Improving Developmental Education

Multiple Measures and Math Pathways

Presented by: The Center for the Analysis of Postsecondary Readiness (CAPR)

Presenters: Alexander Mayer, MDRC; Elisabeth Barnett, The Community College Research Center; Evan Weissman, MDRC

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Innovations Conference \ New York \ 02.26.19

Developmental Education Reform:

Findings from a National Survey

Alexander Mayer, co-Principal Investigator, CAPR

MDRC

Why Study Developmental Education?

- 68% of community college students & 40% of students at public 4-year colleges take developmental courses
- More than half of these students never complete developmental education, and fewer graduate
- States, systems, and colleges are reforming developmental education policies to improve these outcomes:
  - Incorporating more data to assess college readiness
  - Changing instructional practices
  - Providing additional services to support students

The Center for the Analysis of Postsecondary Readiness (CAPR)

- Partnership between the Community College Research Center (Teachers College, Columbia University), MDRC, & several additional research scholars
- Three major studies
  - National Study of Developmental Education Policies & Practices
  - Evaluation of Multiple Measures Placement Using Data Analytics
  - Evaluation of the Dana Center Mathematics Pathways Model
- Two supplemental studies: Early Start policy in California & the Emporium Model of developmental math in Tennessee
- For more information, visit postsecondaryreadiness.org

A National Study of Developmental Education Policies & Practices

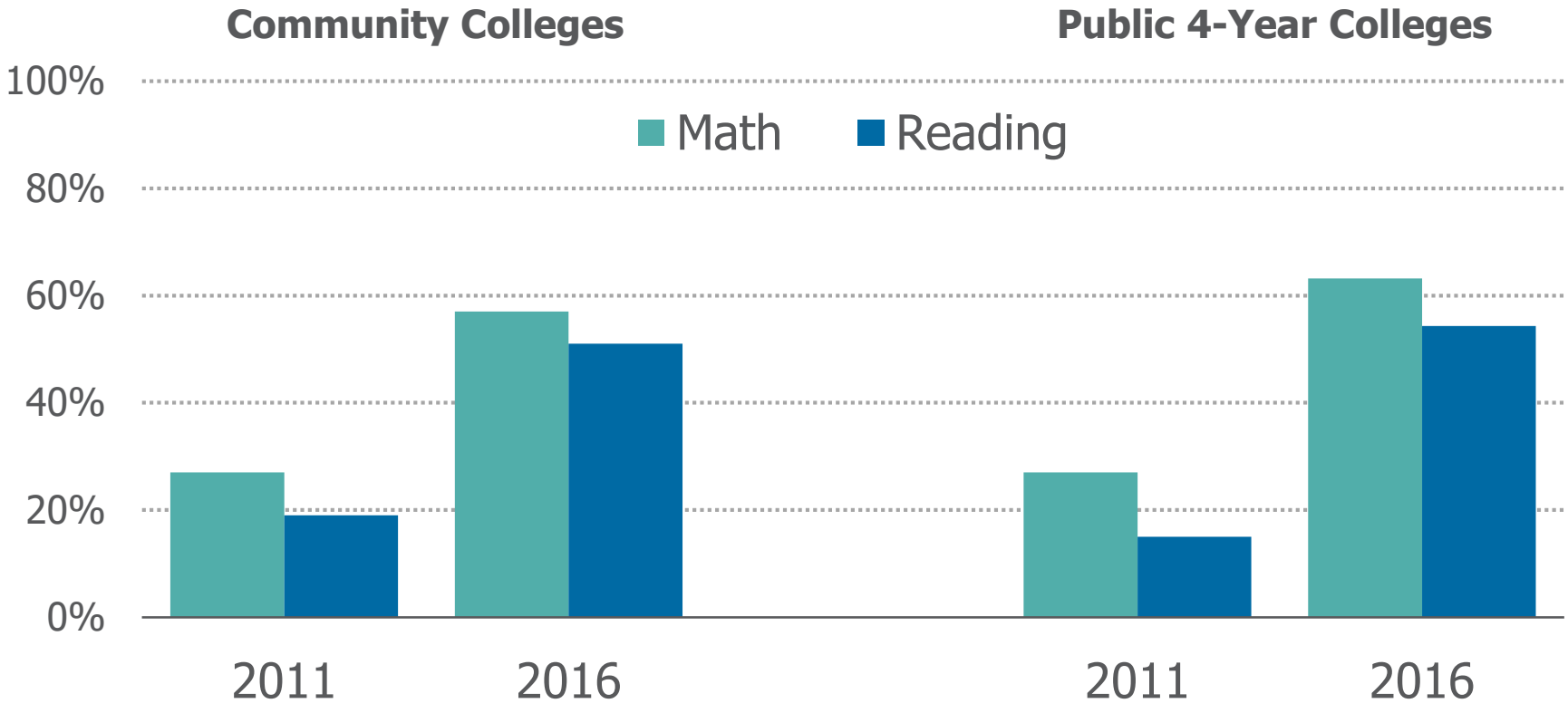
1. **Nationally representative survey**
   - Approximately 1,100 open-access and non-selective institutions
   - Survey was split into 2 sections: math, and reading and writing
   - Fielded in two waves: Spring 2016 and Fall 2016
2. **Qualitative study**
   - 40 interviews with institutional leadership
   - 40 interviews with system-level leadership

Survey Response Rate

	Sample Size	Math	Reading and Writing
Public 2-year	506	91%	90%
Public 4-year	303	94%	95%
Private nonprofit 4-year	279	57%	58%
Total	**1,088**	**83%**	**83%**

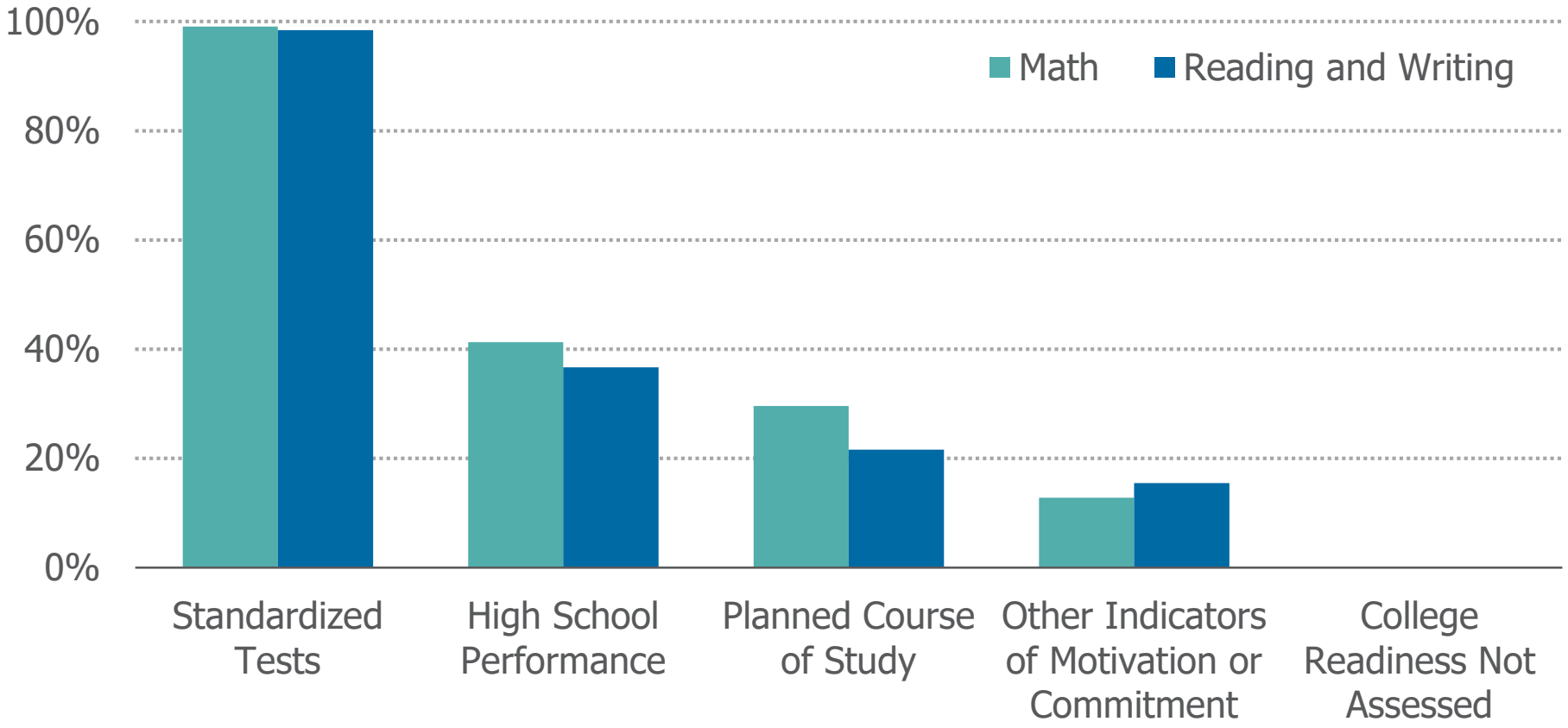
Multiple Measures for Assessment: Growth and Practices

Percent of Colleges Using Measures Other than Standardized Tests for Assessment



SOURCES: 2011 data from Fields and Parsad (2012); 2016 data from the CAPR's institutional survey.
NOTE: The Fields and Parsad (2012) reading statistics are for reading placement only, whereas the CAPR survey data are for both reading and writing.

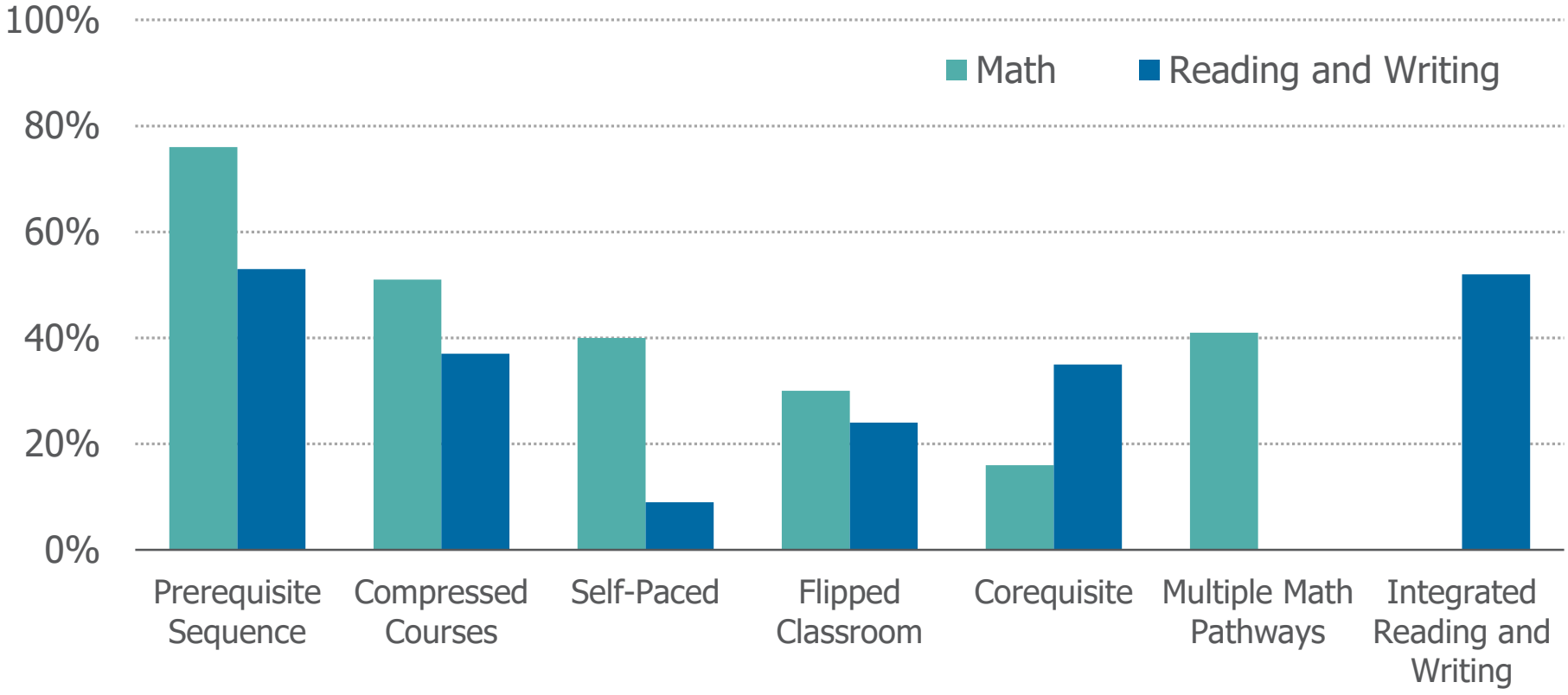
Processes Used to Determine College Readiness in Community Colleges



SOURCE: Data from CAPR's institutional survey.
NOTE: Categories are not mutually exclusive.

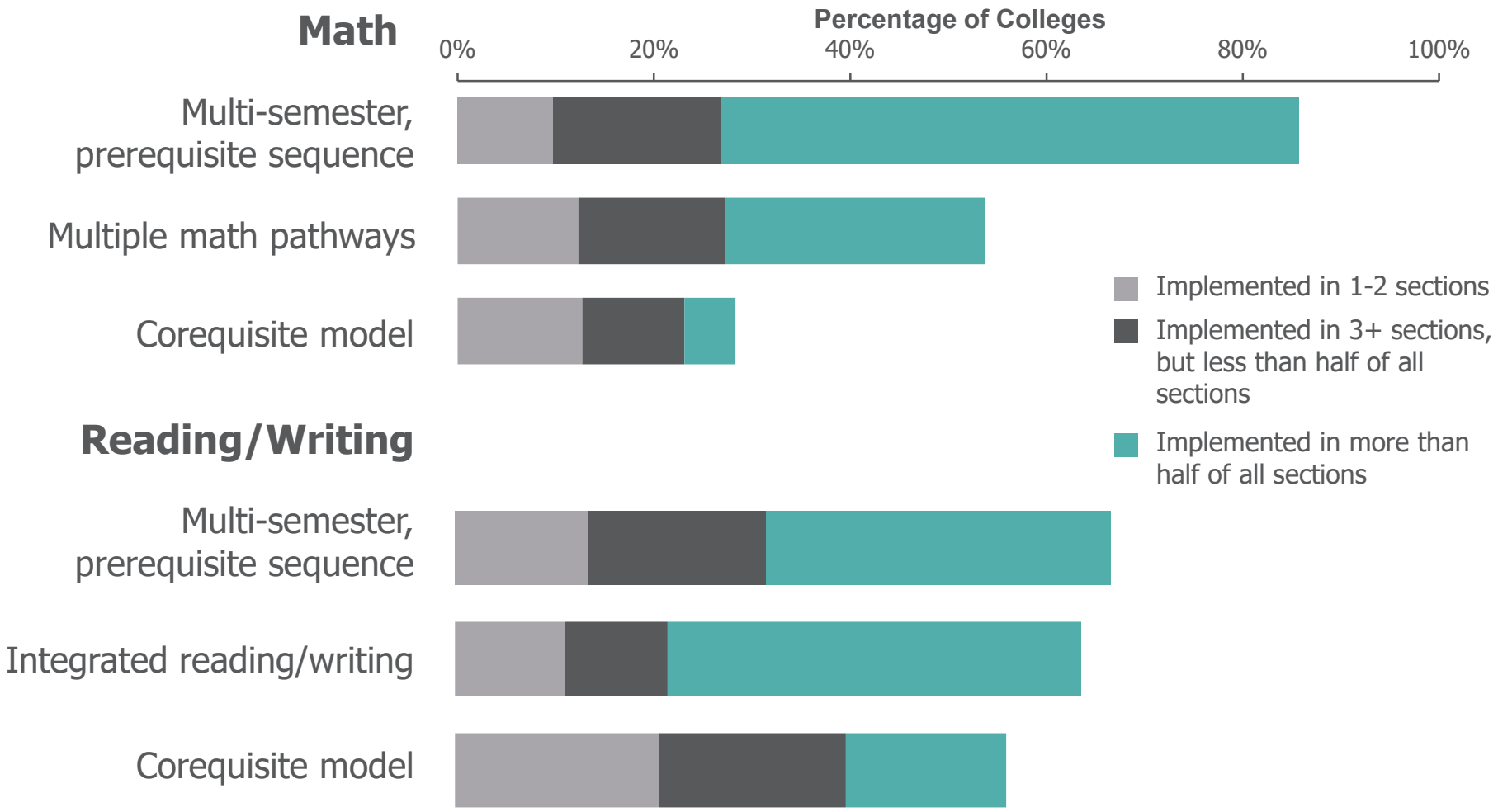
The Prevalence and Scale of Instructional Methods

Prevalence of Developmental Instructional Methods in Community Colleges



SOURCE: CAPR institutional survey.
NOTE: Values represent percentages among community colleges that reported offering developmental courses. Colleges were counted as using an instructional method if they used it in more than two course sections. Categories are not mutually exclusive.

Scale of Reforms in Community College



2019 Landscape Report

- Full analysis of survey findings and interview data with college and system leaders
- Study of the breadth and scope of assessment & instructional reforms in developmental education
- Exploration of the drivers behind developmental education reform

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Student Assessment and Placement Systems Using Multiple Measures

Elisabeth Barnett, Senior Research Scientist

Community College Research Center, Teachers College, Columbia University

Why Use Multiple Measures?

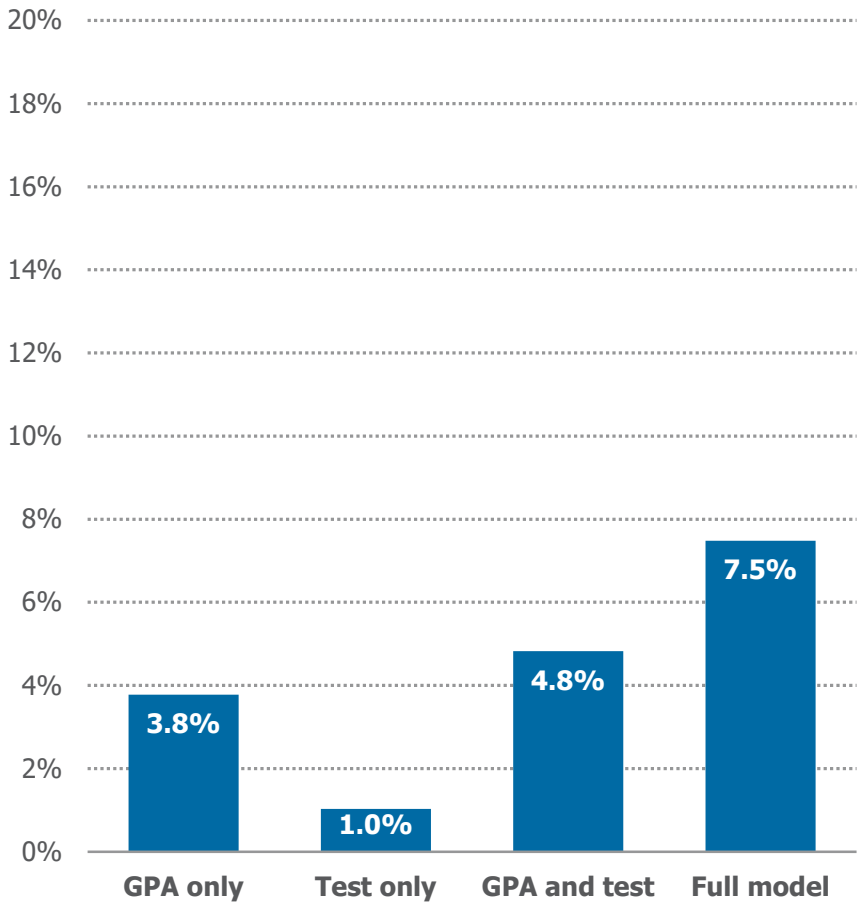
- Existing placement tests are not good predictors of success in college courses. High school grade point average (GPA) does a better job
- More information improve most predictions
- **Different measures may be needed to best place specific groups**

Under-placement and Over-placement

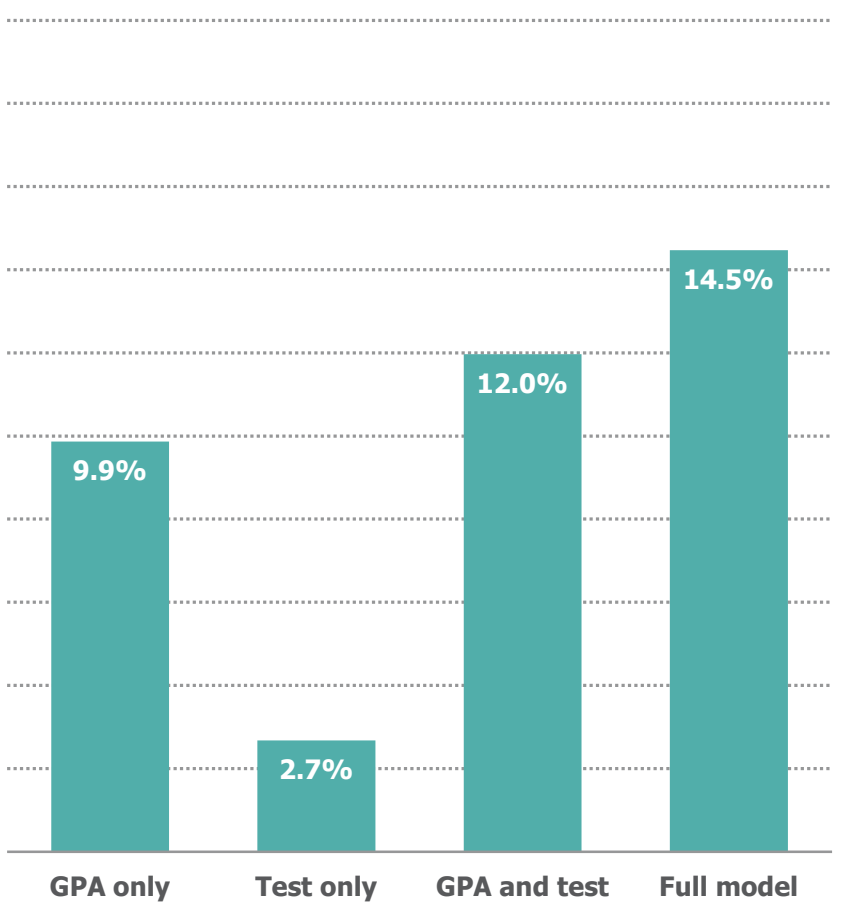
		Placement According to Exam	
		Developmental	College Level
Student Ability	Developmental	✓	*Over-placed* (English – 5%) (Math – 6%)
	College Level	*Under-placed* (English – 29%) (Math – 18%)	✓

A Typical College

English



Math



Multiple Measures Options

MEASURES	SYSTEMS OR APPROACHES	PLACEMENTS
Administered by college: **1. Traditional or alternative placement tests** 2. Non-cognitive assessments 3. Computer skills or career inventory 4. Writing assessments 5. Questionnaire items	1. Waiver system 2. Decision bands **3. Placement formula (algorithm)** 4. Decision rules 5. Directed self-placement	**1. Placement into traditional courses** 2. Placement into alternative coursework 3. Placement into support services
Obtained from elsewhere: **1. High school GPA** **2. Other HS transcript information (courses taken, course grades)** 3. Standardized tests results (e.g. ACT, SAT, Smarter Balanced)		

The CAPR Assessment Study

Research on Alternative Placement System

- 5-6 year project
- 7 State University of New York (SUNY) community colleges
- Evaluation of the use of predictive analytics in student placement decisions
- Research includes Randomized Control Trial (RCT), implementation study, and cost study
- Current status: completed preliminary report

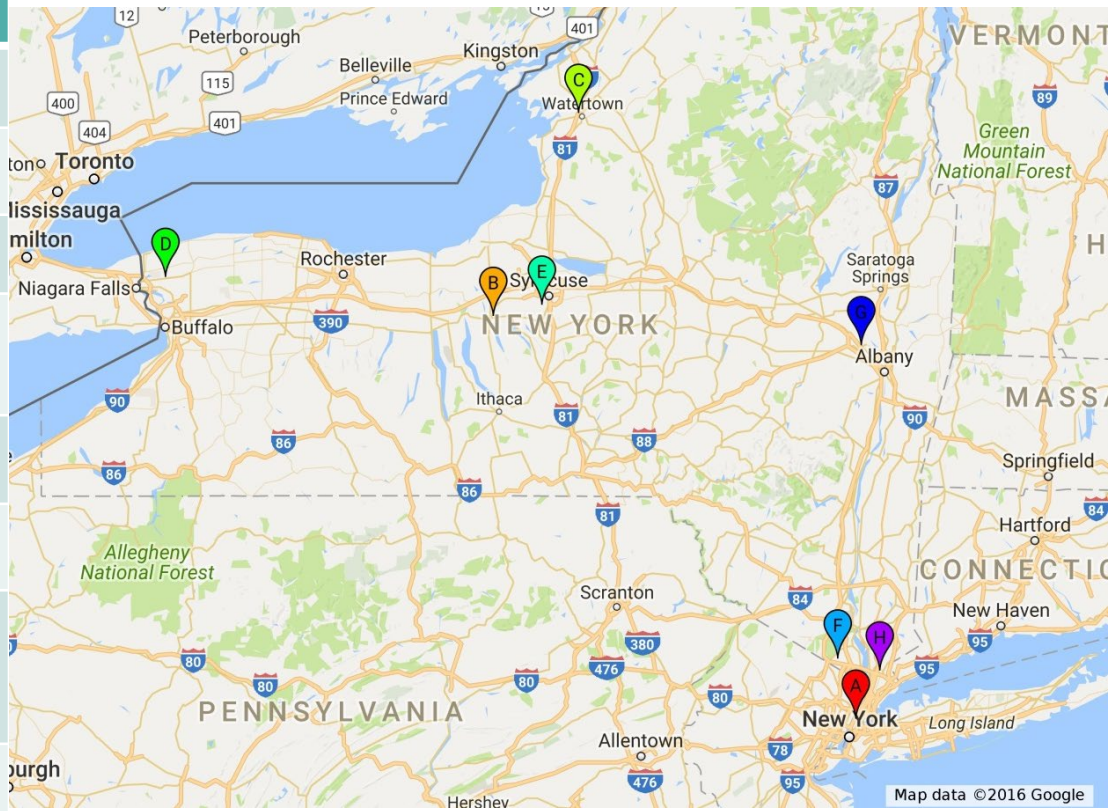
Research Questions (Summary)

1. Do students' outcomes improve when they are placed using predictive analytics?

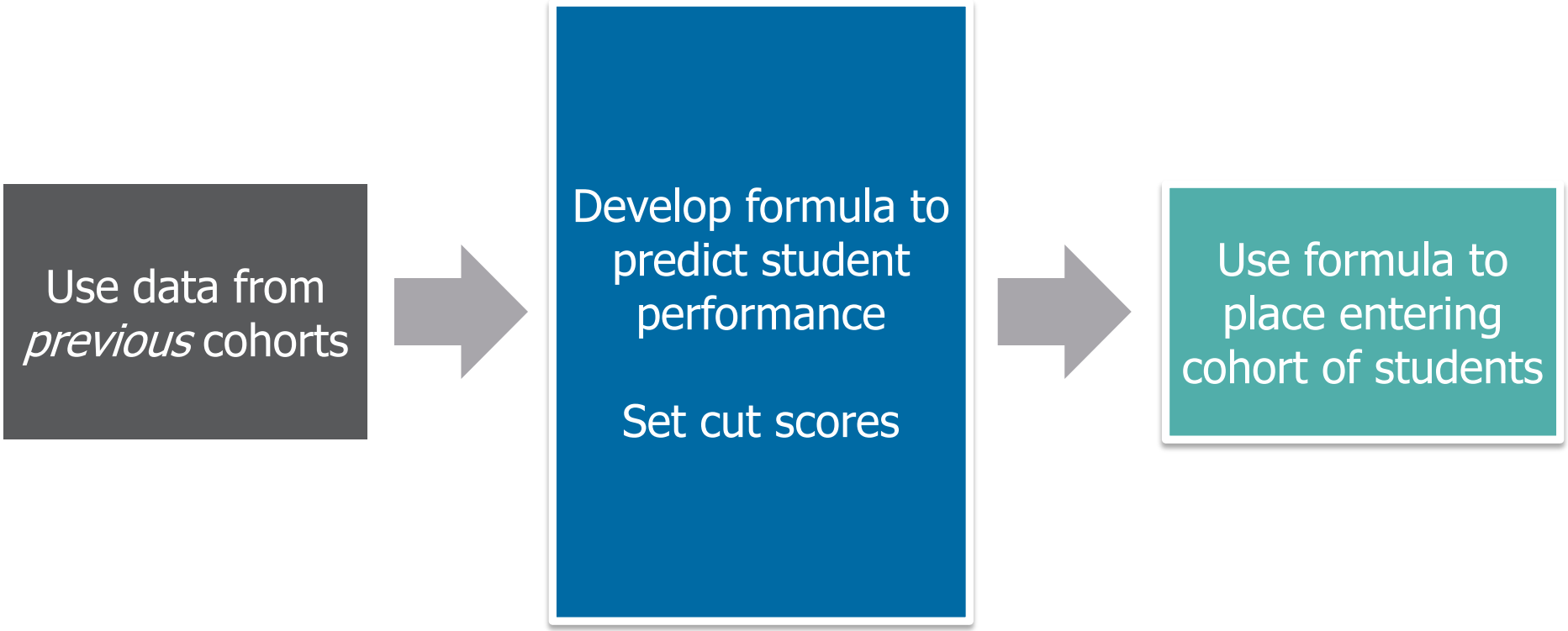
2. How does each college adopt/adapt and implement such a system?

The State University of New York (SUNY) Sites

LOCATION
A. CAPR
B. Cayuga Community College
C. Jefferson Community College
D. Niagara County Community College
E. Onondaga Community College
F. Rockland Community College
G. Schenectady County Community College
H. Westchester Community College



How Does the Predictive Analytics Placement Work?

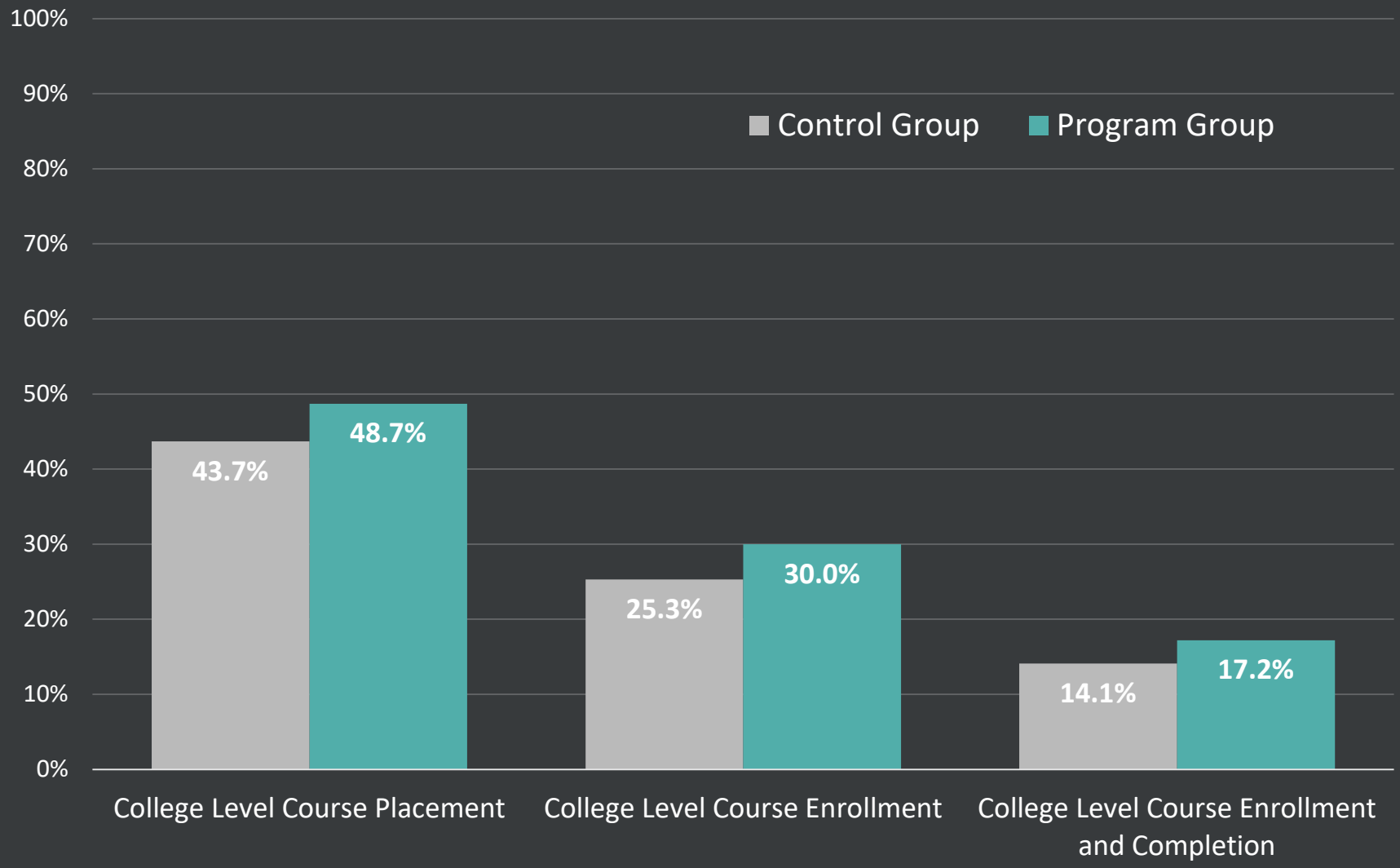


First Cohort – First Semester (Fall 2016)

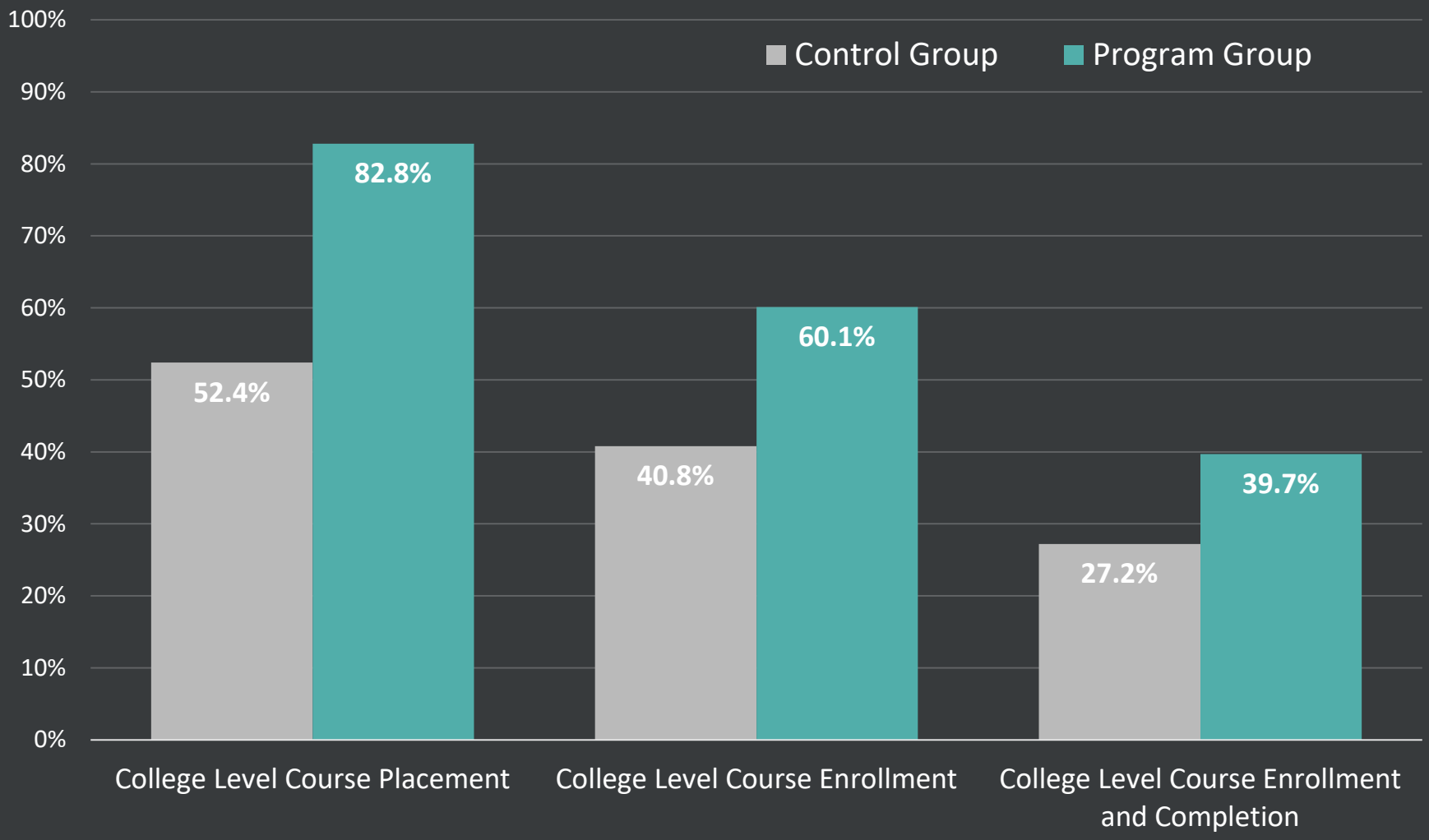
Sample = **4,729 first year students across 5 colleges**

- 48% students assigned to business-as-usual (n=2,274)
- 52% students assigned to treatment group (n=2,455)
- **82% enrolled** into at least one course in 2016 (n=3,865)

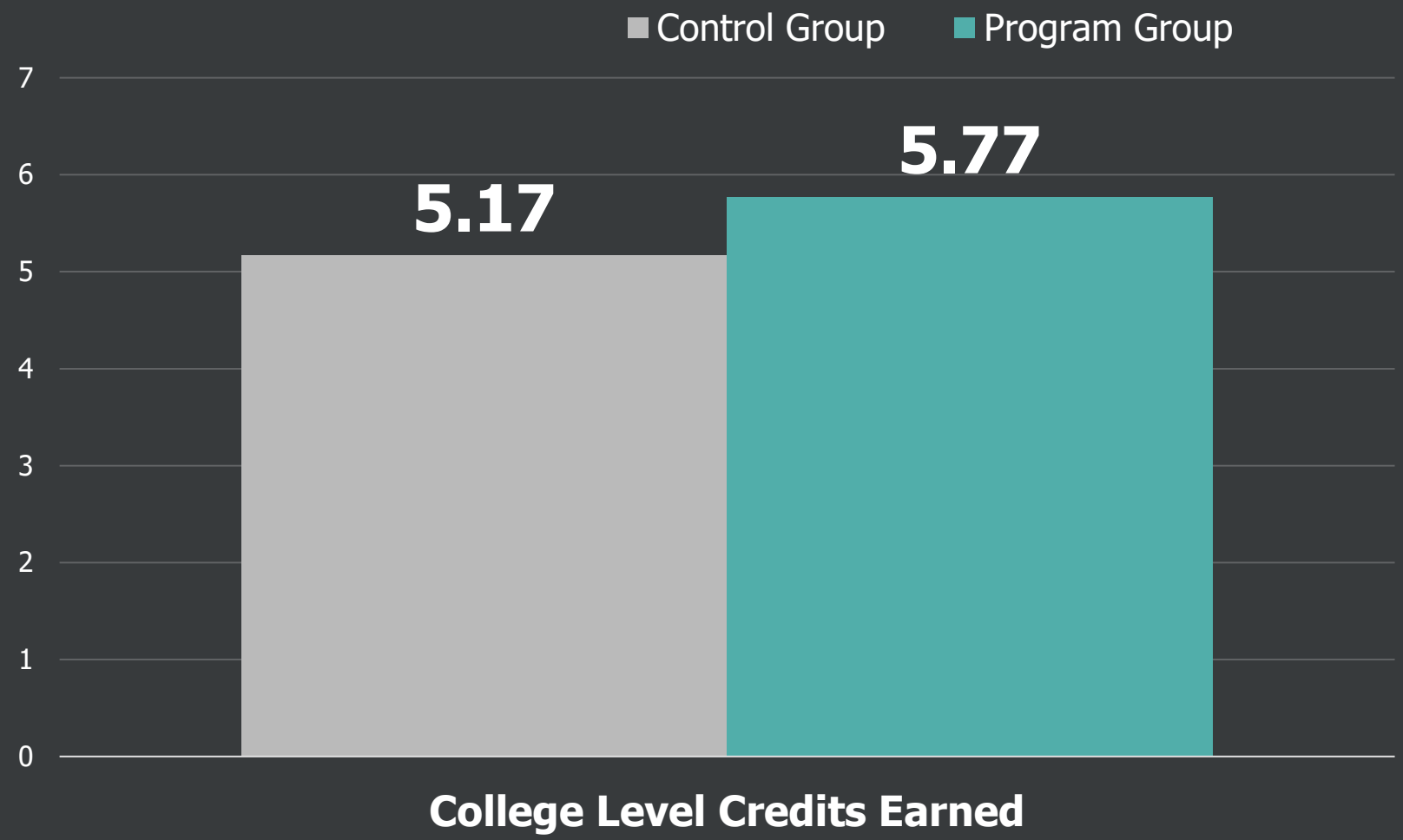
Treatment Effects: Math



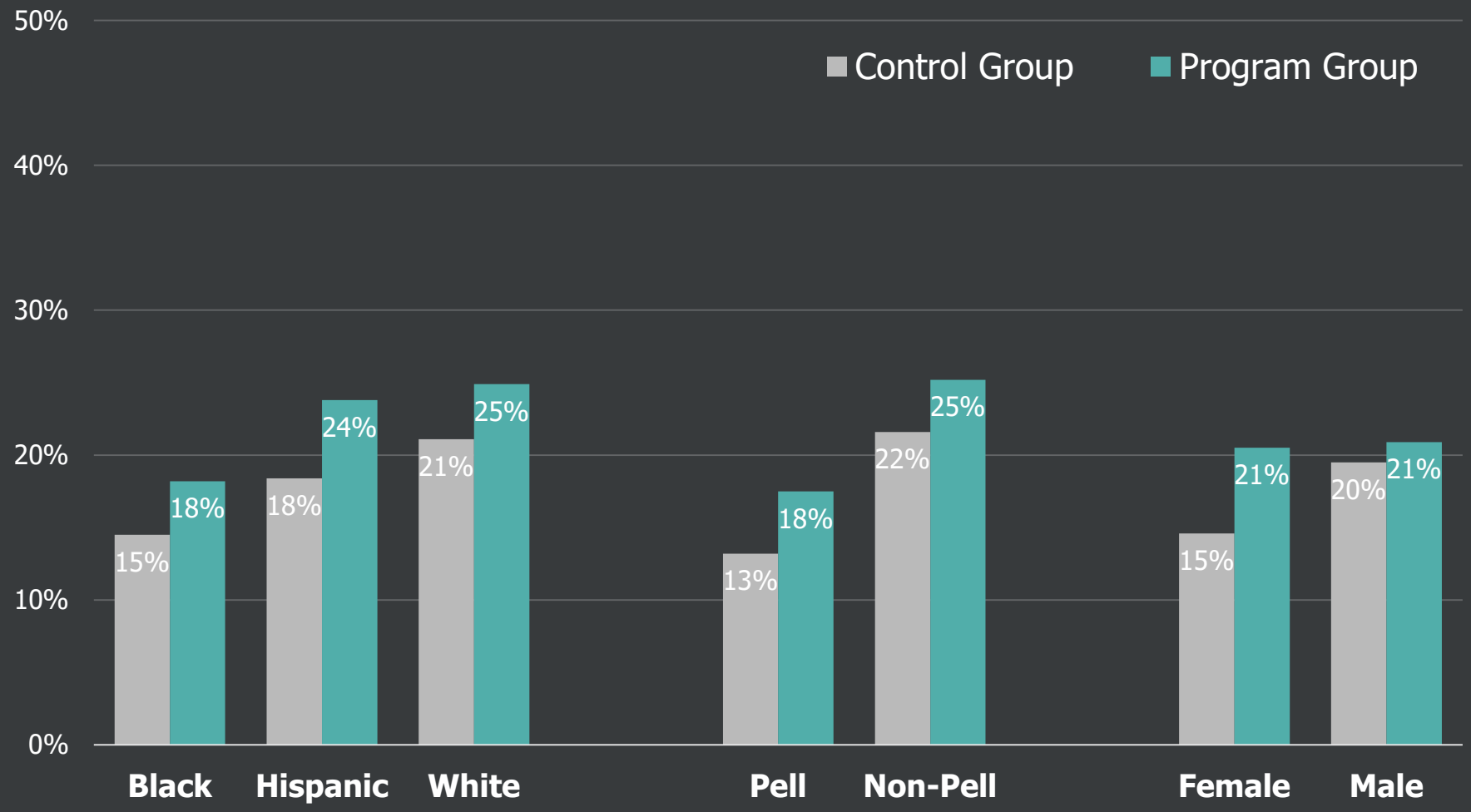
Treatment Effects: English



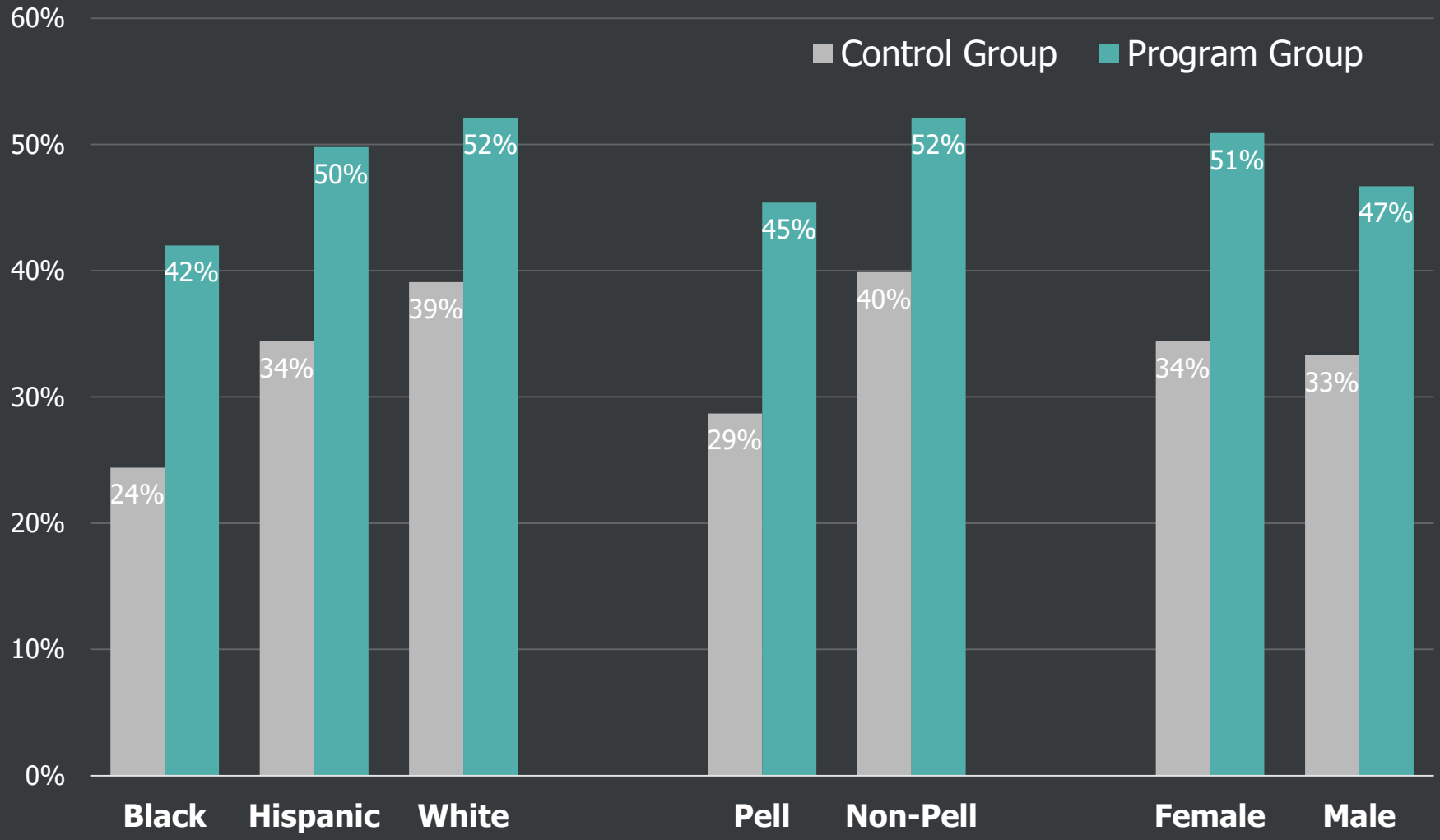
Treatment Effects: Total College Level Credits Earned



Treatment Effects: College Level Math Completion



Treatment Effects: College Level English Completion



Challenge 1: Lack of Data for Algorithm due to Multiple Reforms

- Lack of data for algorithm due to multiple reforms
- Placement tests used
- Course changes
- Missing HS GPA

The seventh college in our sample had been using the COMPASS exam, which was discontinued by ACT shortly after this study began.
(Report)

Challenge 2: Concerns about the HS GPA

- Availability
- Mistrust of it as a valid predictor of college readiness

> Also, just one other thing is I'm wondering if the GPAs at the various schools can be really seen as being, quote, equal….
> *(Interviewee)*

Challenge 3: Communications within Colleges

Make sure you're involving the right parties. Make sure the decision makers are sitting around the table and make sure they understand the decisions they're making.
(Interviewee)

I think that's one of the key things that probably came out of all of this for all of us – to know any kind of changes that we were planning to do with placement testing in general, you'd have to be planning so much further out.
(Interviewee)

Challenge 4: Changes Requiring Forethought

- IT time was needed
- Classroom assignments might change
- Needs for faculty might change

Department chairs reported that they had to make changes based on different numbers of college developmental and college level sections needed. *(Report)*

Challenge 5: Delays in Getting Placement Information to Students

These students were used to getting the result, and they want the results right away, and we have to tell them, "You have to wait until the next business day."
(Interviewee)

Costs

- First fall-term costs were roughly $110 per student above status quo (Range: $70-$320)

- Subsequent fall-term costs were roughly $40 per student above status quo (Range: $10-$170)

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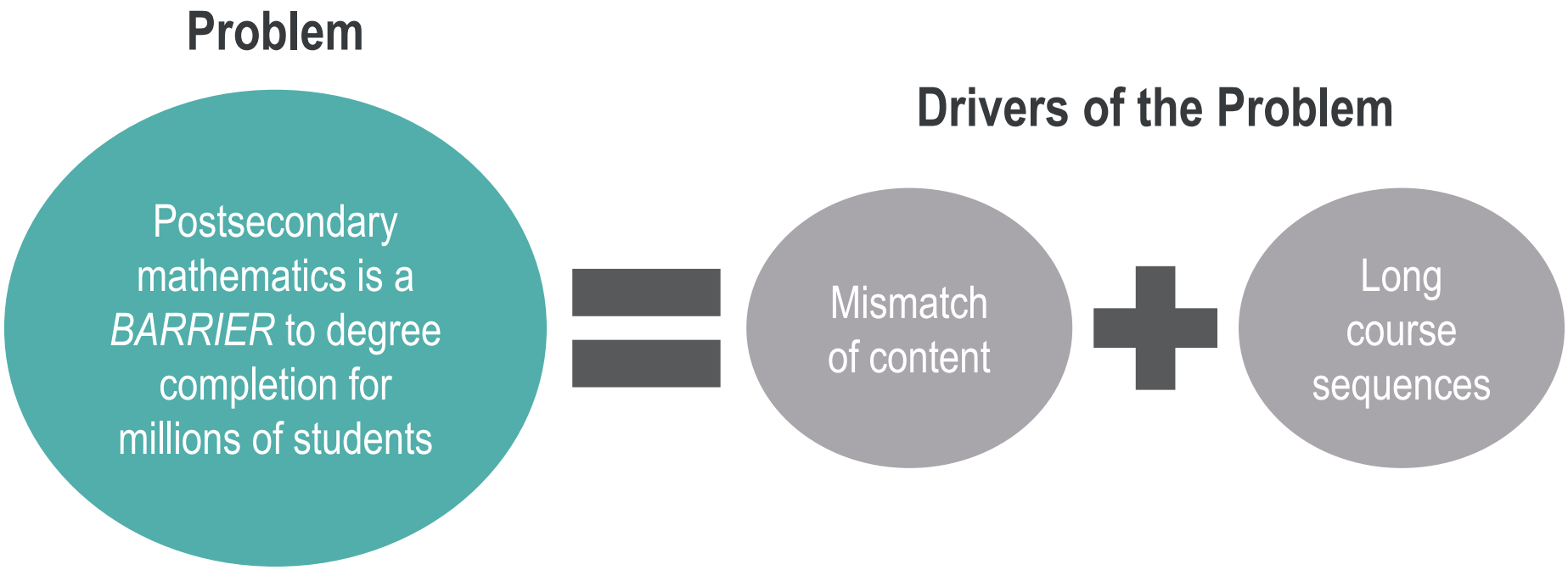
Making it Through:

Findings from the DCMP Evaluation

Evan Weissman, Senior Operations Associate

MDRC

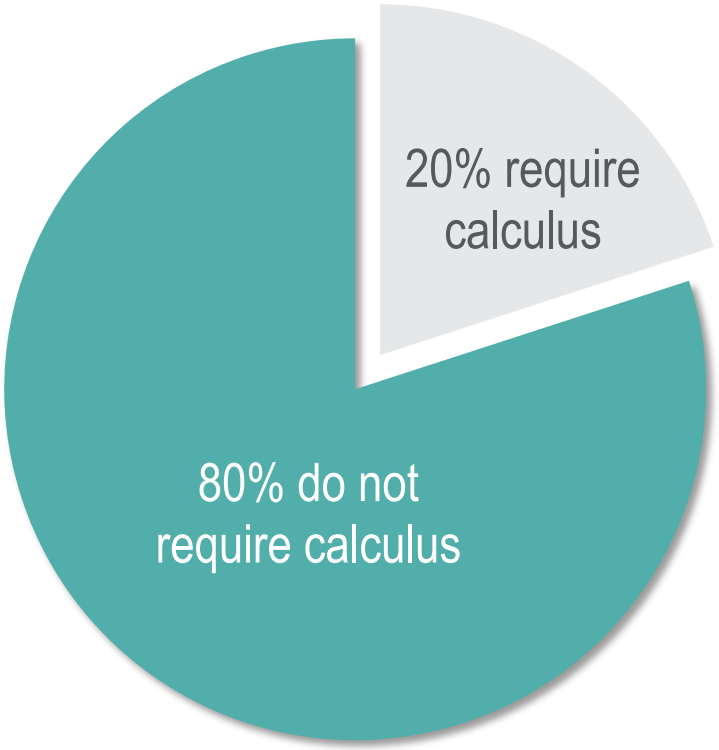
Drivers that Create Barriers for Students



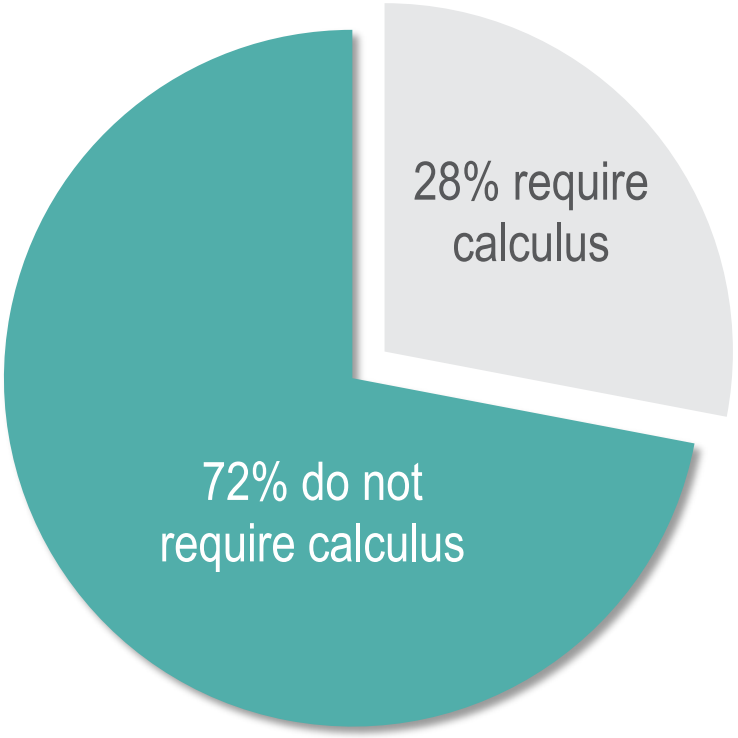
From *The Case for Mathematics Pathways* (Dana Center, 2016)

What Math Do Students Need?

Two-Year College Student Enrollment Into Programs of Study

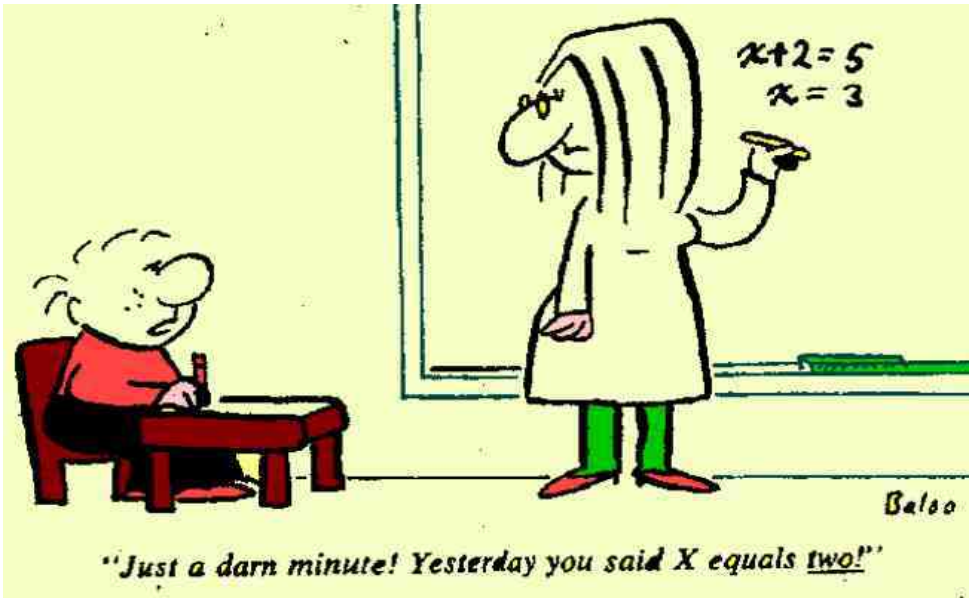


Four-Year College Student Enrollment Into Programs of Study



Burdman, P. (2015). Degrees of freedom: Diversifying math requirements for college readiness and graduation. Oakland, CA: Learning Works and Policy Analysis for California Education.

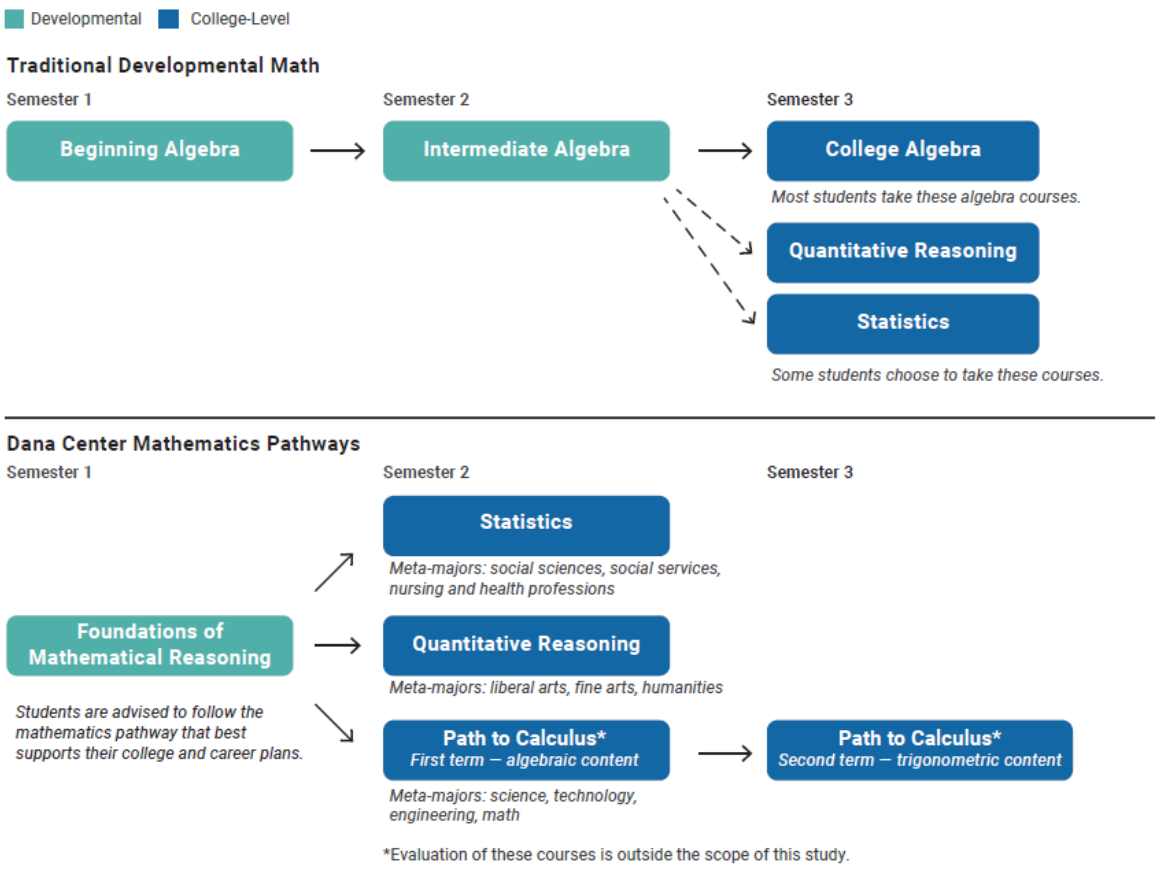
Traditional Math Instruction Tends to Focus on…



- Teacher-directed lecture
- Formulas and equations
- Rote memorization
- Few real-world applications

The Dana Center Mathematics Pathways (DCMP)

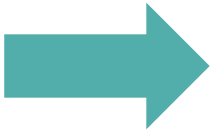
The DCMP Model: Revisions to Math Content



A Comparison of Mathematics Offerings for Students with Two Levels of Developmental Need

The DCMP Model: Instructional Changes

Teacher-directed lecture

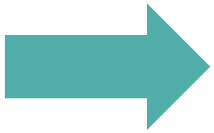


Active Learning

Small group work, student interaction, presenting solution methods

Reading and Writing

Formulas and equations



Problem Solving

Multistep problems building on previously learned content or answers;
Multiple solution methods

Rote memorization

Constructive Perseverance

Understanding the role struggle plays in learning

Few real-world applications

Contextualization

Problems contextualized in real-life situations

Sample DCMP Problem

Question: A research report estimates that individuals who smoke are 15 to 30 times more likely to develop lung cancer than individuals who never smoke. If the lifetime risk of developing lung cancer for nonsmokers is about 1.9 percent, what is the lower limit of the estimated risk for smokers according to the report?

Answer: The lower limit of the estimated risk for smokers according to this report is _____ percent.

The CAPR Evaluation of the DCMP

A Mixed-Methods Evaluation: Impact, Implementation, & Cost Study

Impact study

- RCT at four Texas colleges
  - 1,422 students
  - 4 cohorts (Fall 2015 - Spring 2017)
  - Outcomes tracked for 3+ semesters
- Key outcomes
  - Completion of Developmental Math
  - Completion College-Level Math Course
  - Overall Academic Progress

Implementation study

- Fidelity and treatment contrast
- Differences in content and pedagogy

Cost study

- Is DCMP cost effective relative to traditional services?

Early Implementation: Challenges & Changes

Which pathway should students take?

- Revise requirements for majors
- Revise advising
- But not all eligible students reached

Will four-year transfer colleges accept a non-algebra math course?

- Good progress made with alignment four-year colleges

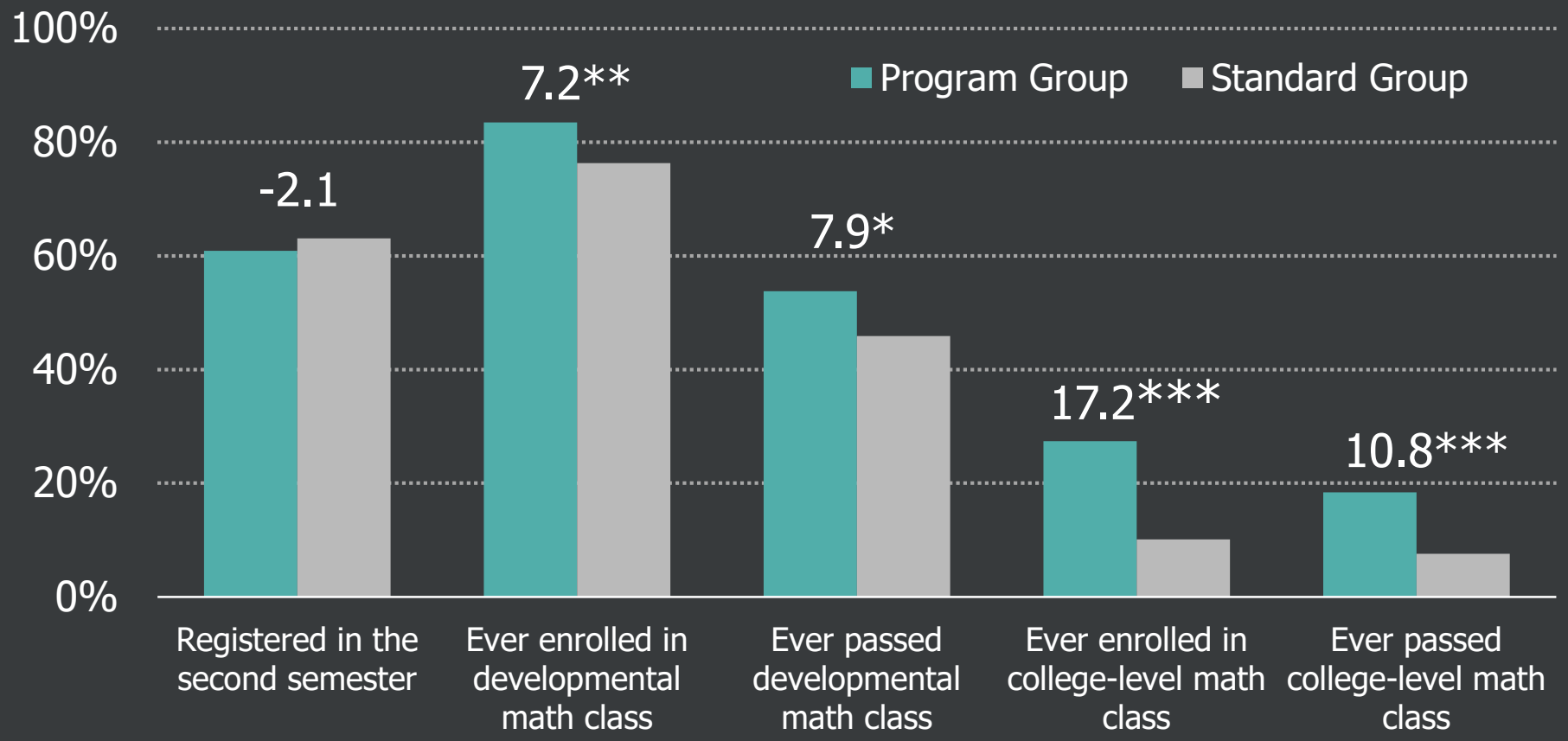
Can math faculty move away from algebra?

- Strong implementation
- Very different course content

Can faculty change pedagogy?

- Relatively strong implementation
- Contextualization & student centered approaches
- Qualitatively different classroom experience for students

Early Impacts on Student Success
(Fall 2015 and Spring 2016 Cohorts, through 2 Semesters)



Statistical significance levels are indicated as follows: * = 10 percent; ** = 5 percent; *** = 1 percent.

The Final Report will include…

- Impact analysis, following all cohorts for at least three semesters
- Analysis of the institutional-level and classroom-level implementation of the DCMP
- Cost-effectiveness analysis of the DCMP

To be published in fall 2019

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The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305C140007 to Teachers College, Columbia University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

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Reimagining Developmental Education

How can we do better for our students?

SAVE THE DATE
November 21–22, 2019
New York City, NY

Sign up for announcements at
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