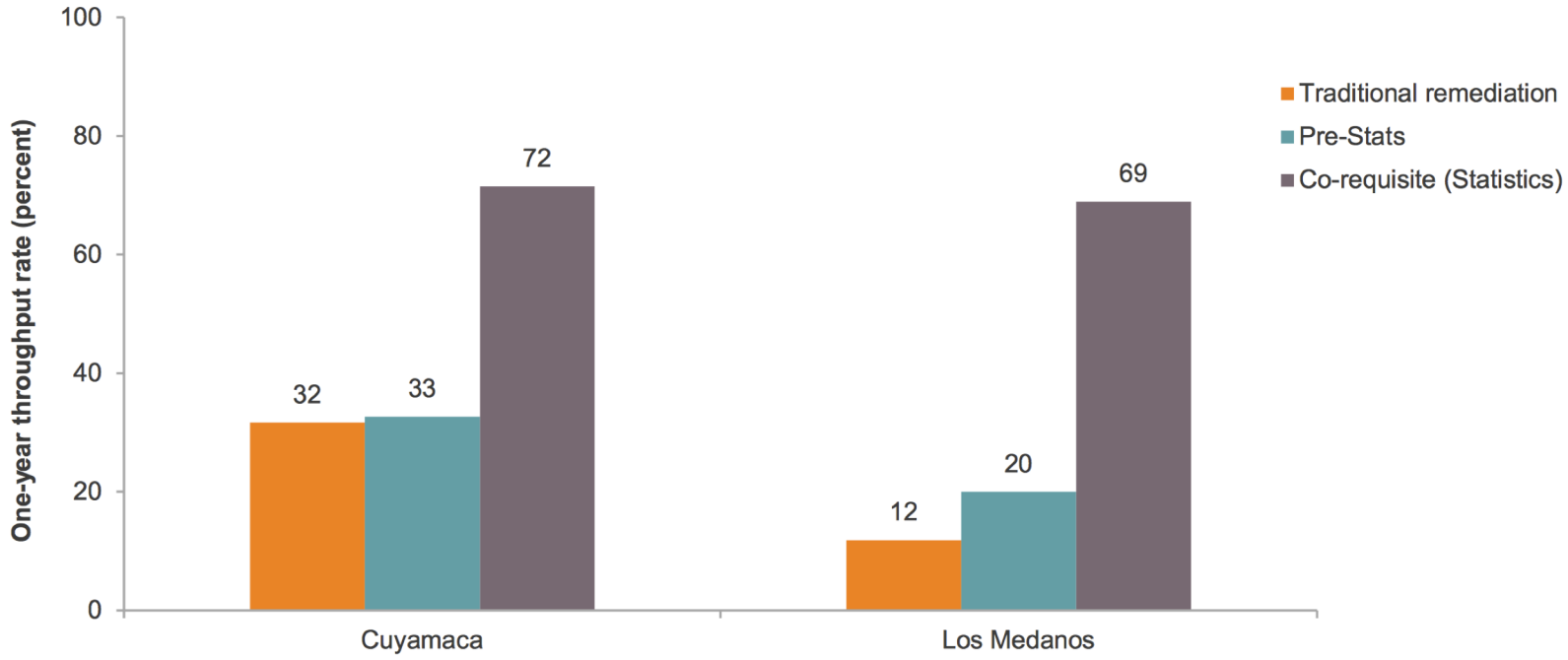



bit.ly/PPICEarlyEvidence

# One semester acceleration vs. corequisite

**FIGURE 5**

Co-requisite students were more likely to complete transfer-level statistics within one year



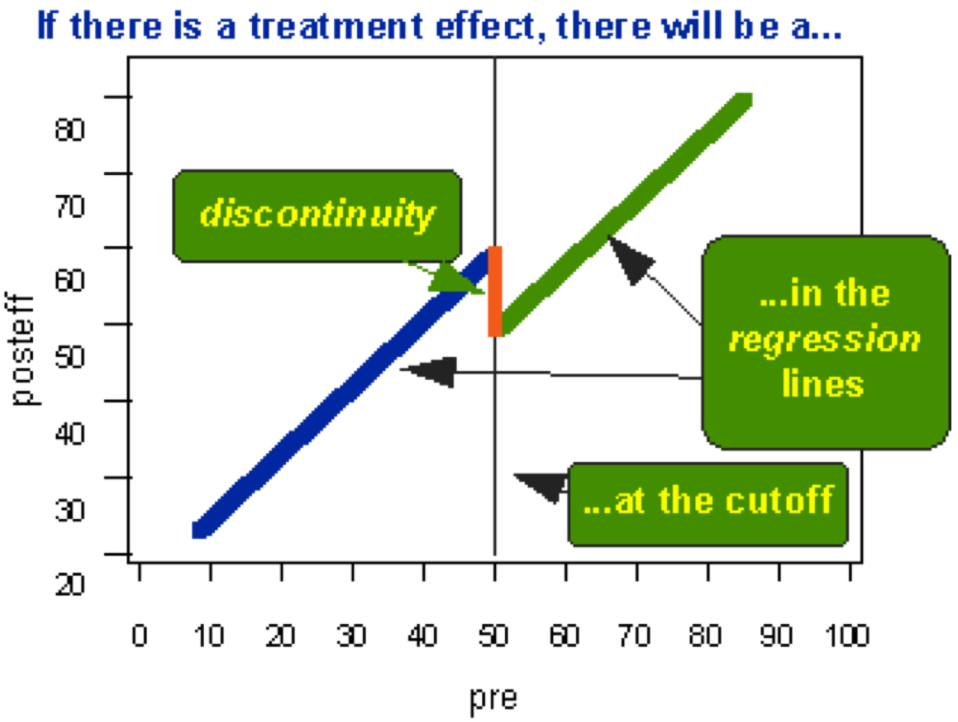

bit.ly/PPICEarlyEvidence

# ARE OUR DEVELOPMENTAL COURSES CHANGING STUDENT TRAJECTORIES?

Evidence from regression discontinuity designs

# Regression Discontinuity Designs

- Compares students on either side of cut score
- Developmental education should have significant positive impact for essentially otherwise identical students
- Recent meta-analysis (Valentine, Konstantopoulos, & Goldrick-Rab, 2017): placement in developmental education has "effects that are negative, statistically significant, and substantively large" for:
  - gateway course completion
  - college credits earned
  - degree/transfer.
- See also http://bit.ly/CCRCDEVED



## Overview of Findings on Outcomes for Developmental Students[9]

Positive  Negative  Null

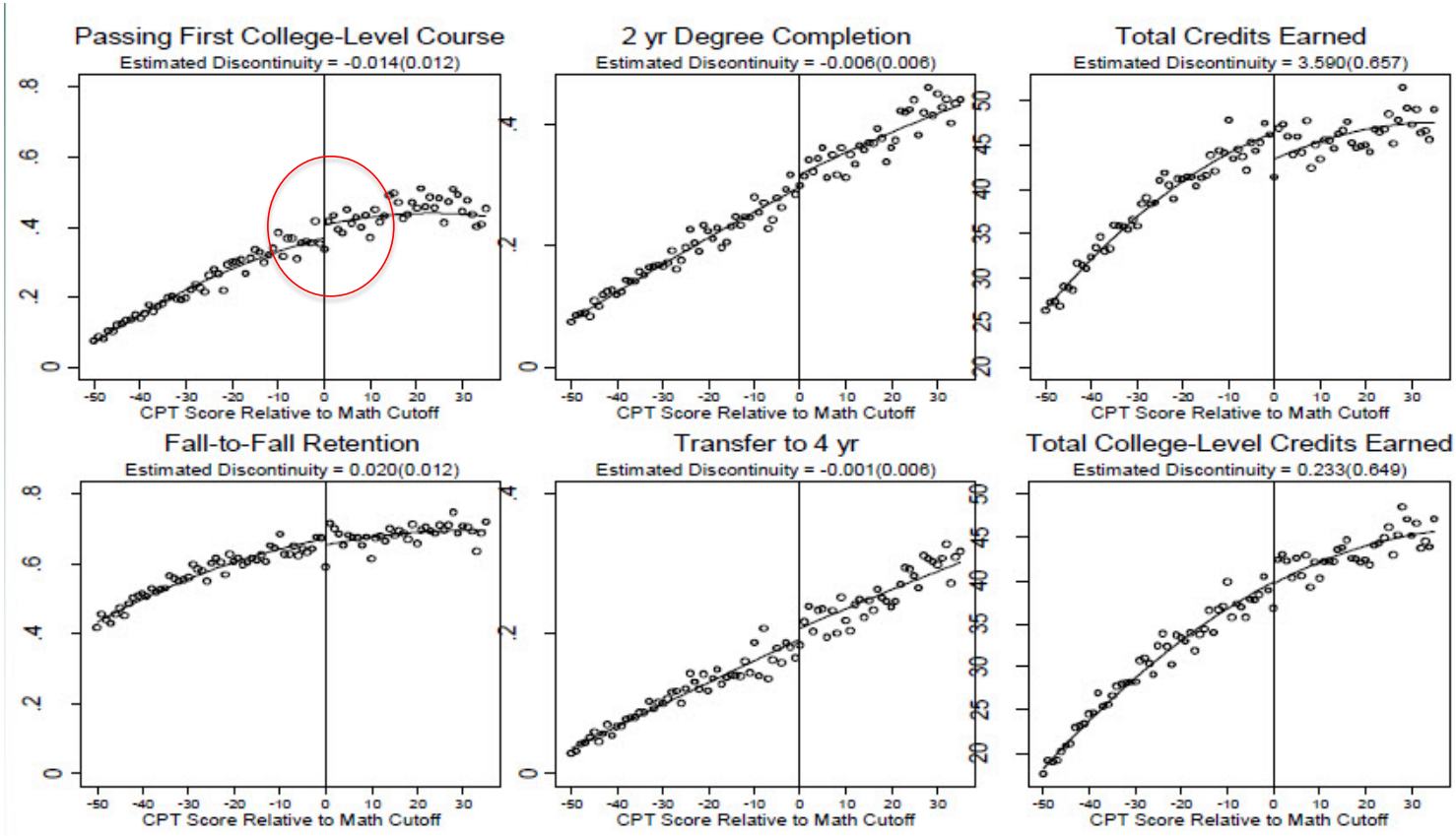
### DEVELOPMENTAL MATH STUDENTS

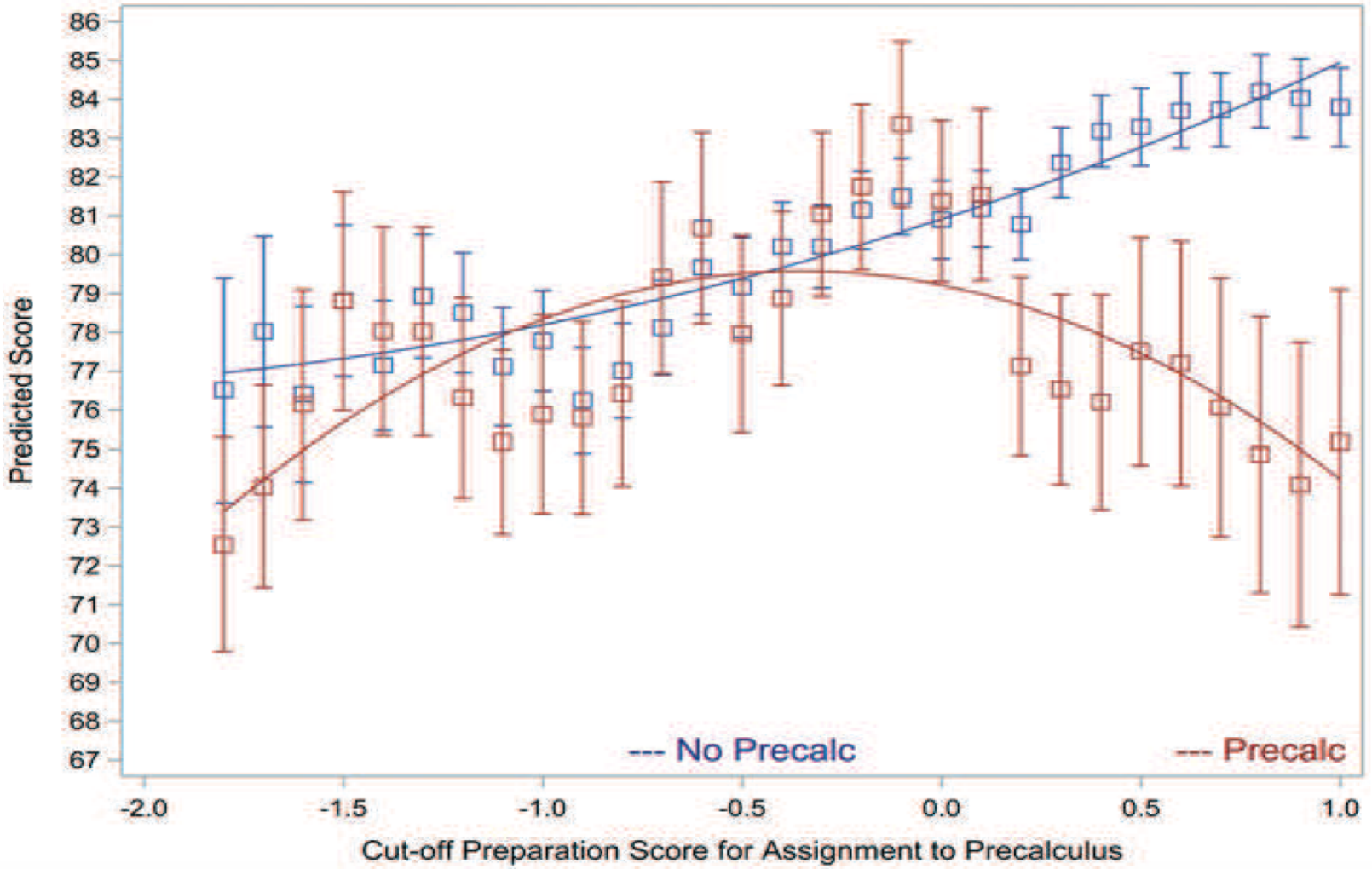
| | | Short-Term Impacts | | | Medium- & Long-Term Impacts | | |
|---|---|---|---|---|---|---|---|
| Study | Level | Persistence | Passed College-Level Math | Grade in College-Level Math | Persistence | College-Level Credits Earned | Credential and/or Transfer |
| TENNESSEE[10] | UPPER | NEG | | NULL (conditional) | NULL | NULL (conditional) | NEG (credential) |
| TEXAS[11] | UPPER | NULL | | | | | NULL |
| OHIO[12] | UPPER | | | | NULL | | POS (transfer) |
| LUCCS[13] | UPPER | | NEG | NEG | NULL | NULL | NULL |
| FLORIDA[14] | UPPER | NULL | NULL | | | NULL | NULL |
| VIRGINIA 1[15] | LOWER vs. MIDDLE | | NULL | | | | NEG (credential) |
| TENNESSEE | LOWER vs. MIDDLE | NULL | | NULL (conditional) | NULL | NULL (conditional) | POS (credential) |

*Note. "Conditional" signifies that only outcomes for students who enrolled in college-level courses, or persisted in college, were compared. LUCCS stands for large urban community college system.*

http://bit.ly/CCRCDEVED

# Math (CCRC: 17 CUNY CCs)






Source: Sonnert, G., & Sadler, P. M. (2014). The impact of taking a college precalculus course on students' college calculus performance. *International Journal of Mathematical Education in Science and Technology*, *45*(8), 1188-1207

## DEVELOPMENTAL WRITING STUDENTS

| | | Short-Term Impacts | | | Medium- & Long-Term Impacts | | |
|---|---|---|---|---|---|---|---|
| Study | Level | Persistence | Passed College-Level English | Grade in College-Level English | Persistence | College-Level Credits Earned | Credential and/or Transfer |
| TENNESSEE | UPPER | NEG | | NULL (conditional) | NULL | NEG (conditional) | NEG (credential) |
| VIRGINIA 2 | UPPER | NULL | NULL (conditional) | | | NULL | NULL |
| LUCCS | Writing & Reading vs. Reading Only | | NULL | NULL | NULL | NULL | NULL |
| VIRGINIA 2 | LOWER vs. UPPER | NEG | NULL (conditional) | | | NEG | NULL |
| TENNESSEE | LOWER vs. UPPER | POS | | POS (conditional) | NULL | NULL (conditional) | NULL (credential) |

*Note. "Conditional" signifies that only outcomes for students who enrolled in college-level courses, or persisted in college, were compared. LUCCS stands for large urban community college system.*

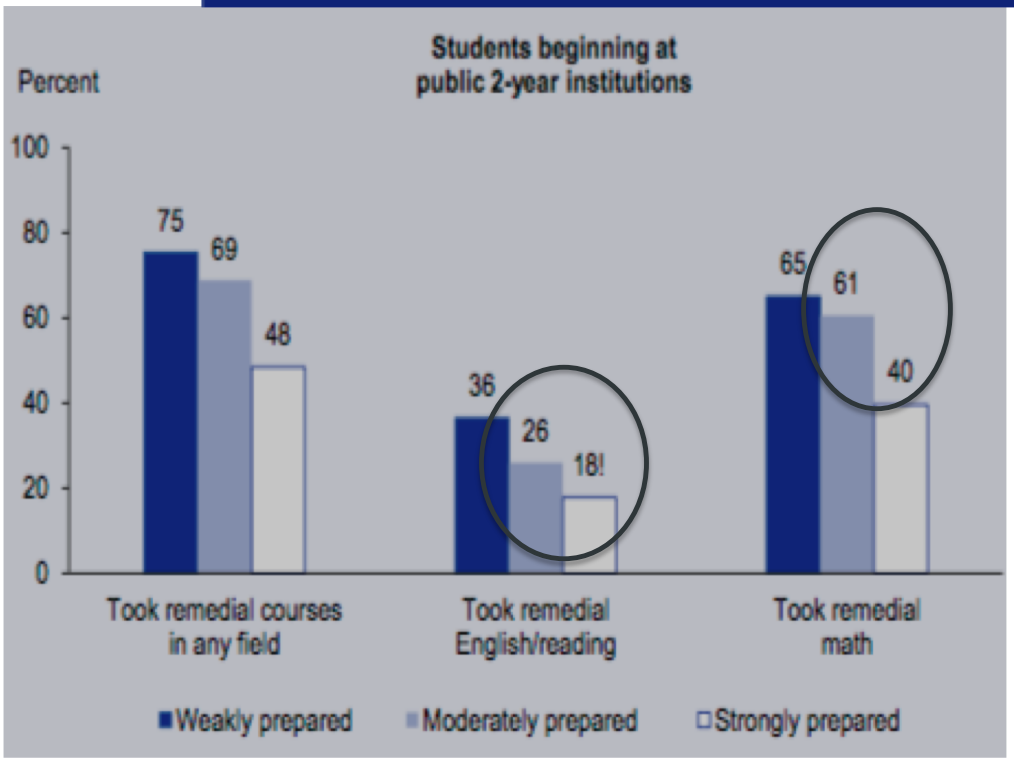
http://bit.ly/CCRCDEVED

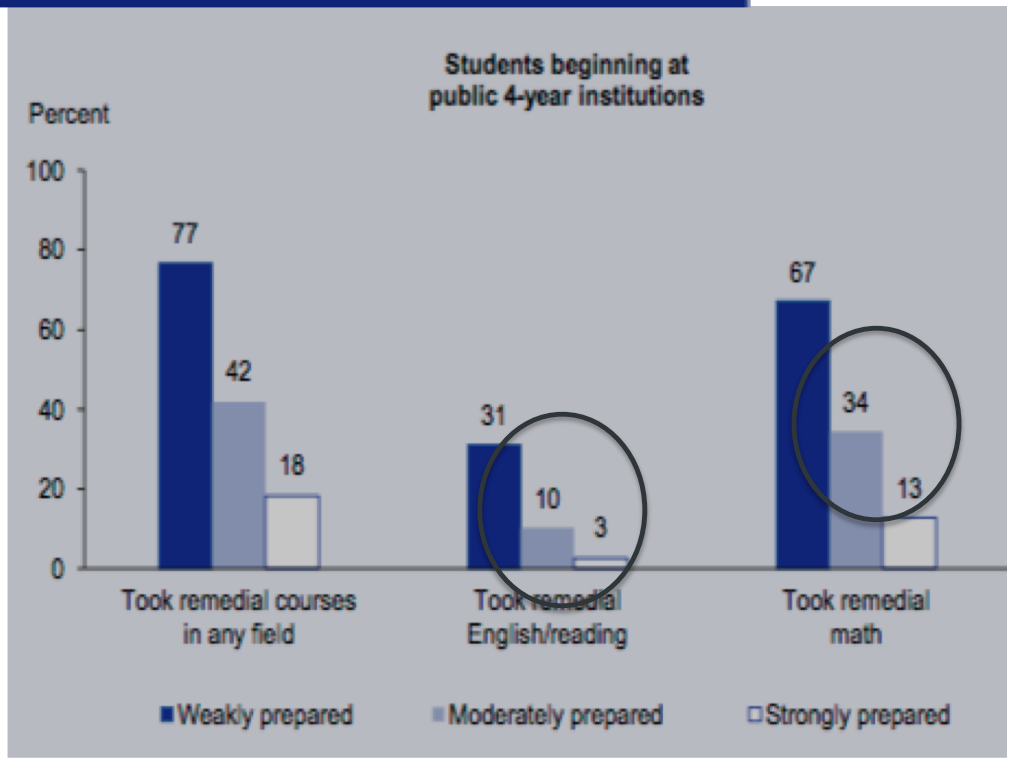
# IES Report on impact of placement into Developmental Education

- Assignment to development education had no significant positive but some negative impacts for moderate to strongly prepared students (see Table A)
  - Moderate preparation = meet at least two: HSGPA >2.5, one course above Algebra 2, SAT (or ACT equivalent) > 840
  - Outcomes: completing college-level course in discipline, number of college credits completed, transfer to four-year institution, completion of four-year degree, exiting college in first two years without a degree
  - Underrepresented students of color, first generation college students, low SES students, and women disproportionately assigned to developmental education **bit.ly/IESRemedial**

# Moderately/strongly prepared students assigned to developmental education in 2-year colleges more often

**Figure 1.**
**REMEDIAL COURSETAKING: Among 2003–04 beginning postsecondary students who first enrolled in public 2- and 4-year institutions, percentage who took remedial courses in various fields, by precollege academic preparation: 2003–09**



# Why might developmental education not demonstrate the positive effects we expect?

- **Semester long intervention should have strong positive effects***
- **Potential beneficial effects are masked/degraded by underplacement**
  - **Placing high-achieving high school students in developmental education means developmental education will have minimal benefits**
  - **Such placement may have active negative effects**
    - e.g., discouragement, cynicism, anger, disidentification, undermining of academic/math self-confidence, undermining of taking course seriously, increased time to completion/increased opportunity for life/running out of financial aid to interrupt education)
  - **Distortions of standards of comparison/grading curve by underplaced students puts students who need course at significant disadvantage**
  - **Distortions to pedagogical feedback to instructor from students**

# What about X students?

# What did disaggregation of the basic findings that all students are more likely to complete college-level if they start there show?

- There were no identifiable groups of students who completed a college-level course at a higher rate when starting in developmental education than if simply placed directly into the college-level course.
  - This patterns holds across ethnicity, gender, EOPS and DSPS status (ELL status in high school and Pell-eligible students as well)
  - Webinar: bit.ly/AB705DISAGG
  - DSPS/EOPS Report: bit.ly/AB705SpecialPop
  - Gender/Ethnicity Report: bit.ly/AB705GenderEth Technical Report: https://bit.ly/2JgxK8L

# English comparisons by HSPGA level by gender

## Success rates if placed directly

| Gender | HS GPA<1.9 | | HS GPA≥1.9 & <2.6 | | HS GPA≥2.6 | |
|---|---|---|---|---|---|---|
| | Rate | N | Rate | N | Rate | N |
| Female | 37% | 1,540 | 56% | 9,173 | 80% | 26,636 |
| Male | 38% | 2,952 | 54% | 11,653 | 78% | 20,485 |

## Successful completion of transfer-level if start one-level below

| Gender | HS GPA<1.9 | | HS GPA≥1.9 & <2.6 | | HS GPA≥2.6 | |
|---|---|---|---|---|---|---|
| | Rate | N | Rate | N | Rate | N |
| Female | 12% | 3,370 | 25% | 13,336 | 41% | 18,186 |
| Male | 12% | 5,069 | 24% | 13,590 | 38% | 12,180 |

# Direct Placement Success Rate Advantage Relative to Successful Completion of Transfer-level if Starting One Level Below

| | HS GPA<1.9 | HS GPA≥1.9 & <2.6 | HS GPA≥2.6 |
|---|---|---|---|
| **Gender** | | | |
| Female | 25% | 31% | 39% |
| Male | 26% | 30% | 40% |
| | | | |
| **ELL Designation** | | | |
| No ELL Designation | 26% | 32% | 40% |
| ELL Designation | 23% | 30% | 40% |

# Direct Placement Success Rate Advantage Relative to Successful Completion of Transfer-level if Starting One Level Below

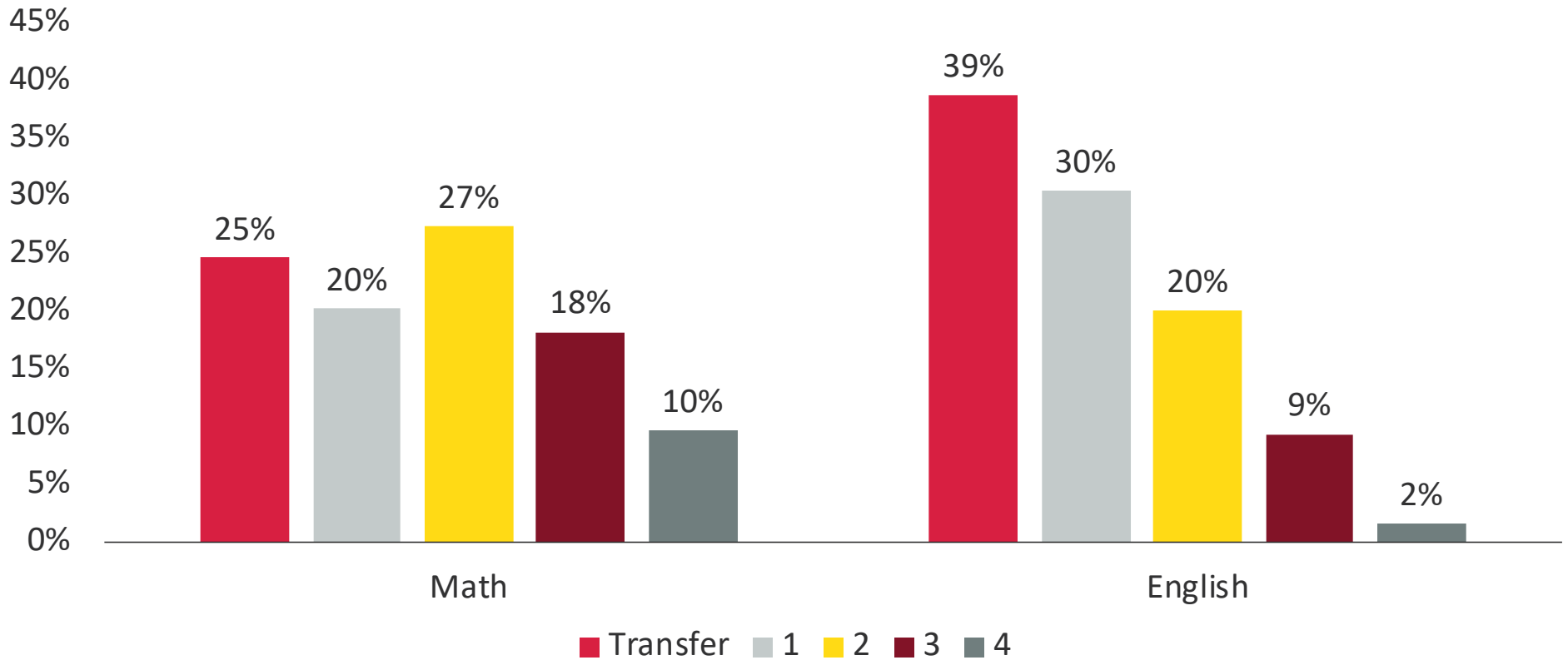
| Ethnicity | HS GPA<1.9 | HS GPA≥1.9 & <2.6 | HS GPA≥2.6 |
|---|---|---|---|
| Asian | 24% | 32% | 51% |
| African American | 21% | 26% | 39% |
| Filipino | 18% | 29% | 40% |
| Hispanic | 25% | 29% | 37% |
| Native American | 12% | 29% | 33% |
| Pacific Islander | 22% | 34% | 30% |
| Two or more races | 24% | 24% | 40% |
| White | 28% | 31% | 36% |
| Unknown | 23% | 31% | 39% |

# Direct Placement Success Rate Advantage Relative to Successful Completion of Transfer-level if Starting One Level Below

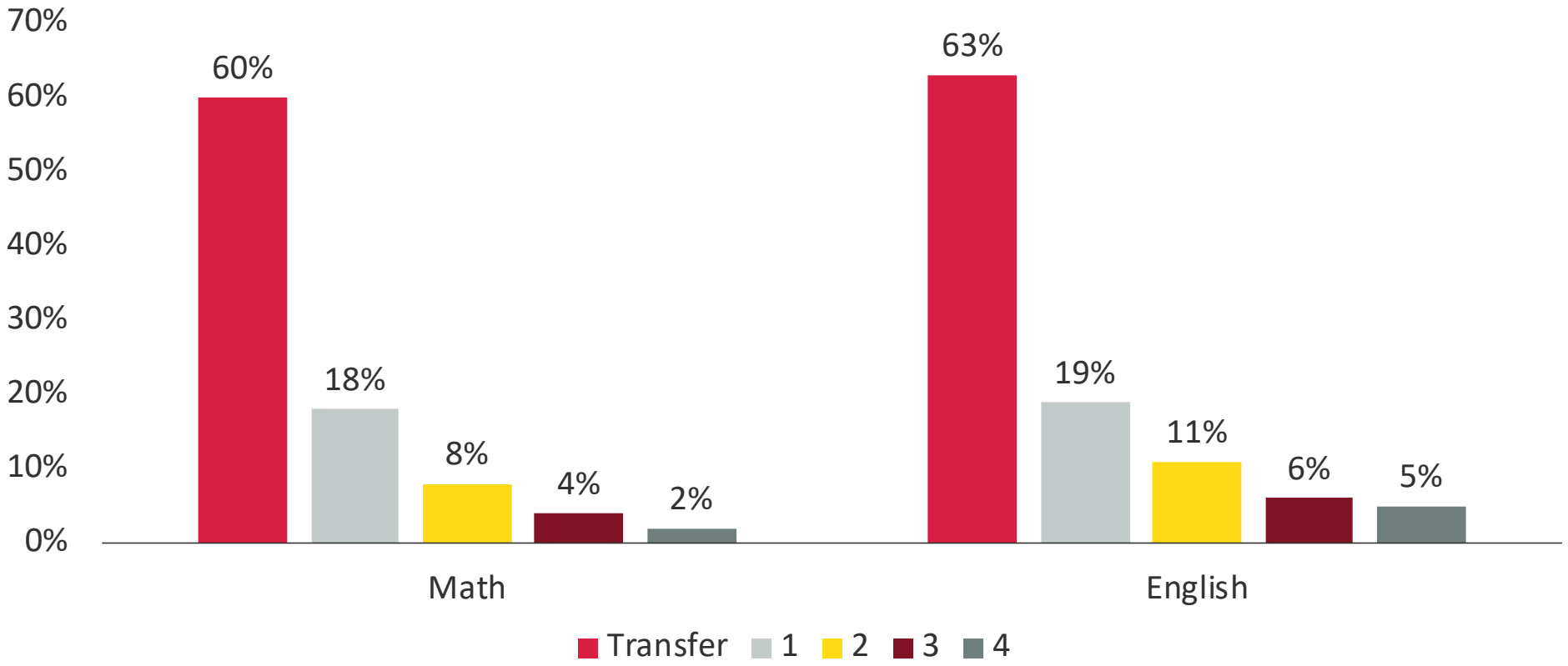
| | HS GPA<1.9 | HS GPA≥1.9 & <2.6 | HS GPA≥2.6 |
|---|---|---|---|
| **EOPS** | | | |
| Not EOPS | 25% | 32% | 40% |
| EOPS | 20% | 27% | 27% |
| | | | |
| **DSPS** | | | |
| Not DSPS | 26% | 31% | 39% |
| DSPS | 26% | 31% | 32% |
| | | | |
| **Pell** | | | |
| Not Pell | 25% | 30% | 42% |
| Pell | 26% | 32% | 34% |

# Why is this so robust? Who actually completes college level courses?

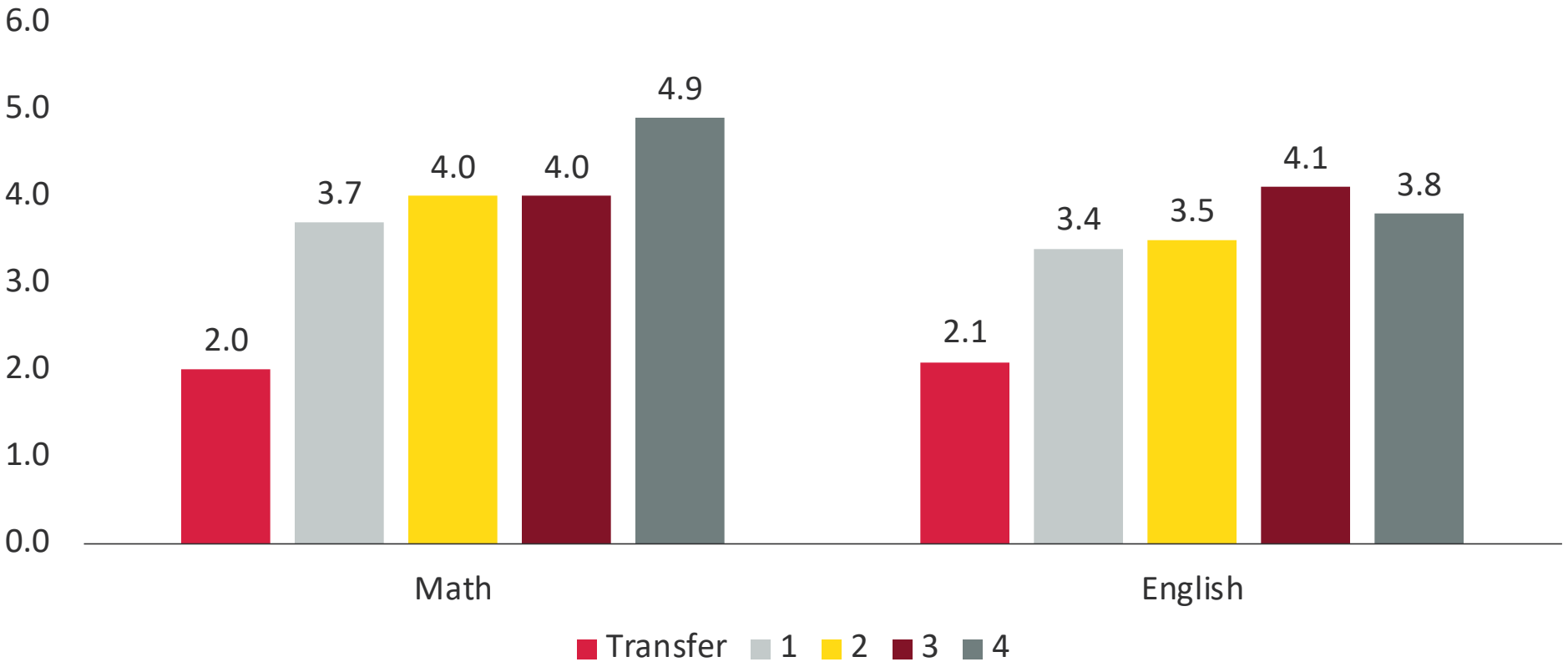
# Level of first attempt, Fall 2007 CCC students (by levels below transfer of first attempt)



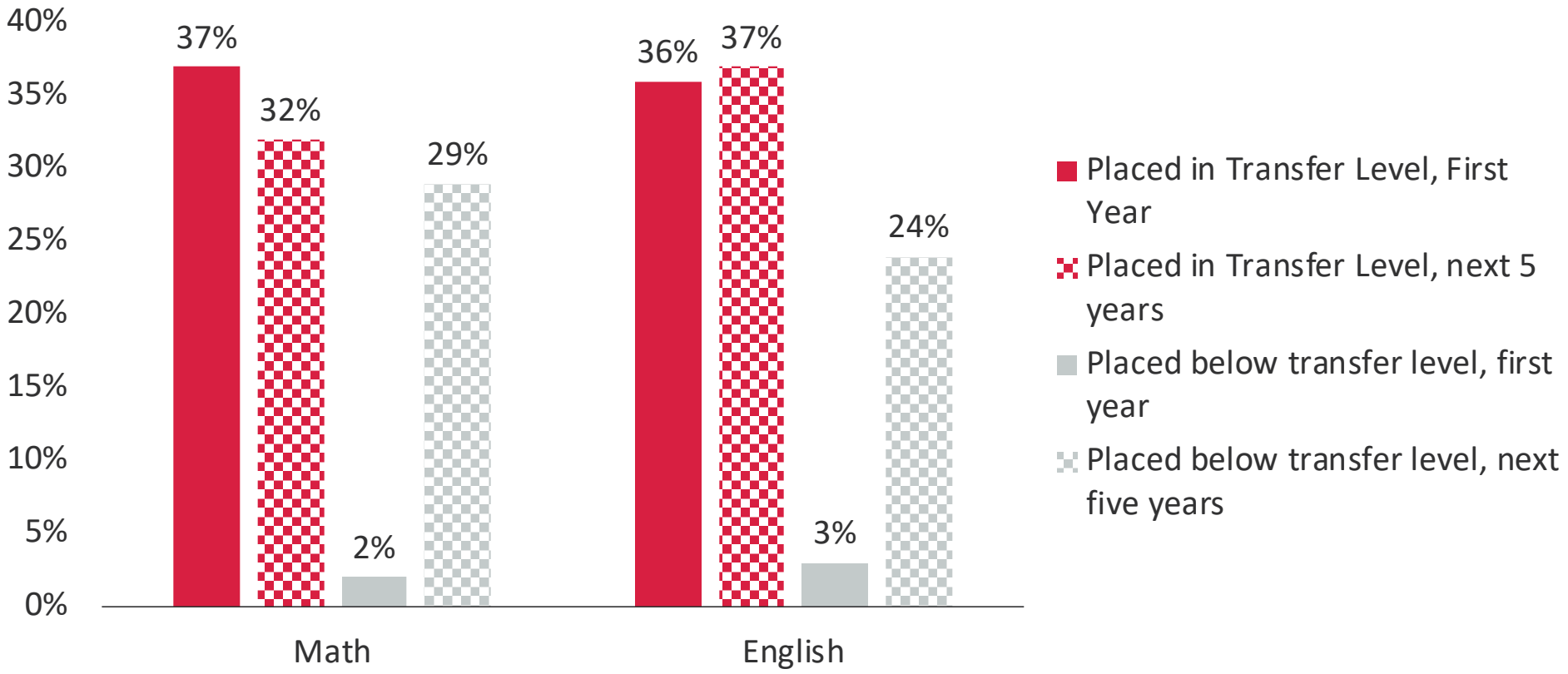
# Percentage completion of transfer-level course (by level of first attempt)



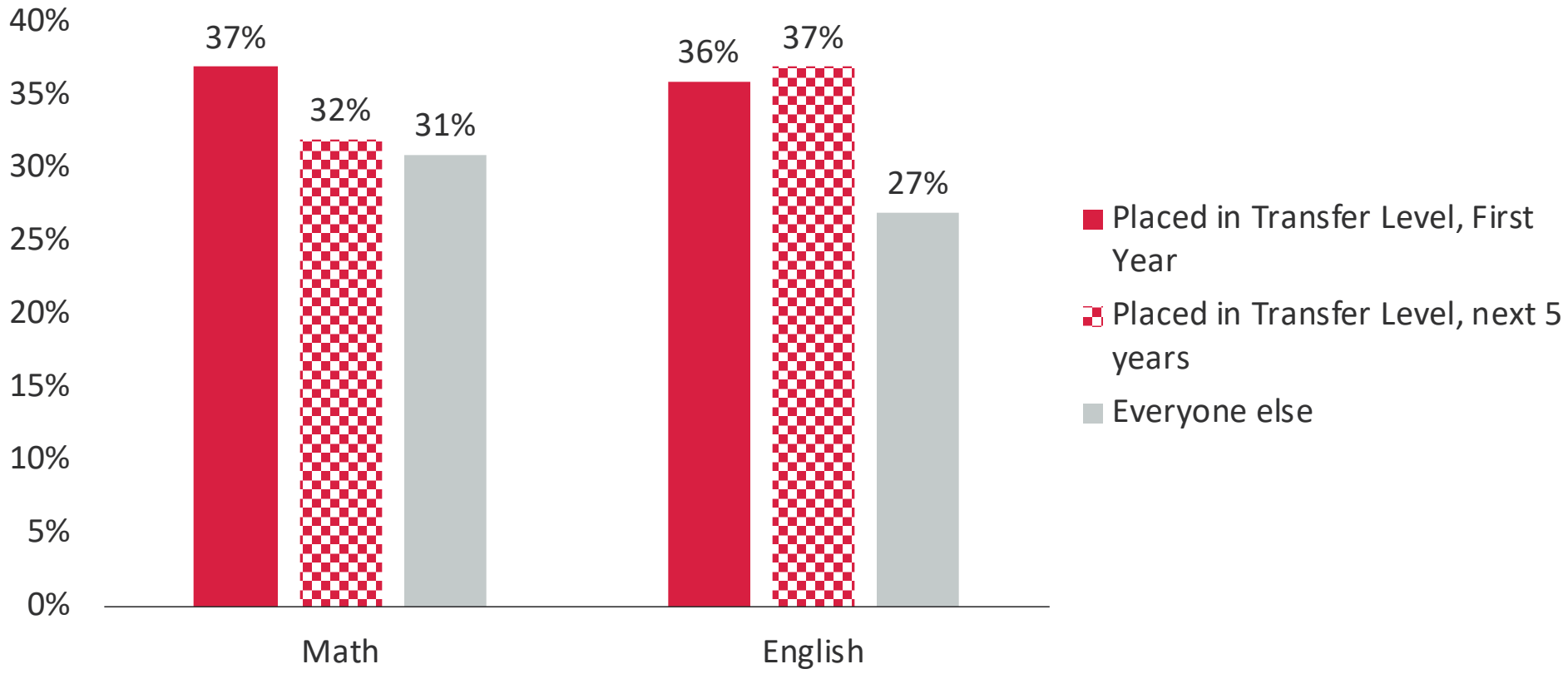
# Among completers, average year of completion of transfer-level course (by level of first attempt)



# Among completers, distribution of completions by F2007 first-time students



# Among completers, distribution of completions by F2007 first-time students



# What about different approaches to corequisite support?

http://bit.ly/RandCoreq

# Five primary models

- Paired-course
  - Course similar to prerequisite (usually just “deved” students)
- Extended instructional time
  - Added unit or two to existing course
- Accelerated Learning Program models
  - Mixed college level + smaller deved only attached course
- Academic support service
  - Required participation in supplemental instruction or learning activities
- Technology-mediated support
  - Usually computer adaptive, self-pacing filling in of potential skills gaps

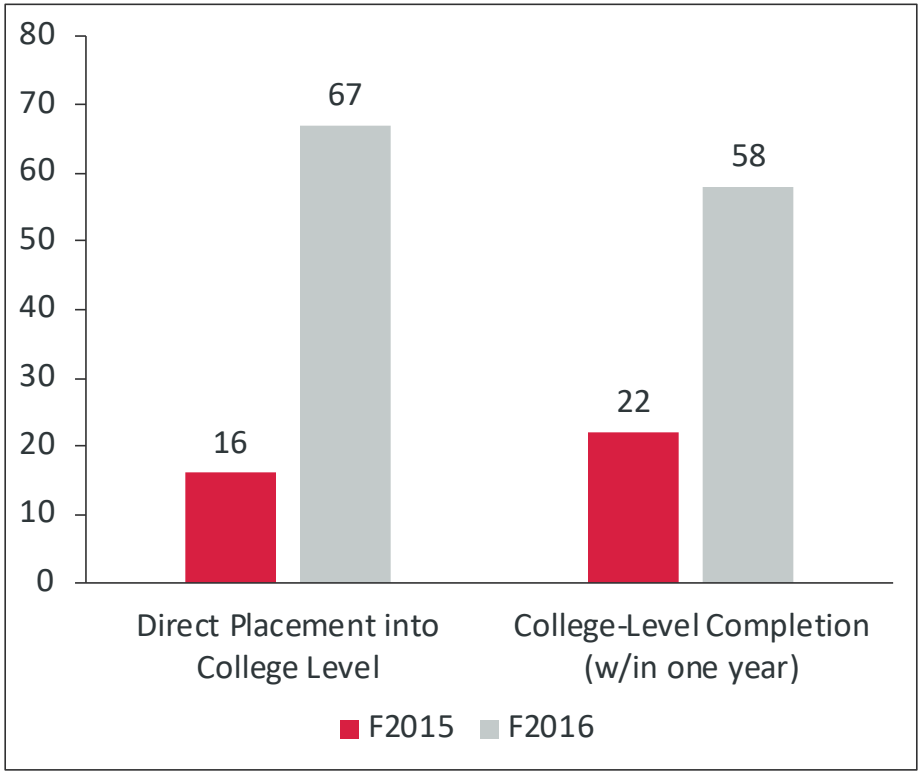
- To date, none yet appears definitively better or lacking
  - The structural change appears to carry the load

# Lots of challenges

- Tradeoff b/w increased instructor contact time models often associated with difficulty with costs, rooms, schedules, and SIS
- Uncertainty breeds inaction
- Change in pedagogical practice has time, monetary, and resource costs and may not easily achievable by some faculty
- Beliefs about students and effectiveness of new approach by faculty and student support services
- Evaluating effectiveness when placement reform hasn't occurred

# One elegant example

- College of the Siskiyous change to college-level statistics
  - Lowered lecture units and increased lab units, for broad range of support and tutoring (Extended Instructional Time model)

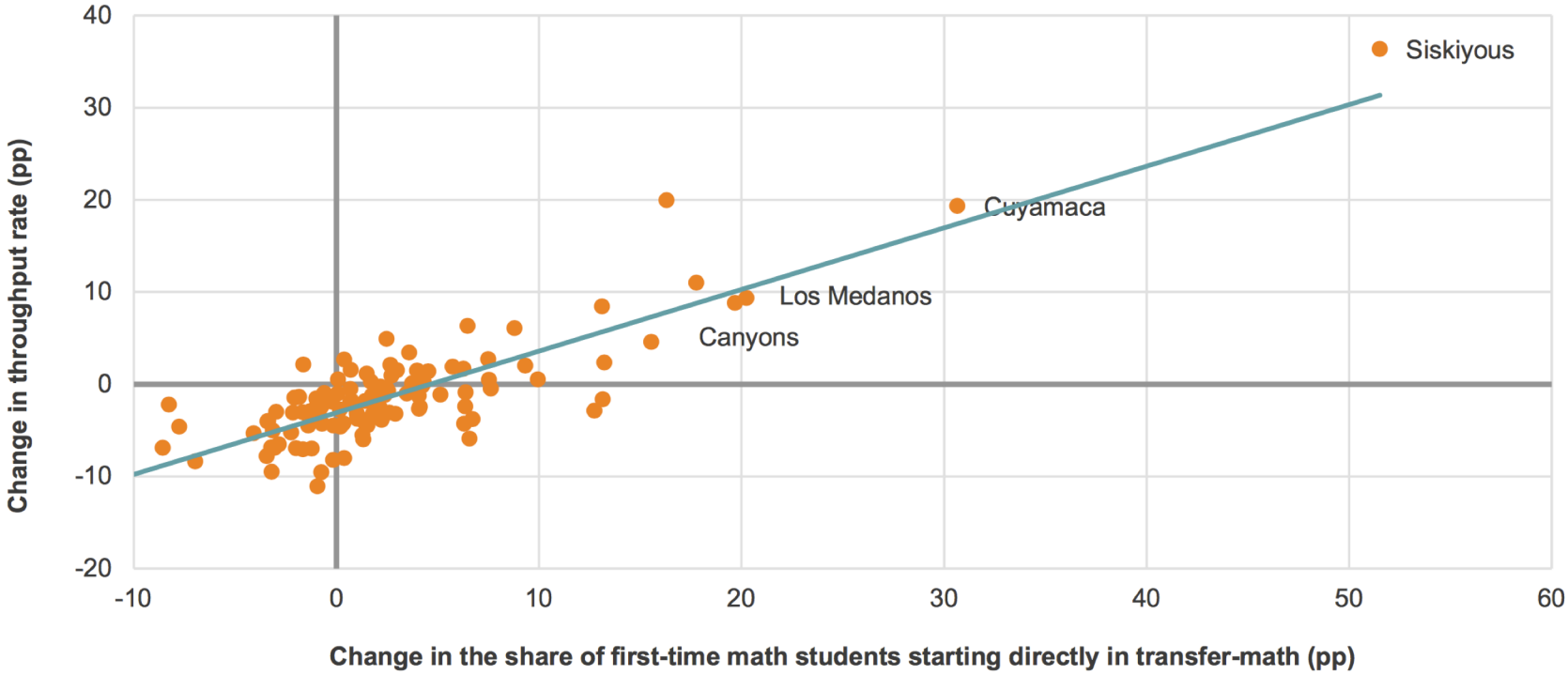



Adapted from bit.ly/PPICEarlyEvidence

# A theme emerges again

FIGURE 2

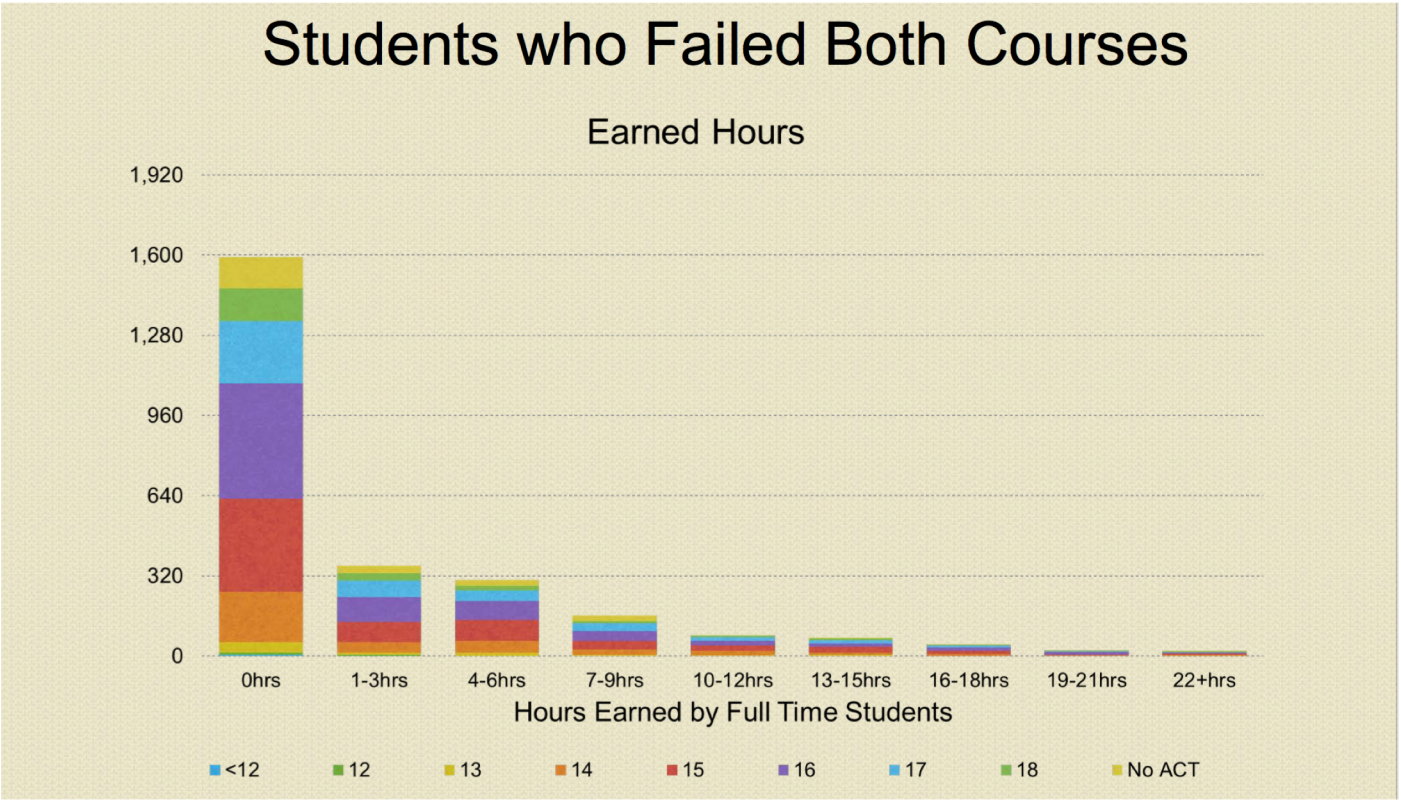
Increased access to transfer-level math is strongly linked to increases in throughput




From bit.ly/PPICEarlyEvidence

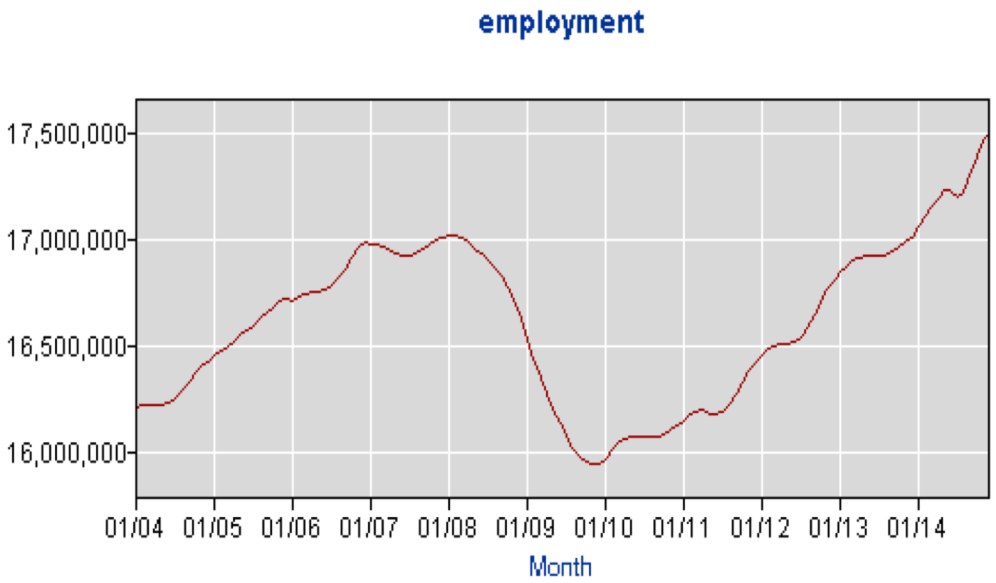
# What about the students who aren't completing in the corequisite format?

# It doesn't appear to be specific to the discipline/course




from: bit.ly/Denley2017

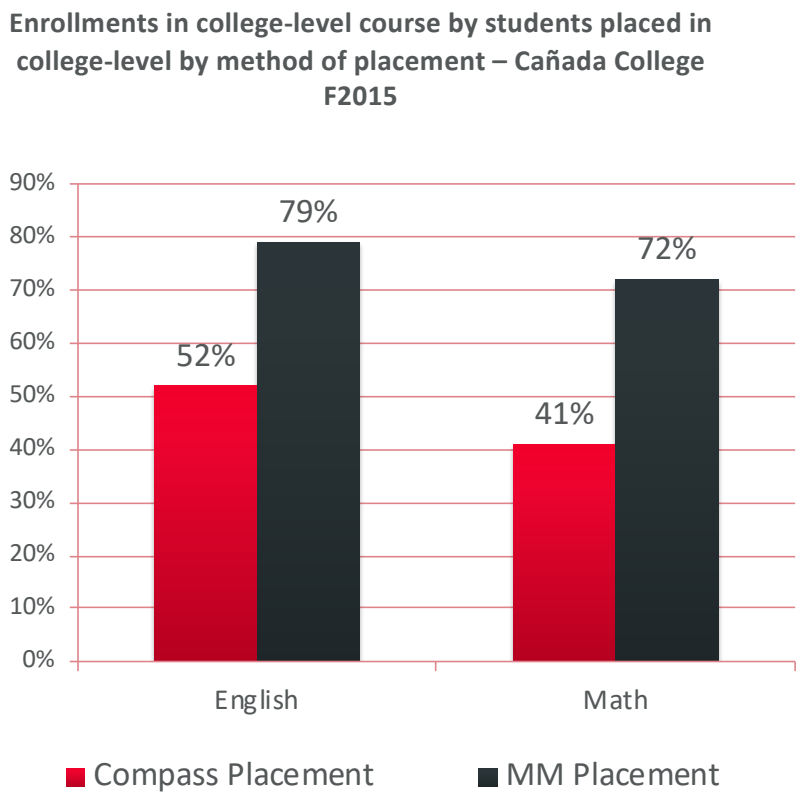
# What might this mean for all of us?
## Great Recession in CA, BLS data




- The worst recession in any of our lifetimes took a million people out of the CA workforce for a year or more, causing suffering on epic scale.
- There are 2-2.5 million community college students in California who have been unnecessarily taken out of the productive workforce for a year or more.

# Potential additional benefits

- Jump start low cost early alert systems
- Better evidence basis to evaluate interventions (e.g., tutoring, supplemental instruction)
- Re-energize even strong K-12 relationships
- Mitigate biggest loss points in foundational skills sequence: failure to enroll in first course in sequence and time



# Tl;dr version

- **Biggest gains come from approaches that get students closer to and optimally directly into college-level coursework**
  - **… and provides them academic and student supports there**
- **Critical aspect of this work is actually metasupport**
  - **Reset of faculty and staff beliefs and institutional structure in support of students and their capacity**
  - **Support success not presume failure**
  - **Also need to reset student beliefs about their capacity**
    - Many corequisite and acceleration approaches build this in
    - Revise lay theories about how education works and about individual student's capacity
      - Can have profound impacts on outcomes: bit.ly/YeagerLayTheories2016

# Thanks again!

## Contact Information


- John Hetts
- Educational Results Partnership
- jhetts@edresults.org
- 714-380-2678 cell
- Twitter: @jjhetts #LetIcarusFly #CollegeLevelForAll

- bit.ly/MMAP2019
- bit.ly/PlaceRes

## Don’t have to have everything perfect!

- Better is good. … Not perfect. Better. … Do not let people tell you the fight's not worth it because you won't get everything that you want. …That makes no sense. You can make it better. Better's always worth fighting for. – BHO, 9/7/2018

# Other Miscellaneous Items

# Considering alternative math pathways: is intermediate algebra critical for success in statistics?

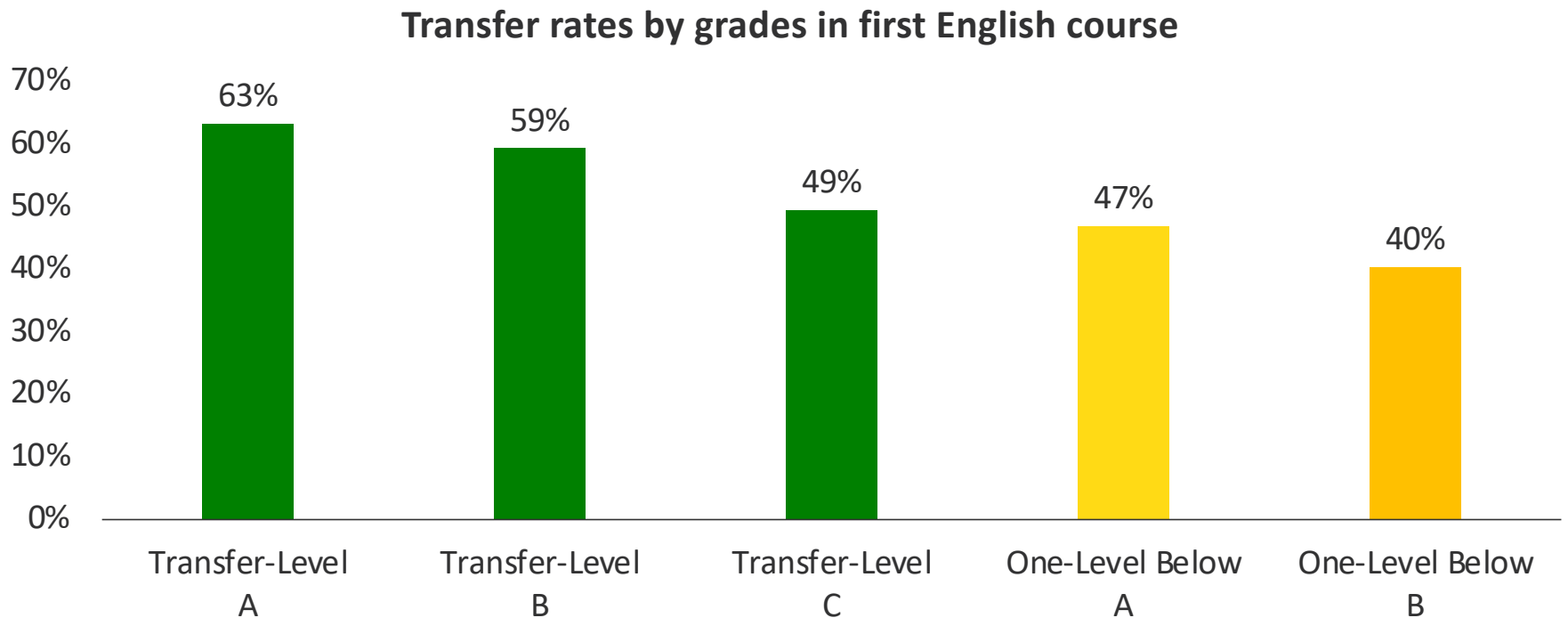
- Based on statewide data on actual performance in Statistics in the CCC's, ASCCC allowed implementation of MMAP rules at local discretion of the college for using algebra as prereq
- http://bit.ly/ASCCCPrereq

| Highest Math successfully completed in HS | Any | Higher than Algebra 2 | Algebra 2 | Algebra 1 | Neither prereq met |
|---|---|---|---|---|---|
| All students | 69% | 79% | 63% | 49% | 49% |
| MMAP statistics placement (or higher) rules met | 77% | 80% | 72% | 60% | 74% |
| MMAP statistics placement rules not met | 48% | 47% | 50% | 44% | 41% |

# Could this affect student's likelihood of transfer?

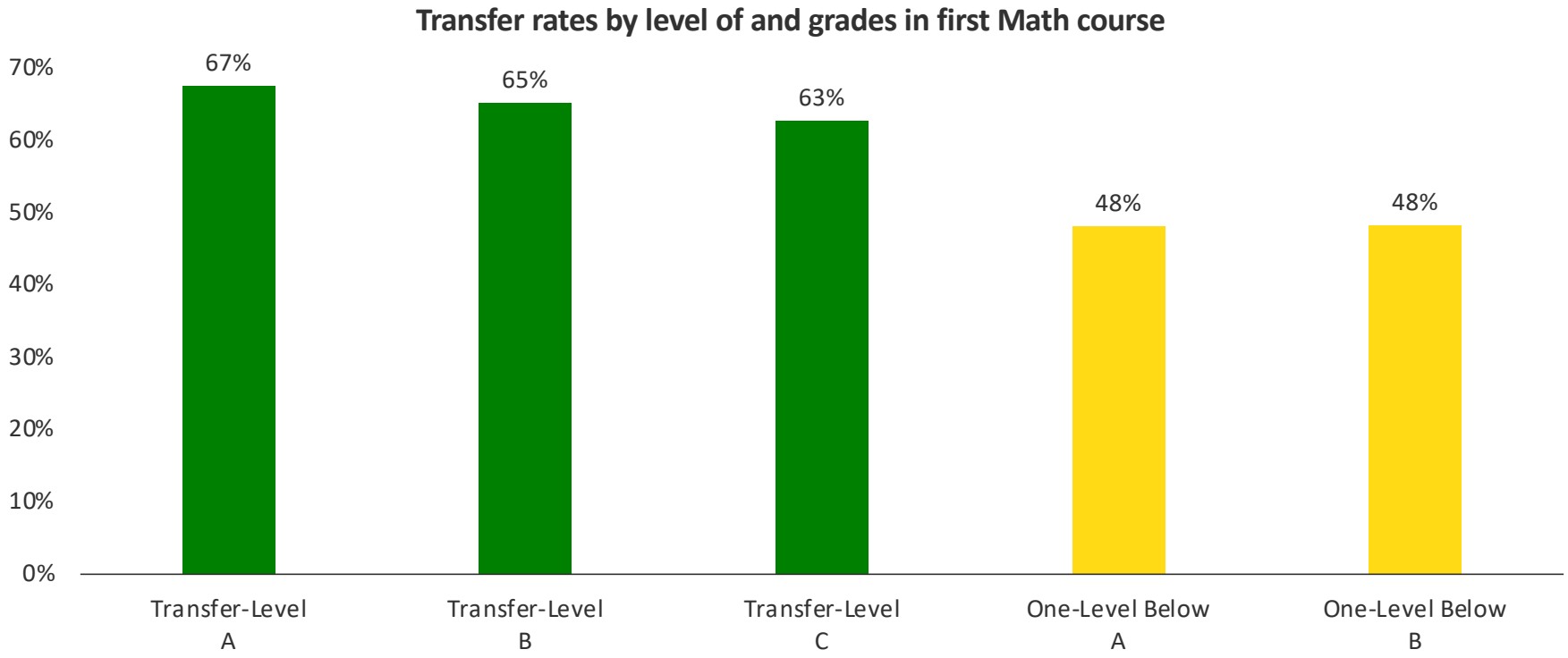
**(setting aside vast differences in becoming eligible to transfer)**

# Students who get a C in transfer-level course are more likely to transfer




Hayward & Fagioli (in preparation) Irvine Valley College Multiple Measures Research: First course enrolled in, Spring 2000 to Fall 2011 - transfer within 4 years of course

# Students who get a C in transfer-level are more likely to transfer




Hayward & Fagioli (in preparation) Irvine Valley College Multiple Measures Research: First course enrolled in, Spring 2000 to Fall 2011 - transfer within 4 years of course

# Technical details of AB705 Adjustments

# Adapting MMAP to AB 705

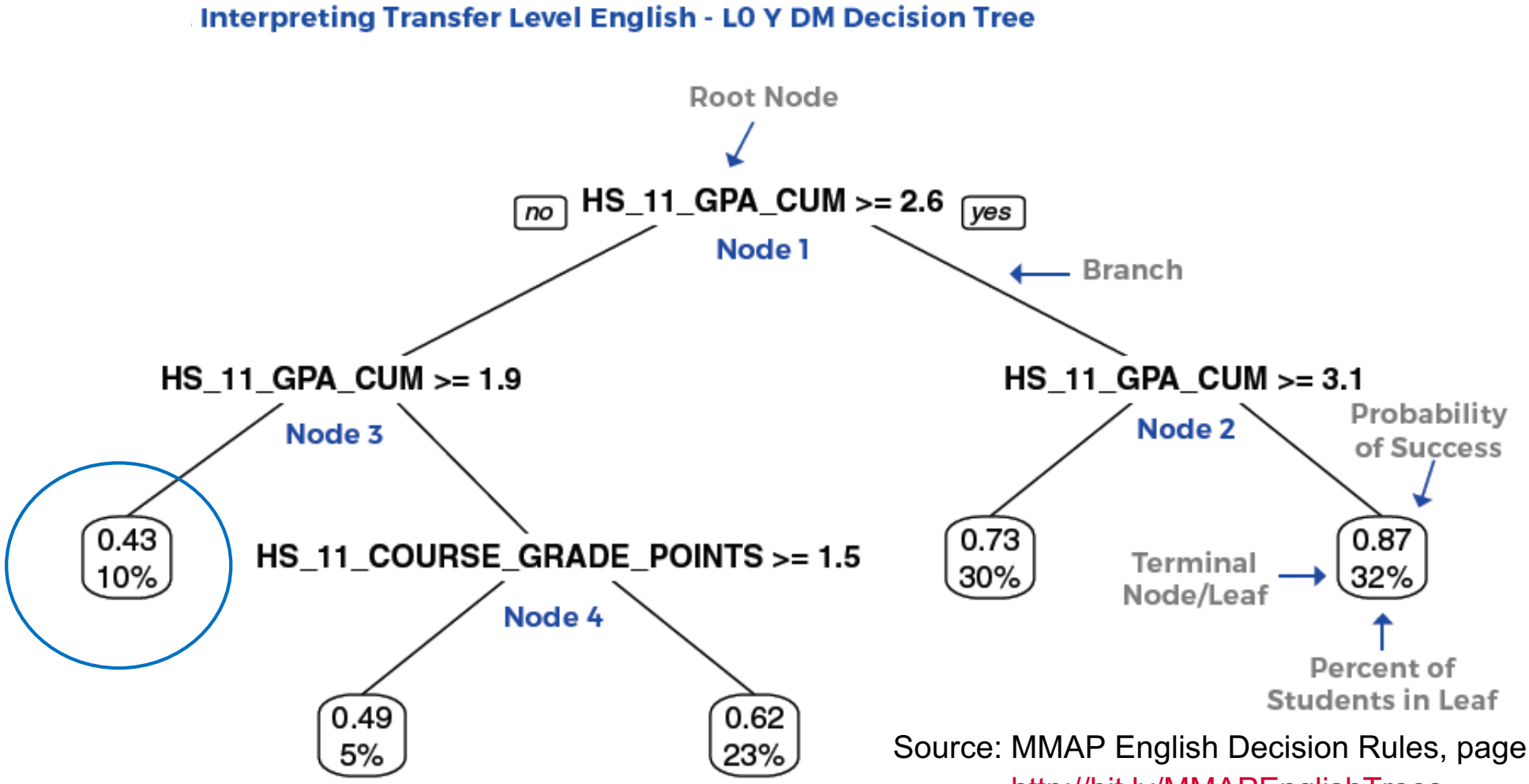
- MMAP decision trees were based on identifying students who were highly likely to be successful
  - At least 70% probability of success in transfer-level

- Now, students can only be assigned to developmental education if:
  - They are *highly unlikely* to succeed at the transfer-level class
  - AND
  - Developmental education maximizes probability of successful completion of transfer-level coursework in one year.

## Essentially… what about everyone else? What maximizes their completion of gateway English and Math?

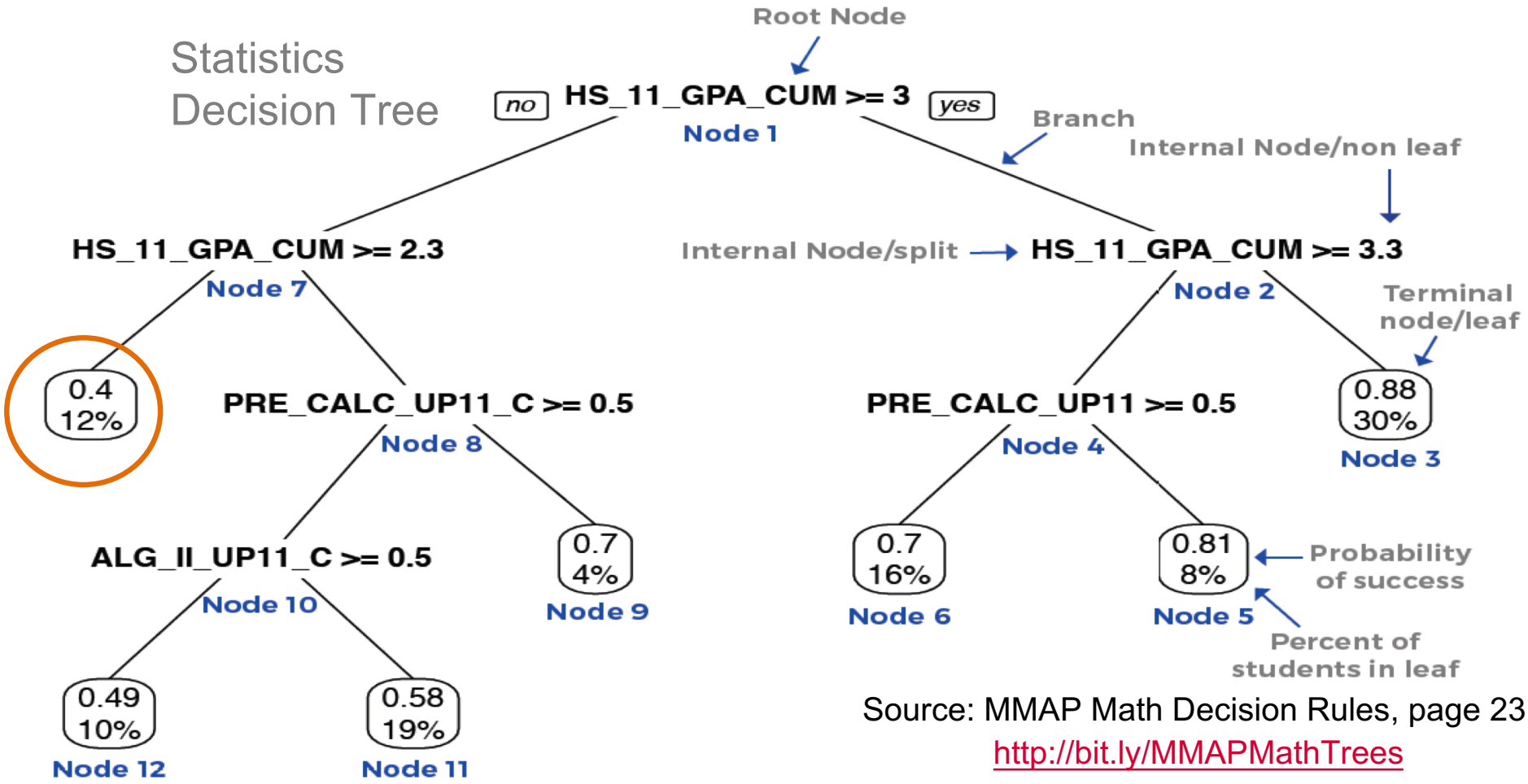
- Can we identify any students more likely to complete gateway English or Math if they start in developmental education?
  - Let's look at the students least likely to succeed based on their HS performance

# How to Read a Decision Tree for English



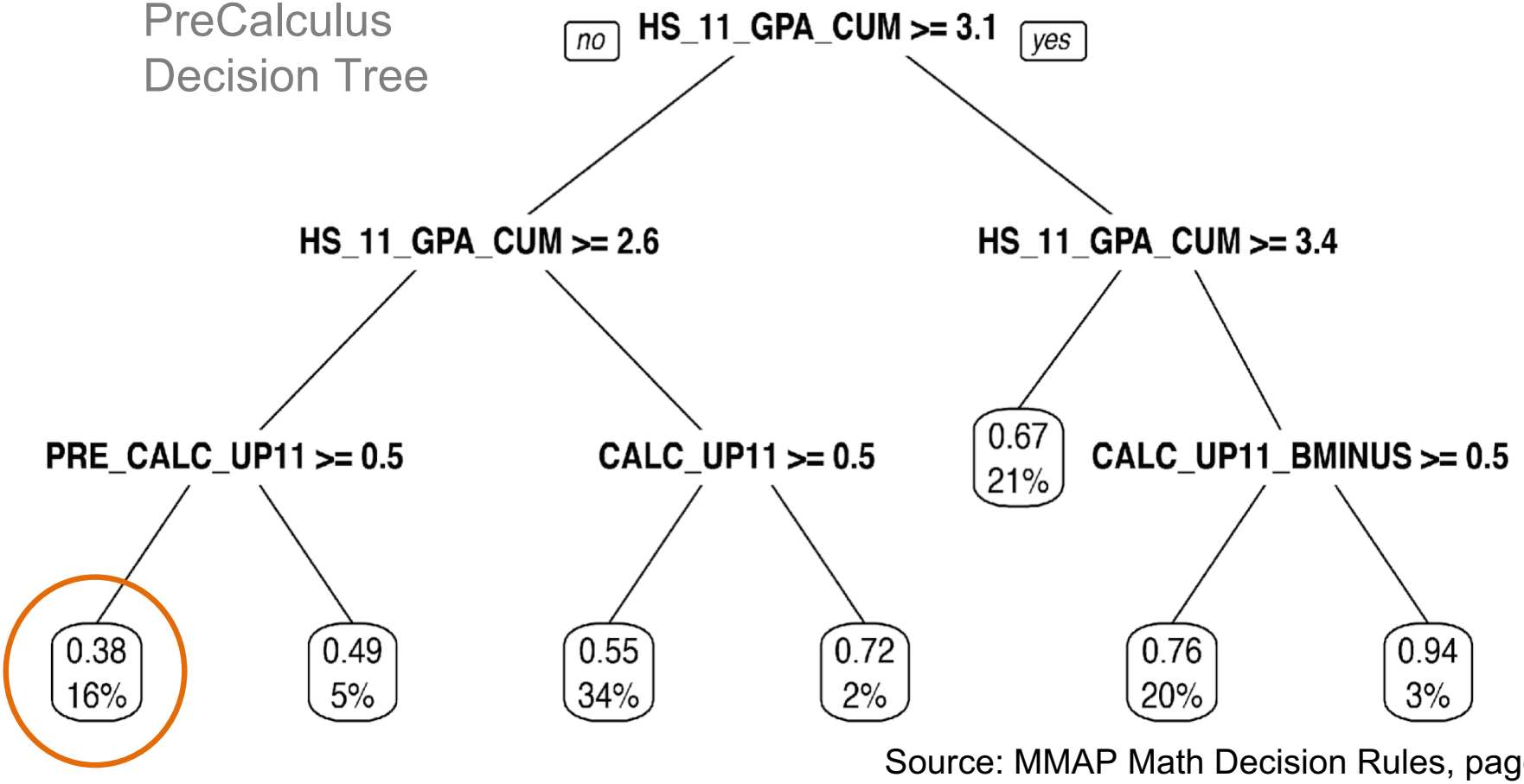

Source: MMAP English Decision Rules, page 8: http://bit.ly/MMAPEnglishTrees

# Statistics Decision Tree




Source: MMAP Math Decision Rules, page 23:
http://bit.ly/MMAPMathTrees

PreCalculus
Decision Tree




Source: MMAP Math Decision Rules, page 13:
http://bit.ly/MMAPMathTrees

# Checking for what would maximize likelihood of successful completion of transfer-level course

- Compare the success rate of similar students, in this case the lowest performing HS students, if placed directly into transfer—level course

to

- Rate of successful completion of transfer-level course within one year (AB705) for students who start one level below
  - Note - not success rate in transfer-level if transfer-level is taken

# Addressing selection bias

- Differences in test scores, high school grades, and other factors that led led to different placement  may also be related to course performance
  - REMINDER, however – tests are more weakly related to course performance

- Still, the transfer-level course performance of students with low HSGPA who test into transfer-level courses may not fully generalize to those same students who didn't place into transfer-level.
  - Have to adjust for differences in test scores and overall GPA

# Adjusting Projected Success Rates

- Difference in GPA and placement test score can be accounted for statistically and the projected success rates of similar students but from lower placement levels can be adjusted (lowered)
- Magnitude of the adjustment depends on:
  - extent of differences in test scores and GPA between those in the MMAP models and those who would potentially be entering, and;
  - strength of the association between the test scores/GPA and success in the target class

# Technical Details of Adjustment Process

- Use multivariate regression to predict success rate in target transfer-level using GPA and test scores
- Calculate mean high school GPA and test scores for lowest node students in each level/type of first attempted course
- Use regression model to predict success in the target course using means in step 2.
- Rescale regression predicted success rates against the lowest node predicted success rates to create comparability between decision-tree and regression-based predictions
- Calculate overall success rate estimate by weighting estimates from each level/type weighted by number of students beginning at each level
- Use standard error of prediction from the regression model at each level to create lower and upper error bounds for estimates also weighted as in step 5.

# Regression Models

- **English**
  - HS GPA + ACCUPLACER sentence skills score + ACCUPLACER reading comprehension score

- **Statistics and Precalculus**
  - HS GPA + ACCUPLACER college algebra score
  - Other test scores (arithmetic and elementary algebra) for statistics did not yield useful results so only college algebra was used

# Additional considerations for completion of transfer-level math starting from one-level below

- Not all students goals require transfer-level math*
- Need to take into account that different majors/pathways lead to different possible math
- Need to account for different curricular entry points after intermediate algebra into transfer-level math curriculum
  - College algebra, trigonometry, precalculus

# Statistics

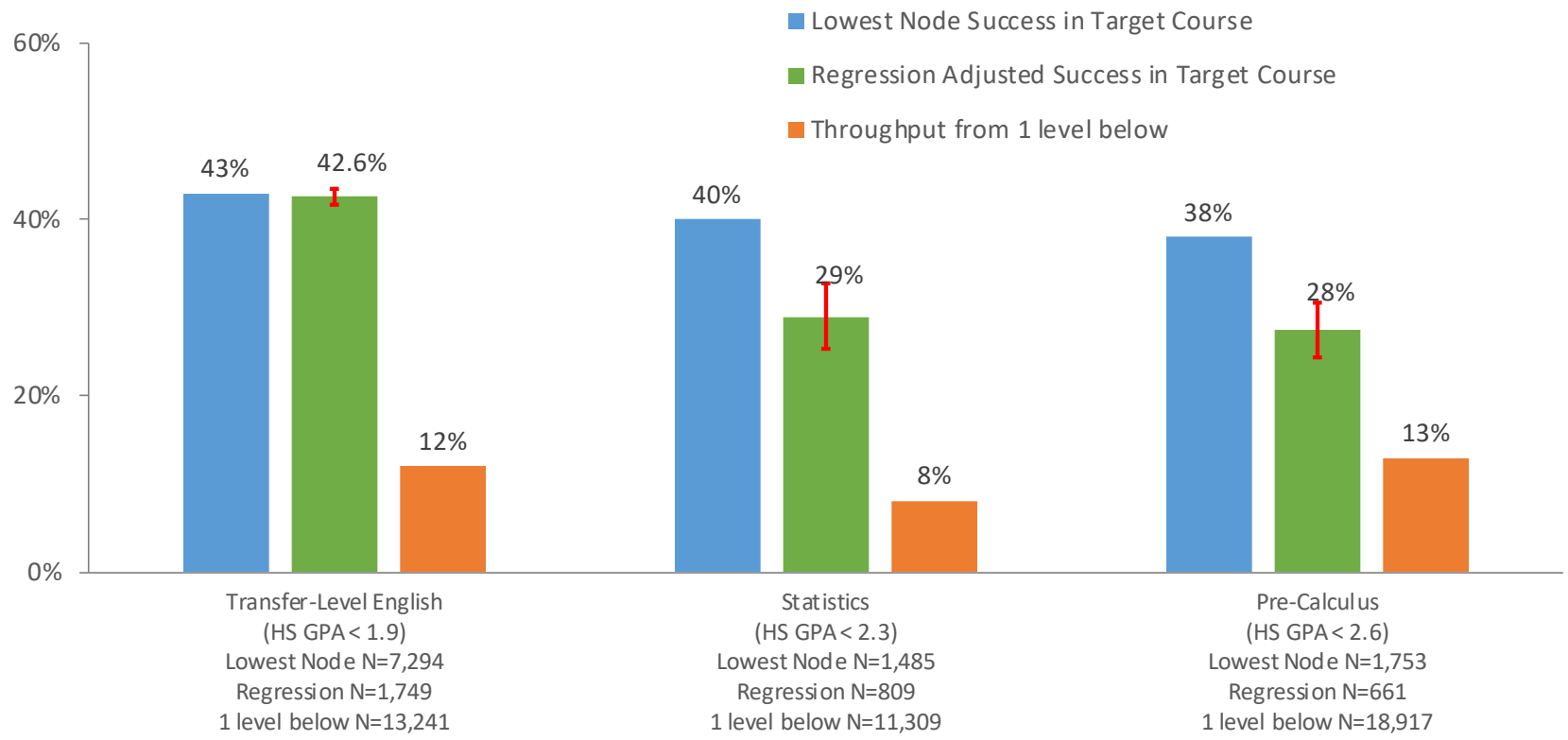
- **For students starting one-level below**
  - count any/all transfer-level math completions in the numerator, not just statistics
  - adjust denominator downward *(improving throughput)*, removing percentage of students with ed goals not requiring a transfer-level math course (~12%)
- **This is a conservative method (generous to throughput f/1 level below :**
  1. it still counts any transfer-level completions of students without transfer-level ed goals
  2. most students when asked typically have transfer goals
  3. doesn't account for terminal degrees that may still have transfer-math requirement

# Precalculus (Entry-level BSTEM)

- Chosen because it's most advanced post-intermediate algebra entry-level STEM courses across the colleges
  - Rules developed for direct placement into Precalculus should work for colleges with earlier math courses (e.g., College Algebra or Trigonometry)
- For students starting one-level below
  - count any/all BSTEM transfer-level math completions in the numerator from College Algebra and up, not just pre-calculus (to be as fair as possible given colleges with courses between intermediate algebra and precalculus)
  - adjust denominator downward, removing percentage of students with ed goals not requiring transfer-level math course (as with Stats)
  - adjust denominator further downward to reflect percentage of students with STEM major (~25%, so reduce denominator by additional 75%)
- Still conservative method (generous to throughput f/1 level below :

1. still counts any transfer-level completions of students regardless of edgoal/major (no changes to numerator) while adjusting denominator downward to account for edgoal/major

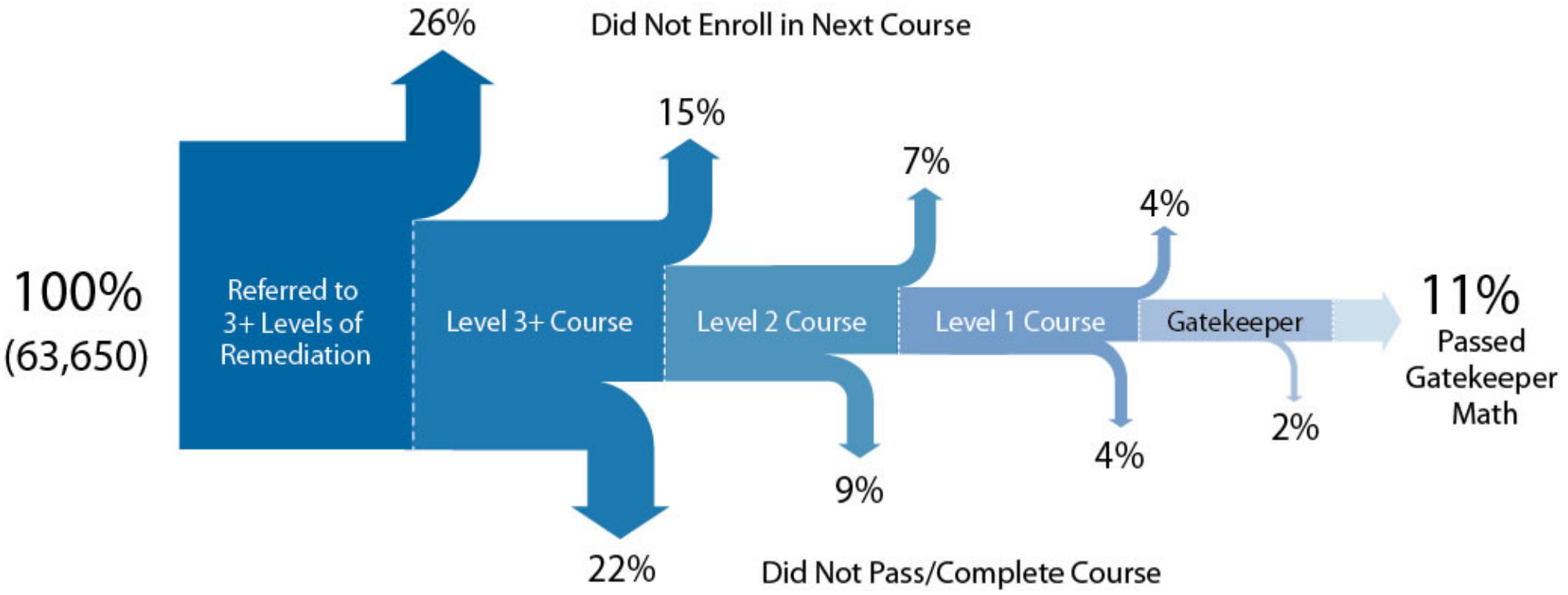
# Transfer-Level Course Completion in One Year from First Class in Discipline (error bars represent ±1 se)



# Another reason these are generous comparisons

- **Starts clock at first course not at placement**
  - 25-30% of students placed below transfer never attempt a course in discipline: bit.ly/Bailey2010
  - Students placed below transfer-level often more likely to delay course – clock doesn't start til first attempt

## Student Progression Through the Developmental Math Sequence[21]




**Source: CCRC**