COREQUISITE APPROACHES TO INTRODUCTORY STATISTICS

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The plan

- A bit of history—how did we get to where we are today?
- What we learned along the way
- Things to consider if you are planning to implement co-reqs
- Resources
- Questions and discussion

A Bit of History…

- The problem (and it was a big one!):
  Students enrolled in long sequences of remedial courses rarely graduate. Black, Hispanic and low-income students disproportionately placed into remediation.

- The vision:
  Increase student success and create more equitable outcomes for students by transforming developmental education by placing significantly more students into college-level courses and providing them with additional academic support.

The Experiments Begin (around 2011)

- Different approaches
  - Shorten the developmental pathway to one semester, focused on the math needed for the specific college level course for a student's program of study (e.g. statistics, quantitative reasoning, STEM). Many colleges experimented with "pre-stat" courses.
  - Additional support—enrolling students in credit bearing transfer courses while providing additional support. Colleges experimented with integrating support into college level course with expanded time and with providing extra support through a paired co-requisite companion course.
  - Direct to statistics—enrolling students directly in credit bearing courses with no additional support provided. A few colleges experimented with this approach.

A Decade Later—What We Have Learned

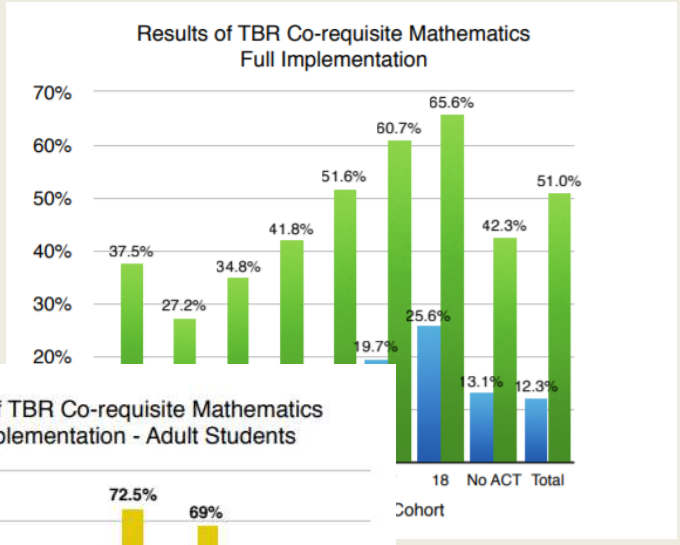
- Direct to Stat with no additional support
  - Saw some success. Many students who would have been placed in developmental sequence passed the intro stat class, even without support. This surprised many, but highlighted real problems with placement policies that tended to under-place students.
- Shorten and focus the developmental sequence
  - Schools implementing a developmental course focused on math needed for statistics (often called pre-stats) saw an increase in student success, as measured by the number of students successfully completing the intro stat course in their first two years.
- Additional support (either integrated with extra time or co-req)
  - Surprising increases in student success.

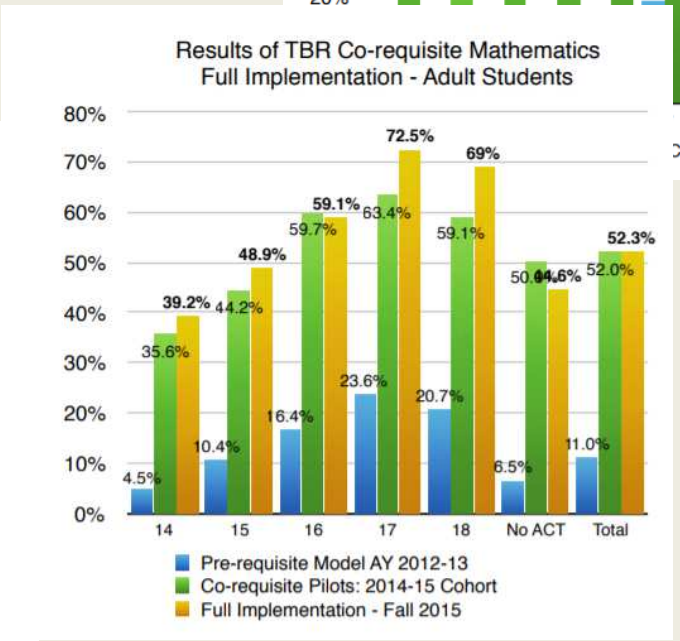
- Today…

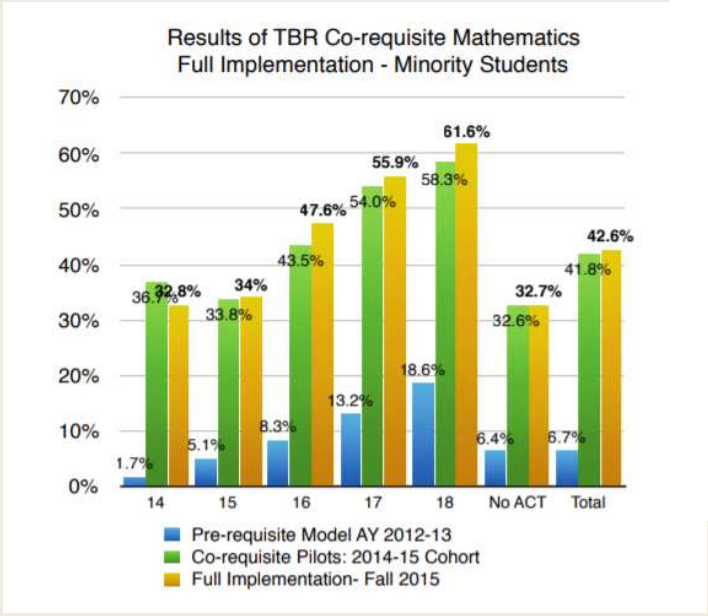
  The co-req model, which enrolls students into the transferable college-level course while providing additional support that enables them to be successful in that course, is recognized as the most successful and promising model.

Evidence of Success

- Tennessee—full implementation of co-reqs at all public institutions (both two-year and four-year colleges).



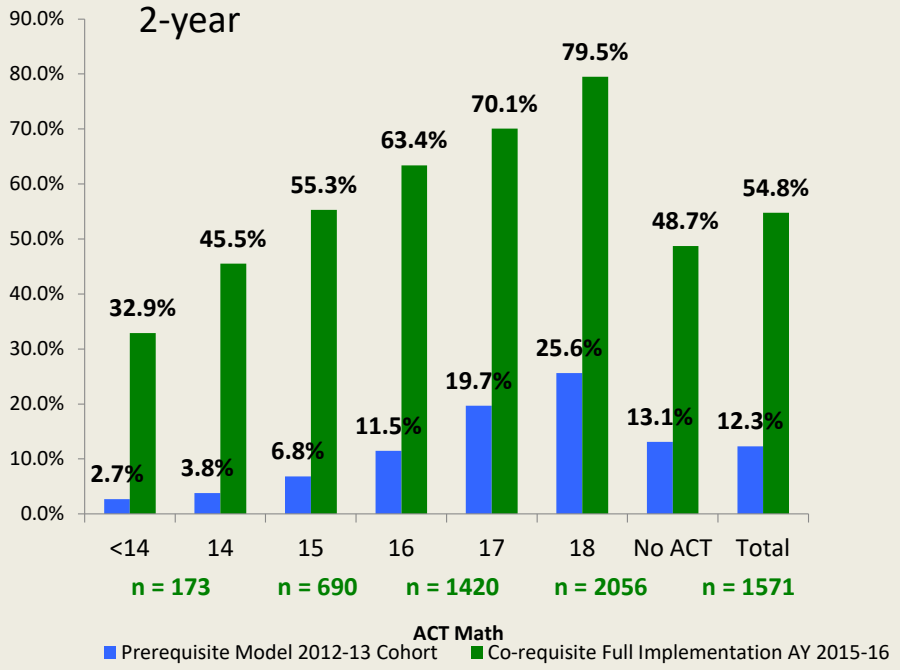


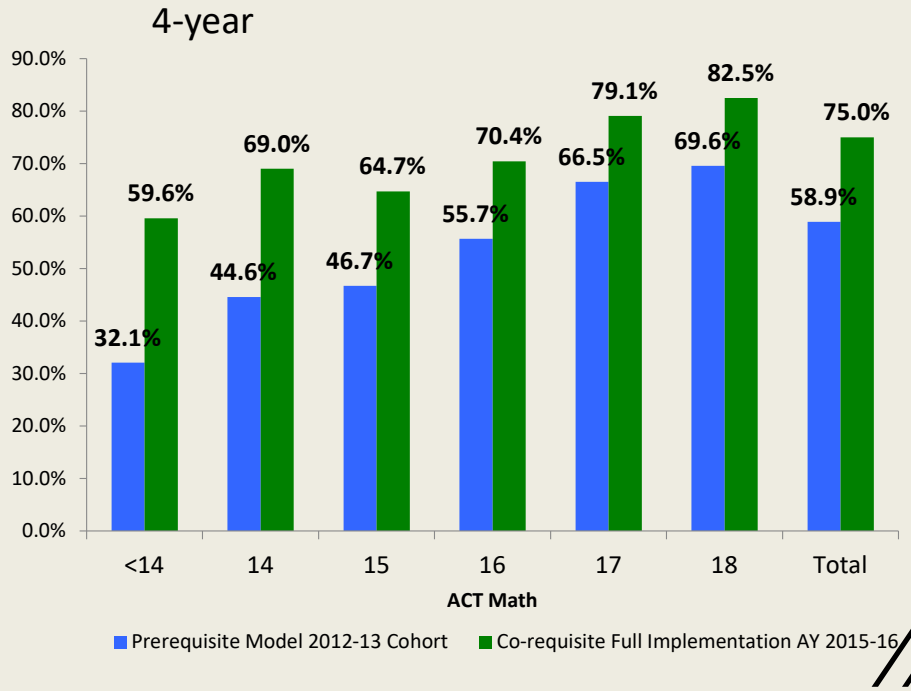


https://dcmathpathways.org/resources/co-requisite-remediation-full-implementation-study-tennessee-board-regents-report

Evidence of Success

- Tennessee—two-year college and four-year college results





Evidence of Success

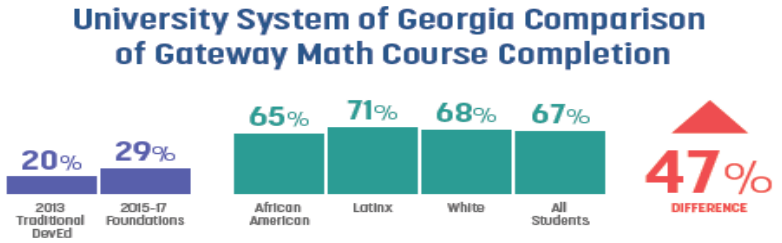
- New report released just this month:
  No Room for Doubt: Moving Corequisite Support from Idea to Imperative
  http://completecollege.org/article/coreq-report/

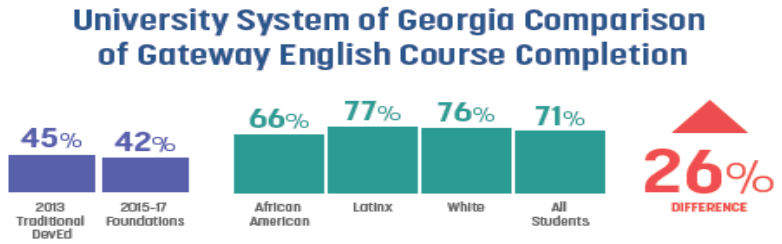
- Georgia
- CUNY

Evidence of Success--Georgia

Georgia Doubles Completion of Gateway Courses

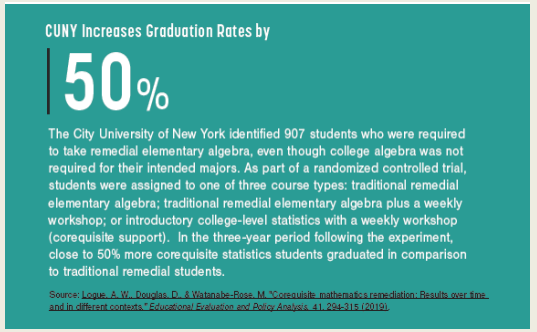
In 2015, the University System of Georgia abandoned traditional remedial approaches in favor of new models that could dramatically improve student outcomes. Campuses initially launched a Foundations model that compressed remediation into a single semester while also introducing corequisite sections. Students showed small improvements, but Georgia believed more was possible. In 2018, institutions adopted full corequisite models for both math and English development education. And it had a dramatic effect: Georgia doubled the percentage of students who completed gateway courses for all students, regardless of race or entrance exam scores.





Evidence of Success--CUNY

- CUNY randomized controlled experiment
  - 907 students placed into dev math randomly assigned to one of 3 groups.
    - Group 1: Direct to stat with 2 unit support workshop
    - Group 2: Traditional remediation to stat
    - Group 3: Traditional remediation but with support.
  - Pass rate for intro stat
    - Group 1: 56%
    - Group 2: 39%
  - Follow up study found that students in group 1 were no less likely to pass other gen ed courses, including science. And students in group 1 had graduation rates that were 50% higher than students that started in traditional remediation.



The California Experience

Capacity Unleashed (2016)
Report from the California Acceleration Project

"Each year, over 140,000 students take their first remedial math course in a California community college. More than 100,000 of them will never complete the math required to earn a degree.

Statewide, over half of African-American and Hispanic students in remediation are required to start in the lowest levels of the curriculum, From this starting point, only about 6% go on to complete a math course that transfers to a four-year college.

These are the unacceptable results of traditional remediation."

The California Experience

- AB 705, passed in 2017 and effective January 1 of 2018

What does my college need to do?

Every college is required to **maximize the probability that a student will enter and complete transfer-level coursework in English and math within a one year timeframe** and use, in the placement of students into English and math courses in order to achieve this goal, one or more of the following measures:

- High school coursework
- High school grades
- High school grade point average

All community colleges are required to be in compliance with AB 705 no later than **fall of 2019**.

The California Experience

- LOTS of grumbling, complaining. Some colleges said “well, we’ll consider it” and they were told “You can consider all you want, but guess what? It’s the law!”

- Setting the complaining aside and looking at the evidence, most colleges and faculty realized that it would be a challenge and that it would be a lot of work, but it would be worth it because it was the right thing to do for students.

- Of course, it didn’t stop the complaining about the mandate and the way it was handled, but colleges embraced the challenge (some more willingly than others!)

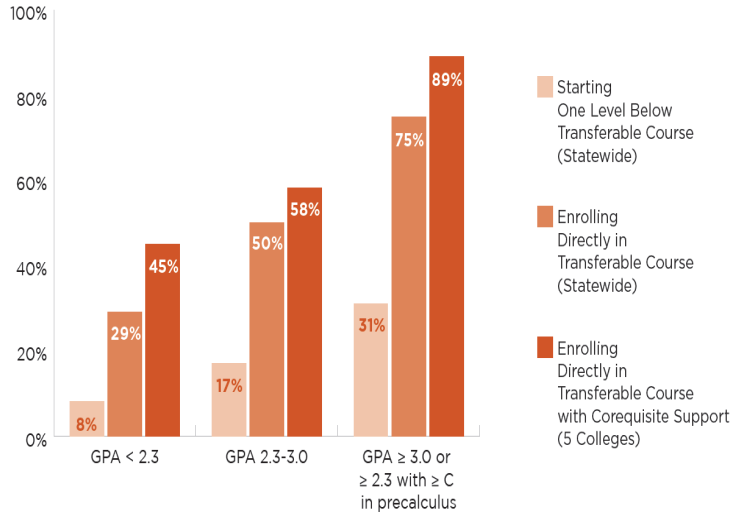
The California Experience

- 2-year colleges implemented in 2018 and 2019, 4-year colleges implemented in 2019 and 2020.

- The results have been impressive!
  Improved student completion of intro stat for students at all placement levels and across all ethnic groups.

Figure 2. Completion of Transferable Statistics

Students with low GPAs who are placed directly into transfer-level courses are three times more likely to complete transfer-level statistics than their peers who are placed one level below transfer level (29% vs. 8%), and students receiving corequisite support in a transfer-level course are five times more likely to complete transferable statistics than their peers placed one level below transfer level (45% vs. 8%).



https://collegecampaign.org/wp-content/uploads/2019/12/Getting-There-II-FINAL.pdf

So where are we 10 years after the experiments began?

Like most innovations, over time, it isn't really new anymore. But it is still new to many, and a large number of colleges and university systems are deciding that there is now enough evidence to make the case for implementation of co-req models compelling.

So you're thinking about implementing co-reqs…

- Things to think about
  - There are different models to consider (each has pros and cons!)
    - Cohort (all students in the intro stat course are in the same co-req, separate sections of intro stat for those not needing co-req support)
    - Co-mingled (students needing co-req support mingled with students who do not need support in the same into stat sections)
  - Same instructor or different instructor for stat and co-req sections?
    - Different instructors requires good coordination between the content of the two courses and between the two instructors.
  - How is the co-req graded. Or is it graded?
  - Alignment of the co-req with the intro stat course. What are the mathematical pre-requisites for success in stat and when are they needed?

So you're thinking about implementing co-reqs…

- Other considerations:
  - For success of co-req, it is important to create a supportive learning environment for students.
  - The focus of the co-req should be on
    - Math skills essential for success in the statistics course
    - Success skills essential for success in all courses
    - May also include some extended time spent of statistics content

Co-Req Implementation Considerations Specific to Statistics

- Necessary algebraic background skills are not extensive.
- Usually very little mathematical background needed early in the semester if methods for collecting data (sampling and statistical experiments) is covered first. This allows some time to include some instruction related to success skills in the first week of support course.
- Necessary reading and writing skills are extensive.
- Necessary problem analysis skills are extensive.
- Most of the math readiness skills are needed in the first half of the support course. This allows time to include additional scaffolding and focus on statistics problems solving in the second half of the course.
- Need consider the technology that will be used in the intro stat course. Good idea to use same technology in co-req course.

The Co-Req Model—What it is not!

The co-req approach is NOT an attempt to water down the intro stat course! The level of rigor there is unchanged, and the learning outcomes are the same. The co-req approach just allows more time and support to enable students who need that support to achieve the learning outcomes of the intro stat course.

- We are past the experimenting stage.

  It is not easy, but the data provides evidence that implementing co-reqs is the right thing to do for our students. They are worth the effort!

Resources to help you along the way…

- Complete College America
  - No Room for Doubt Report
    http://completecollege.org/article/coreq-report/

- California Acceleration Project
  - https://accelerationproject.org/
  - https://accelerationproject.org/Corequisites
  - https://accelerationproject.org/Placement

- Dana Center Mathematics Pathways
  - https://dcmathpathways.org/learn-about-mathematics-pathways
  - Mathematics Foundations for Success in Introductory Statistics
    https://dcmathpathways.org/sites/default/files/resources/2019-08/Mathematics_Foundations_for_Success_in_Introductory_Statistics_20190809.pdf
  - The Case for Mathematics Pathways
    https://dcmathpathways.org/resources/case-mathematics-pathways

Thanks!

- I appreciate the time you spent here today to consider co-reqs and hope you found the information useful. As you might have been able to tell, I am an advocate of this model ☺

- Would love to hear your thoughts, questions, and comments.