The CBMS Survey

Measuring Characteristics and Dynamics of Undergraduate Mathematical and Statistical Science Programs in the US

Panelists

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The CBMS Surveys: Undergraduate Programs in the Mathematical Sciences

Every five years since 1965, on behalf of the Conference Board of the Mathematical Sciences (CBMS), with NSF support, recently administered by the American Mathematical Society (AMS), a committee appointed by CBMS has conducted a national survey of undergraduate mathematics and statistics programs. Reports include:

- Course Enrollments
- Faculty Demographics
- Degrees Awarded
- Program Features
- Topics of Current Interest

- Math departments in 2-year colleges (1,031)
- Math departments in 4-year colleges (1,395)
- Statistics departments (75)

http://www.ams.org/profession/data/cbms-survey/cbms2015

Today's Agenda

Pivoting: Planned-for 2020 the Survey adapted into two parts:

- Winter 2021 report on departments' fall 2020 experiences from COVID-19
- Fall 2021 continuation of the larger longitudinal study begun decades ago

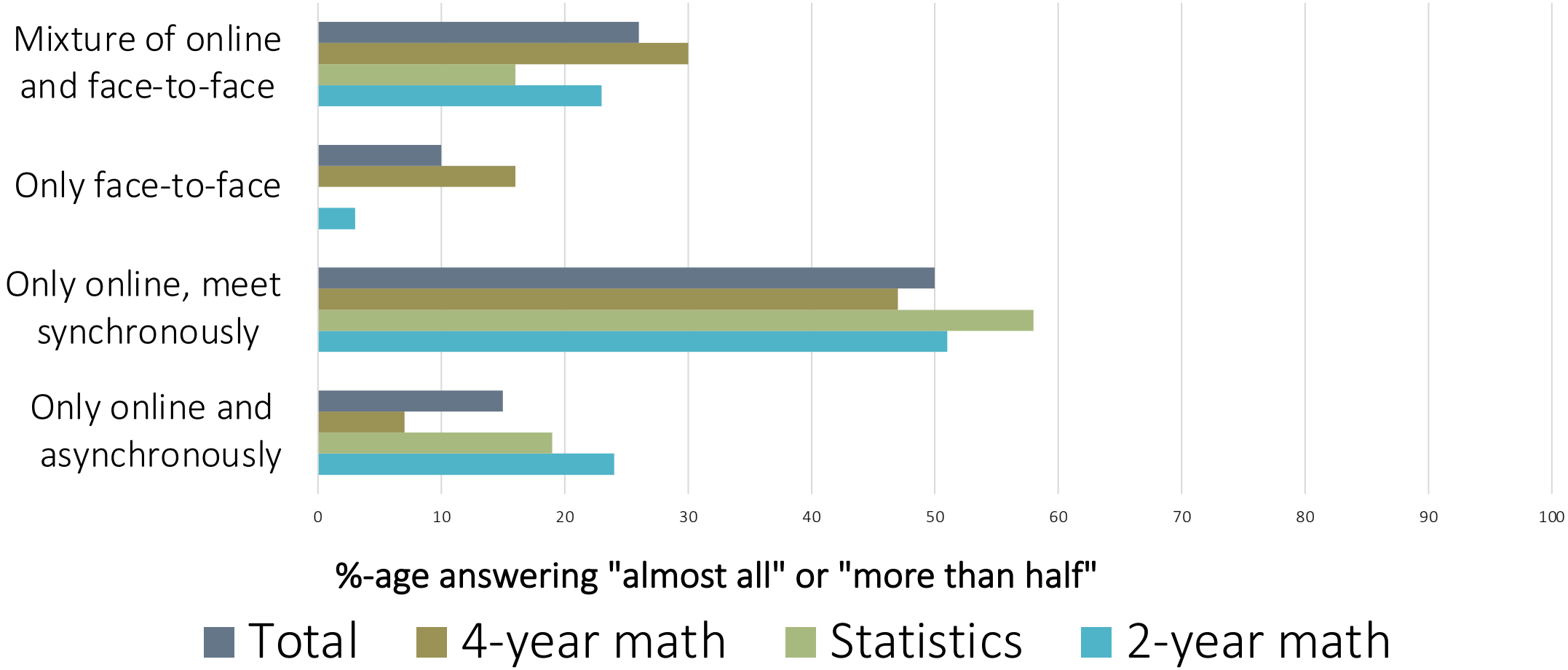
Panelists will:

- Share some of the COVID-19 survey findings
- Tell a data story or two emanating from 2015 and prior iterations
- Provide a look forward to the upcoming Survey and its follow-up

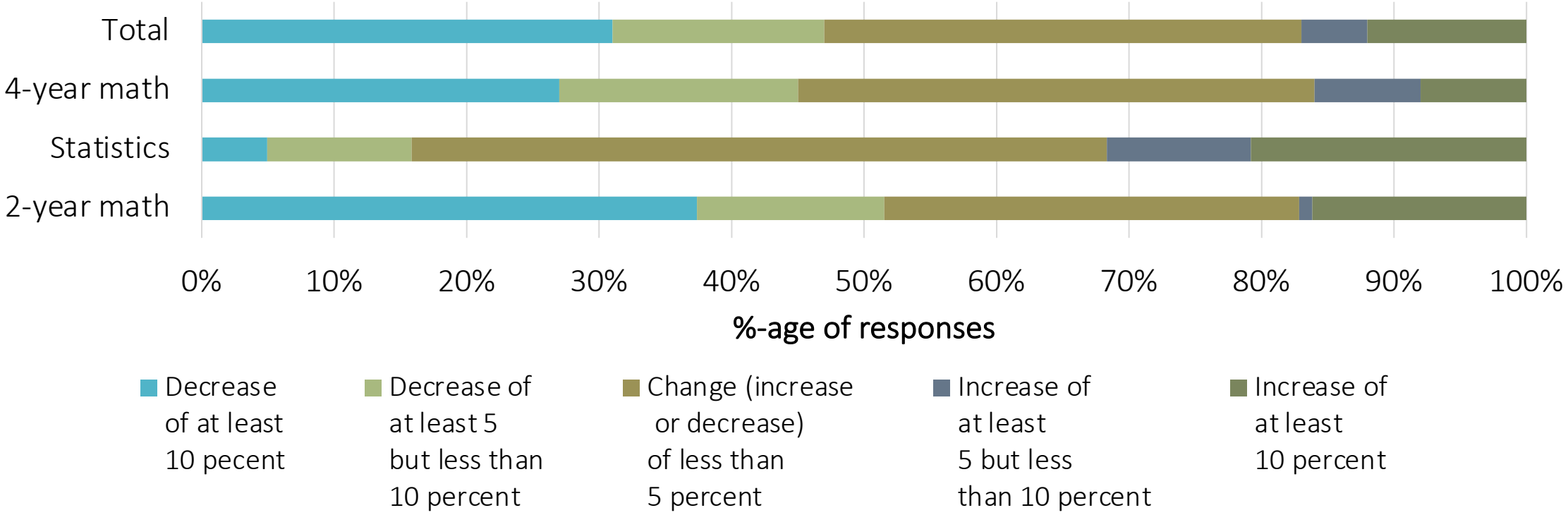
COVID Survey—in the Eye of the Storm

- Conducted October – November 2020
- Six multiple-choice questions, request for enrollment fall 2019 and 2020, two free response
- Effectively a census of 855 2-year math, 85 4-year statistics, and 1,342 4-year math programs obtained from IPEDS
- Usable responses from 81 2-year math, 26 statistics, and 402 4-year math programs
- A sampling of findings….

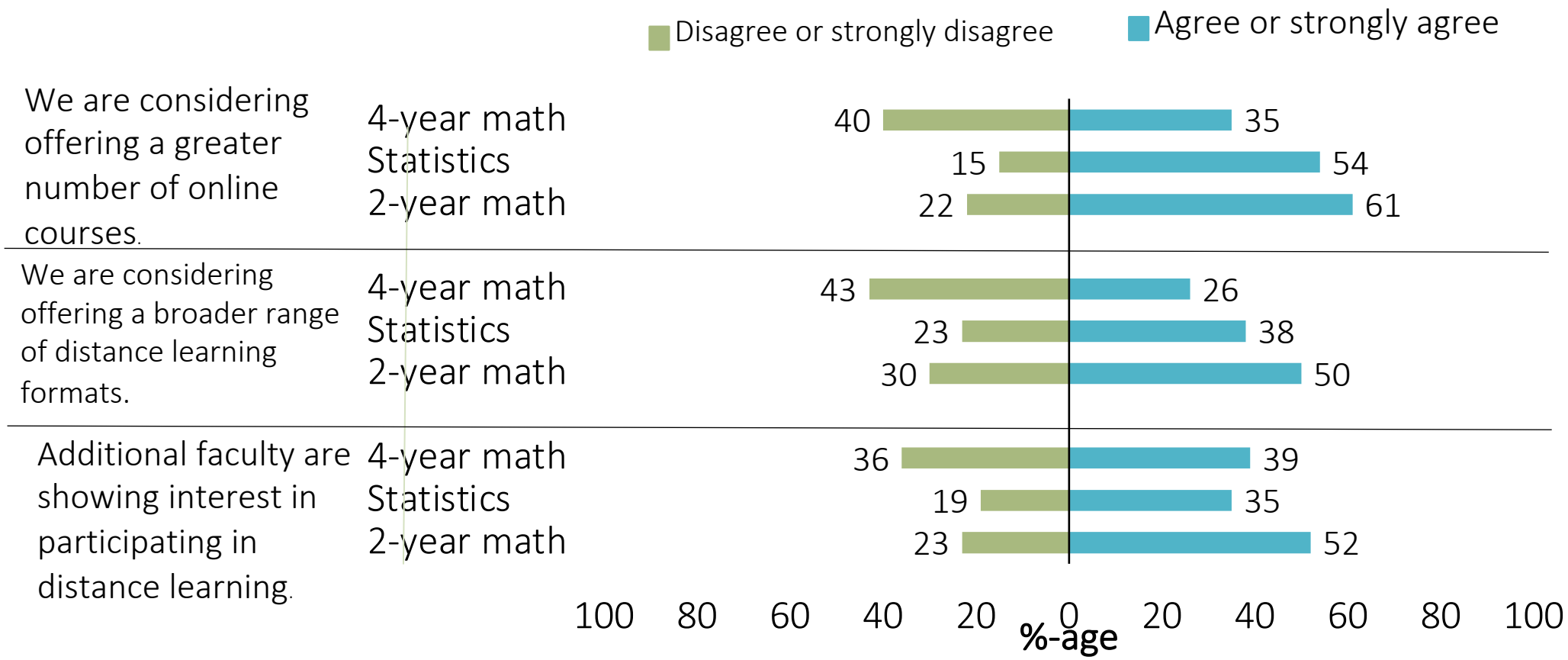
COVID: Class Format, by Department Type



COVID: Percentages of departments with various changes in fall enrollments from 2019 to 2020



COVID: Departments' Future Course-Delivery Planning

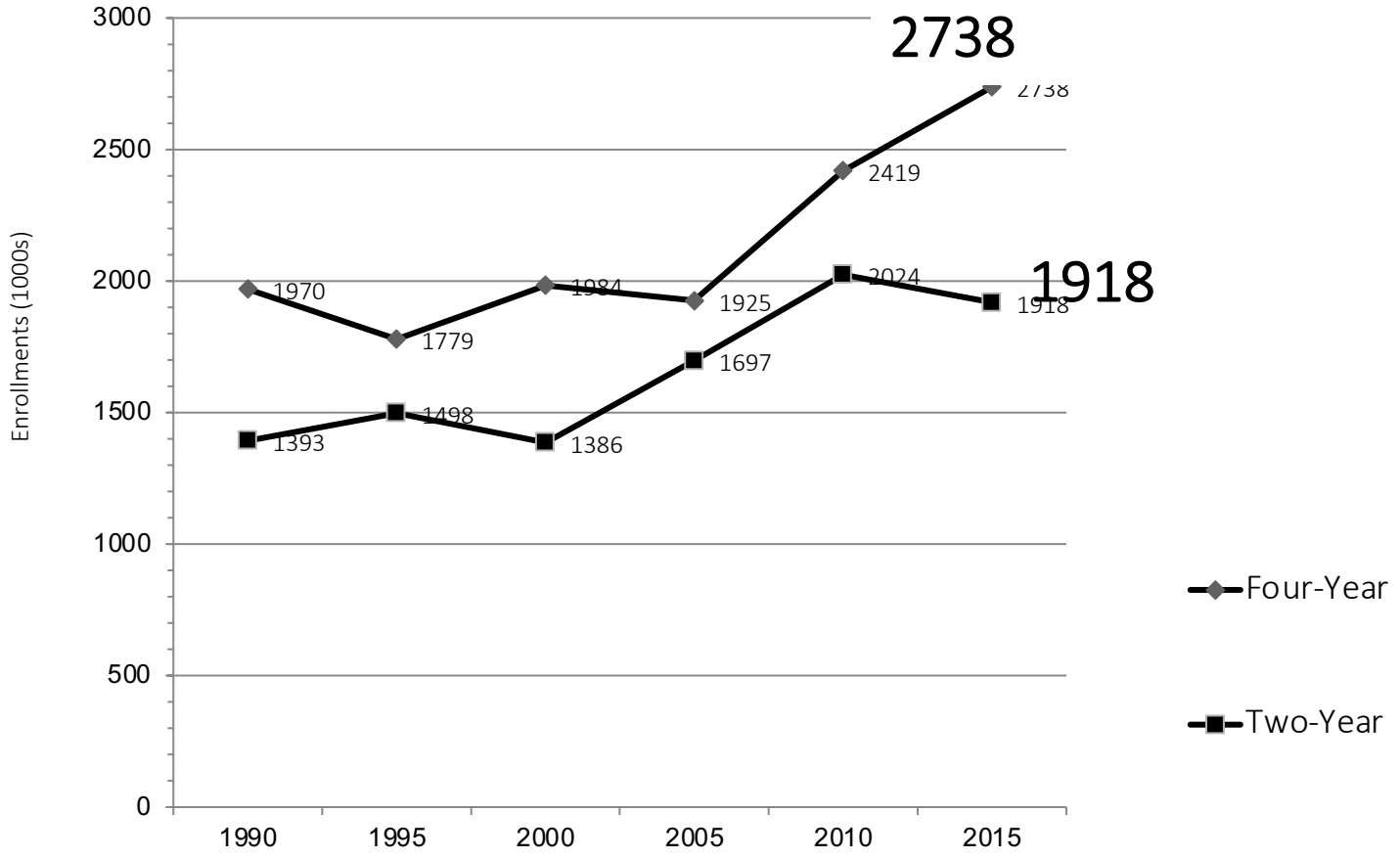


2015 CBMS Survey of Undergraduate Programs

- Conducted October – November 2015
- Stratified random sample of 518 institutions from among roughly 2,400 public 2-year colleges with mathematics programs and 4-year (public and private) colleges with mathematics or statistics programs
- Separate questionnaires to 2-year math, 4-year math, and 4-year statistics programs
- Here is a sampling of findings….

Mathematical Sciences Enrollments

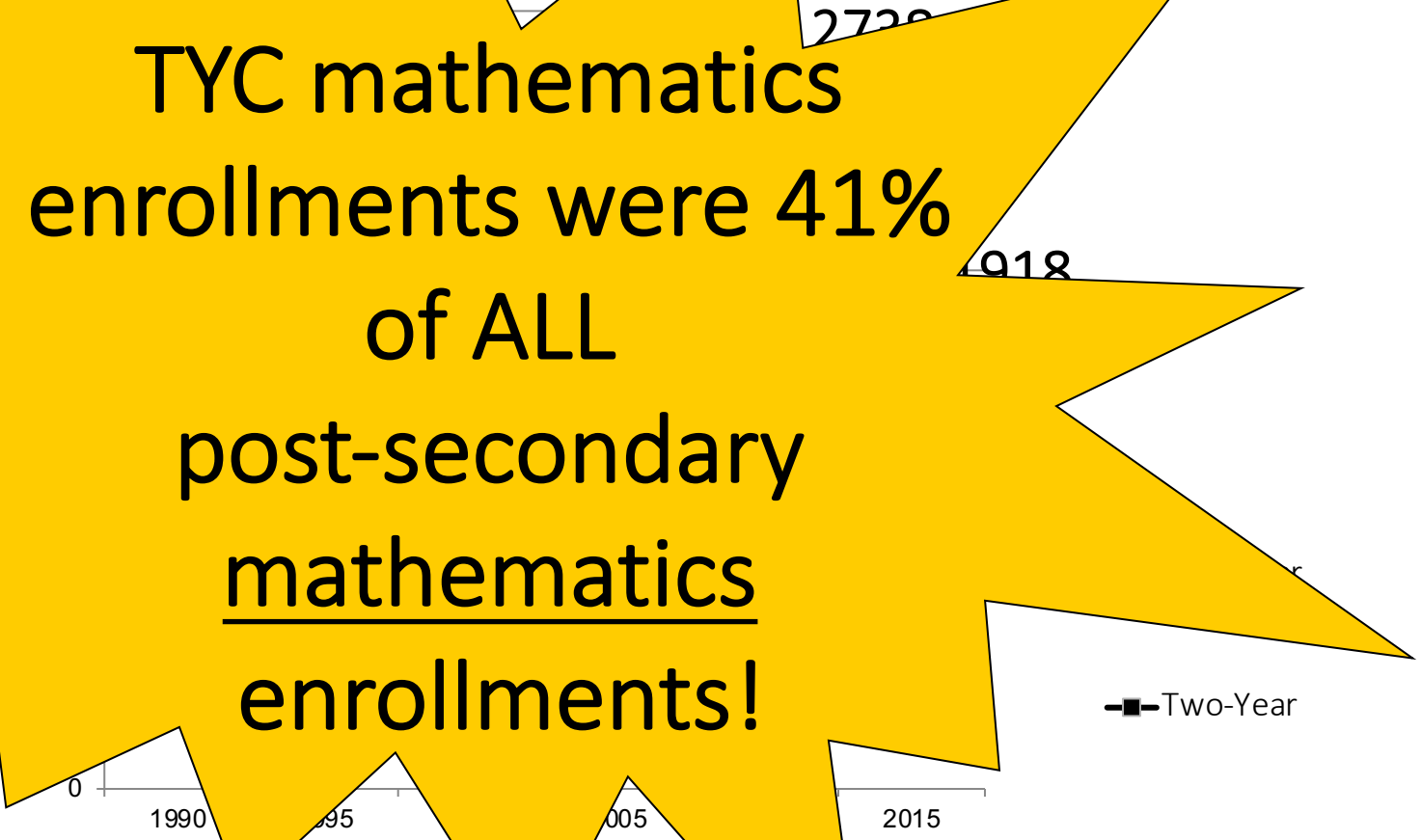
TYC: 1,918,000 FYC: 2,738,000



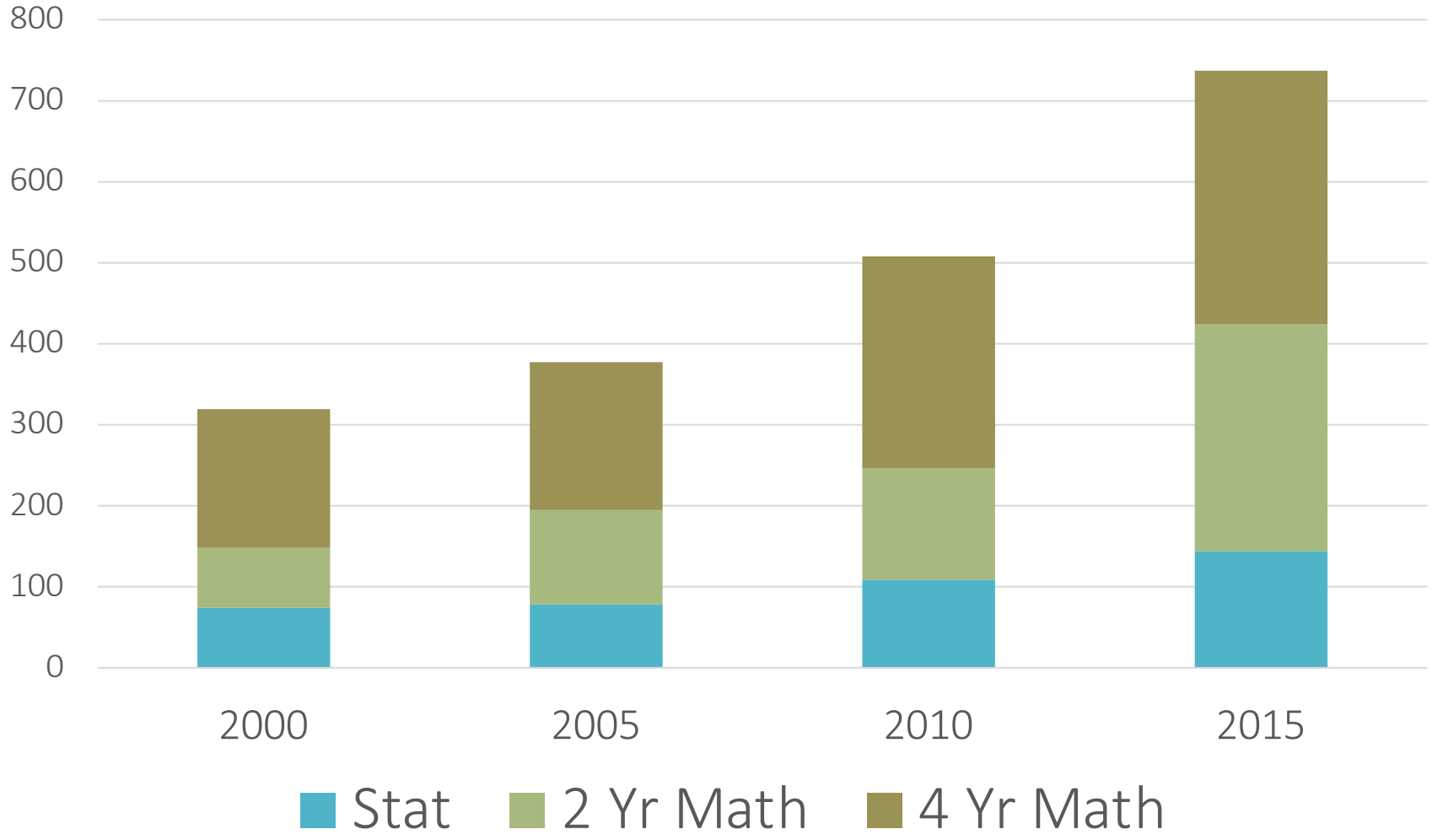
Mathematical Sciences Enrollments

TYC: 1,918,000 FYC: 2,738,000

TYC mathematics enrollments were 41% of ALL post-secondary mathematics enrollments!



Enrollments (1000s) in Statistics in Depts: Stat, 2-Year Math, 4-Year Math



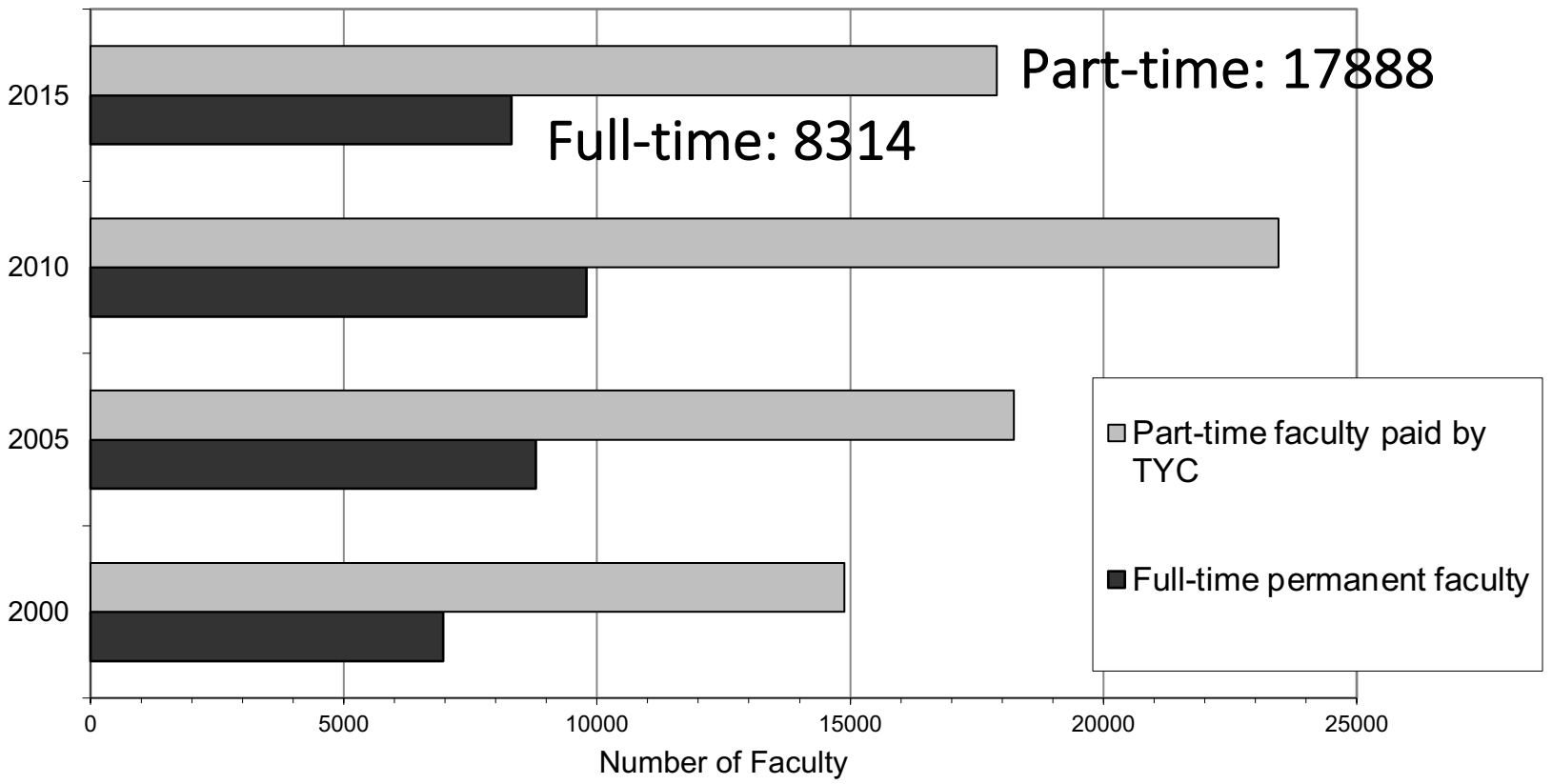
First time in CBMS 2015: Pathways

"Pathways" is defined to be a single course or course sequence that enables students to complete a college-level gateway mathematics or statistics course that is aligned to students' academic and/or career goals within one academic year.

Implemented Pathways in 2-year Colleges (TYE.11)

	Percentage		Enrollment
	Yes	No	
Implemented a Pathways course sequence	58	42	
			Fall 2015
Implemented Pathways course in:			
a. Foundations	51	49	76338
b. Quantitative Reasoning	59	41	45203
c. Statistics	63	37	56342
d. Other	32	68	14631

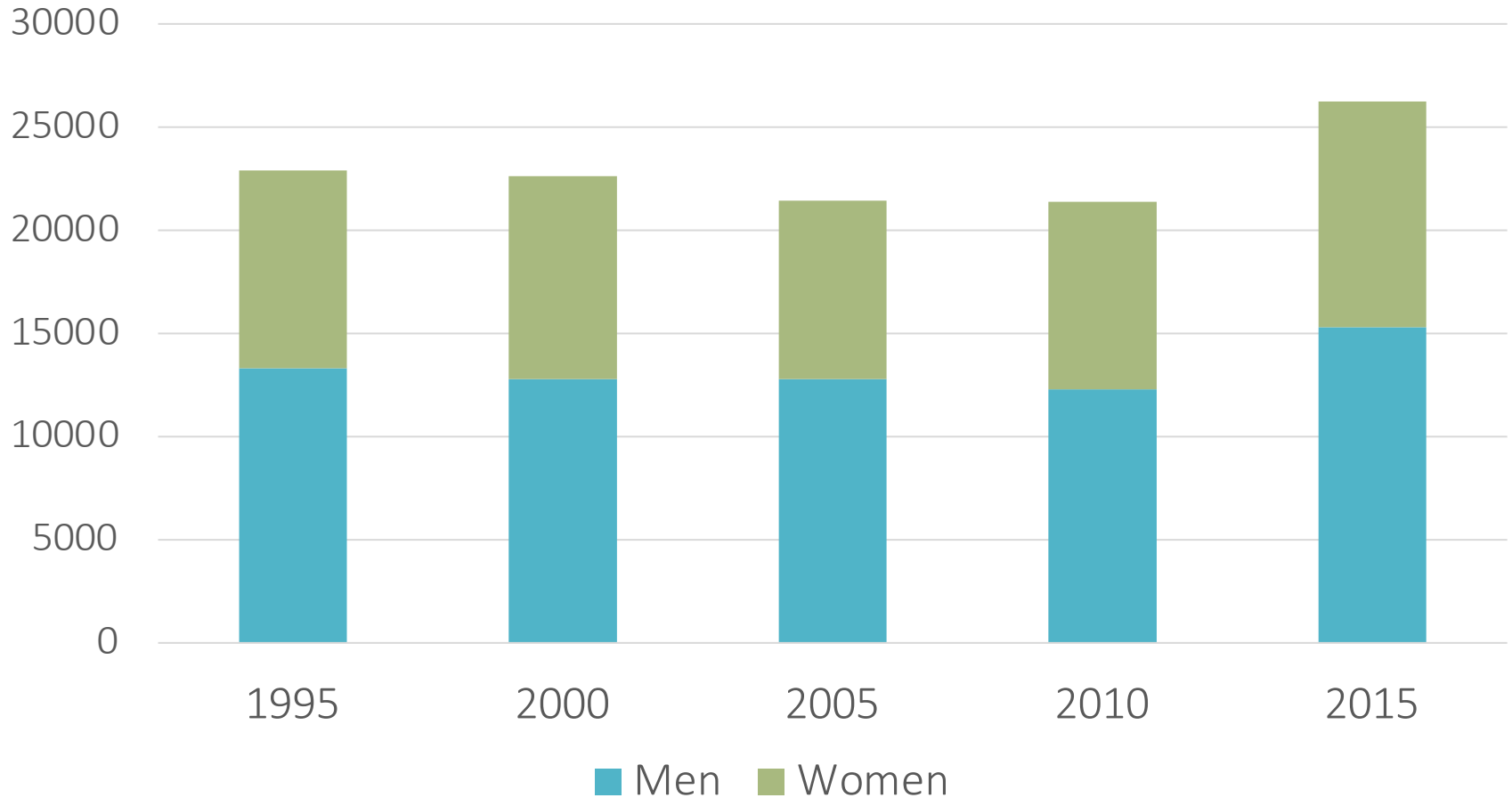
TYC Full-Time Permanent and Part-Time Faculty



Enrollment (in 1000s) at 4-Year Colleges by Course

Course	2000 (math)	2005 (math)	2010 (math)	2015 (math)	2000 (stat)	2005 (stat)	2010 (stat)	2015 (stat)
Math Statistics	13	9	5	5	5	3	3	3
Probability	13	7	9	12	4	3	3	4
Regression/ Correlation	1	1	2	2	1	2	2	3
Stat Software/ Computing	0	0	1	1	1	1	1	2

Bachelors Degrees Awarded by 4-year Math and Stat Depts



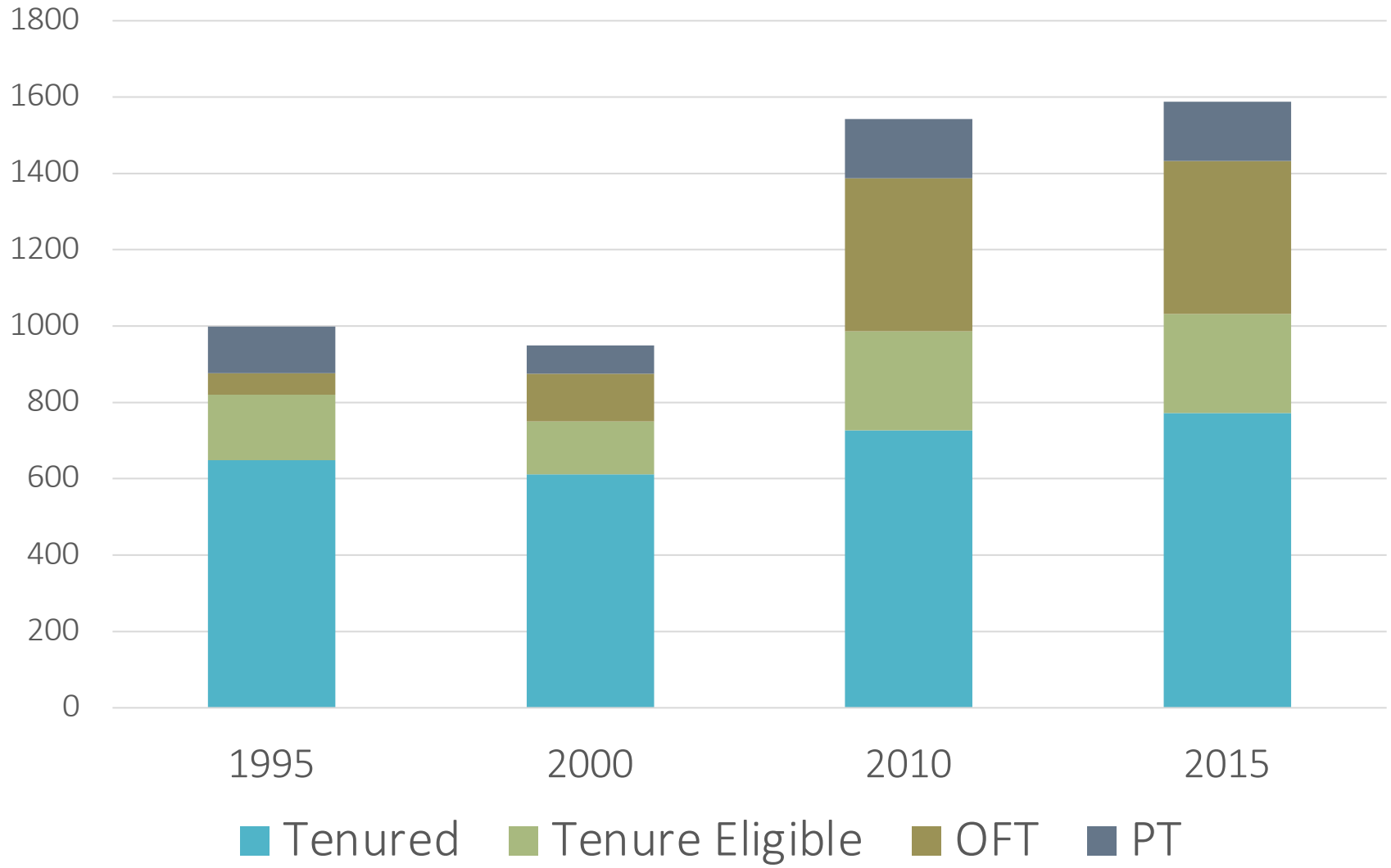
Statistics Minors/Majors in Mathematics Departments

	PhD	MA	BA
Offer a stat minor	13%	52%	10%
Number of minor graduates	305	323	384
Offer a stat major	25%	26%	4%
Number of major graduates	126	133	157

Full-time Faculty in 4-year Math Departments

Department	2010	2015	% increase
Statistics	1266	1433	13%
Mathematics	22293	22532	1%

4-year Statistic Dept Faculty



Graduate Degrees in Stat Among Intro Stat Instructors in 4-year Math Depts

%	None	MA	PhD
Math Depts			
Univ (PhD)	52	29	18
Univ (MA)	48	35	17
Coll (BA)	68	18	14
Total Math Depts	64	21	15

New in the 2021 Survey

- Equity, Diversity, and Inclusion (EDI)
- Instructional strategies in Introductory Statistics
- Technology uses in Introductory Statistics
- Revision and update of distance/remote learning questions
- Updated list of statistics course names

New: Efforts to increase Equity, Diversity, and Inclusion

A question to assess the extent to which activities have taken place in the past year in departments in response to increased national attention to equity, diversity, and inclusion issues.

Options such as

- Faculty or student discussions designed to increase awareness of equity, diversity, and inclusion issues
- Program or policy changes to affect the demographic balance of faculty or undergraduate/graduate students in the mathematical sciences.
- Consideration of existing or new programs to assist underrepresented groups and/or at-risk students in the mathematical sciences.

New: Instruction in Introductory Statistics

How often are each of these instructional strategies used in the Introductory Statistics courses taught in your department in Fall 2021?

Options: At least once a week Occasionally Never

- Focusing on conceptual understanding over formulas and procedures
- Integrating real world applications
- Students collect, organize, and analyze real data
- Using student-centered active learning strategies
- Using assessments such as regular graded homework or quizzes used to inform teaching

New: Technology in Introductory Statistics

How successful is your program in adopting each of the following use of technology (graphing calculators, statistical software, online applets) in your Introductory Statistics (no calculus prerequisite) courses taught in Fall 2021?

Options: Very successful Somewhat successful Not successful

- Students use technology to explore concepts
- Instructors use technology to demonstrate concepts
- Students use technology to analyze data
- Students' ability to use technology to solve problems is assessed

The 2021 CBMS Survey

Learn more:

http://www.ams.org/profession/data/cbms-survey/cbms2020