Students are ...

- Taking too much time
- Taking too many credits
- Diverted into Remediation
- Not graduating
Too Much Time to Degree

Of those who graduate...

2-year Associate
Full-time students take 3.9 years

4-year Bachelor's (Non-Flagship)
Full-time students take 4.9 years
## Too Many Credits

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Credits Accumulated</th>
<th>Credits Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2-year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td><strong>78.8</strong></td>
<td><strong>60</strong></td>
</tr>
<tr>
<td><strong>4-year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s (Non-Flagship)</td>
<td><strong>136.2</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

Does NOT count remediation
Rates of Referral to Developmental Education

51.7% of those entering a 2-year college enrolled in remediation

19.9% of those entering a 4-year college enrolled in remediation

Source: Fall 2006 cohorts
Developmental Students Struggle to Progress

<table>
<thead>
<tr>
<th>2-Year Colleges</th>
<th>4-Year Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>62.0%</strong> Complete remediation</td>
<td><strong>74.4%</strong> Complete remediation</td>
</tr>
<tr>
<td><strong>22.3%</strong> Complete remediation and gateway courses in two years</td>
<td><strong>36.8%</strong> Complete remediation and gateway courses in two years</td>
</tr>
<tr>
<td><strong>9.5%</strong> Graduate within 6 years (projected)</td>
<td><strong>35.1%</strong> Graduate within 6 years (projected)</td>
</tr>
</tbody>
</table>

Student attrition and long course sequences are at the heart of the matter.
Remediation: The effect of attrition.

Students assigned 3 or more semesters of math remediation.

Completed 1st semester of remediation.
Lost

Completed 2nd semester of remediation.
Lost

Completed 3rd semester of remediation.
Lost

Passed gateway course.
Lost

The remediation system is broken. More students quit than fail.

What is the “Right Math”?

- College algebra and traditional developmental math sequences were designed in the 1950’s to prepare students for calculus.
- But the majority of students are in majors that do not require calculus.
What is the “Right Math”? 

Estimations based on data from the Texas Higher Education Coordinating Board, 2013: Degrees Earned by CIP code.
What is the “Right Math”?

Based on a study of national enrollment flows, many students who begin on an algebra path never reach—or never intend to reach—calculus.

What is the “Right Math”? 

- Ever Take Calculus 1
- Take Business Calculus
- Do Not Take Any Form of Calculus

Dunbar, S. 2005. Enrollment flow to and from courses below calculus. In A Fresh State for Collegiate mathematics: Rethinking the Courses below calculus, N.B. Hastings et al. (Eds.). Washington DC: MAA Notes, Mathematical Association of America
What is the “Right Math”?

Virtually no students who pass college algebra ever start Calculus III, which is a key course for STEM majors.

- 60% Take Business Calculus
- 30% Do Not Take Any Form of Calculus
- 10% Do Not Take Any Form of Calculus

College Algebra’s **Only** Purpose: Preparation for Calculus
“Unfortunately, there is often a serious mismatch between the original rationale for a college algebra requirement and the actual needs of students who take the course. A critically important task for mathematics sciences departments at institutions with college algebra requirements is to clarify the rationale for requirements, determine the needs of students, and ensure that department’s courses are aligned to these findings.”

-- Mathematics Association of America, Committee on the Undergraduate Program in Mathematics.
Math is Aligned with Meta-Majors

- Health Sciences
- Social Sciences
- Liberal Arts
- Education
- Business

Quantitative Reasoning/Statistics

- Degree
- 4-Year Transfer
- Certificate
- License

- STEM

College Algebra/Precalculus

- Degree
- 4-Year Transfer
- Certificate
- License
Subgroup 1: New and Alternative Pathways

- Improve student success in entry-level courses by aligning mathematics to academic programs of study and by improving instructional delivery mechanisms
  - College Algebra has been the catch-all basket for students as a just-in-case they want to enter the STEM field but in general do not pursue. New pathways are needed that are meta-discipline specific and supportive of future goals of the student.

- Develop, implement and evaluate co-requisite strategies to support underprepared students
  - How does just-in-time integrate with the OTM Math structure?
Remediation is designed for College Algebra

1) Compass and Accuplacer are designed to determine placement in College Algebra, not statistics or quantitative reasoning

2) Cut scores are set for College Algebra

3) Dev Ed courses are designed to prepare students for College Algebra, not statistics or quantitative reasoning
Recommendations from the Math Community

- “College algebra was designed explicitly to meet the needs of student who are preparing to take Precalculus and Calculus”
  
  - University System of Georgia Mathematics Task Force
“Additional academic support should be integrated with gateway college-level course content – as a co-requisite, not a pre-requisite. The delivery of remedial content as a single semester co-requisite alongside college-level content, a one-year course pathway, or embedded remediation can take many forms. In all cases, the remedial instruction must be aligned and coordinated with the college-level course.”

Recommendations from the Math Community

- “We recommend that many more students be advised to begin their programs of study in college-level, credit bearing gateway courses. Underprepared students should also study college-level material with integrated, just-in-time support either in a single semester or over one year.”

  - University System of Georgia Mathematics Task Force
STATISTICS PATHWAY is designed for students seeking a college-level statistics course as part of their general education requirement for majors in fields including:
- Nursing
- Social Work
- Criminal Justice

QUANTITATIVE REASONING PATHWAY is designed for students pursuing a field of study in which general education math is a requirement. These fields include majors in:
- Communications
- Graphic Design
- Paralegal

STEM-PREP PATHWAY is designed for students seeking a STEM or mathematics-intensive major in fields including:
- Petroleum Engineering
- Computer Science
- Chemistry
In Math Pathways Differentiated Gateway Courses are:

- Articulated to Program of Study Requirements
- Transferable into Programs of Study at Receiving Institutions
- Designed to be delivered with a Corequisite for Underprepared Students
- A Key Component of Pre-Major Advising
  - Part of a Meta-Major of like Academic Programs
  - Outlined in Academic Degree Maps
  - Part of a First Semester Default Schedule
A Model Pathway

Advise and Assess

Choose Meta-major
- Social Sciences
- STEM
- Humanities

Gateway Math in 1st year
- Stats
- College Algebra
- QR

Choose Major
- Major
- Major
- Major
Subgroup 2: Revise Existing OTM Mathematics, Statistics & Logic Expectations

- Redesign OTM course criteria and processes to focus on student learning outcomes
- Increase departmental flexibility in determining prerequisite courses and credit hour requirements for OTM courses
- Define what distinguishes a course as “college-level”
- Can we examine OTM course submissions to the general OTM Math guidelines for additional course/pathways that could be codified?
Subgroup 5: Alignment between Secondary and Postsecondary Content & Instruction

- Conduct National Scan of best and promising practices designed to align secondary and postsecondary content and instruction.
- Conduct regional meetings and workshops to generate ongoing conversation among secondary and postsecondary faculty, as well as state education policy leaders about:
  - Aligning K-12 and higher education curricula and policies
  - Preparing and equipping new and existing math teachers
  - Building infrastructure to accomplish this work
- Share best practices with USO institutions and High Schools.
- OBR engage in
  - Student Success Summit
  - Effects of Remediation Free Standards
  - Impact of various institutional strategies to address impact of 22 ACT Math score.
Subgroup 3: Communication and Outreach (and Engagement)

- Improve communication among mathematics faculty and stakeholders across institutions
- Encourage and promote mathematics faculty participation in meetings of professional groups
- Engage the larger (mathematics) community with disseminations from the various subgroups of the Ohio Mathematics Initiative
  
  - Who is in that larger (mathematics) community and how can our communications influence their perspectives/decisions?
  - Communication needs to be both inward and outward? How do we forge those outward connections?
  - How do we encourage the sharing of ideas, resources and information amongst the subgroups and consumers of the Math Initiative?
Subgroup 4: Data Collection, Analysis & Share

- This is a multi-directional endeavor
- The flow of data needs to permit the development of quality measures for improving student success in mathematics.
  - All Subgroups are directly impacted by the availability of quality data for decision-making and dissemination.
    - What data is Reliable? Essential? Helpful? Informative?
    - Where can the data be culled?
    - What information do the other subgroups need to make decisions?
    - What is the best way to present the data for consumption?
What are the subgroup relationships?
Expanding the OTM Math Perspective

Subgroup 1: New and Alternative Pathways Subgroup

Development of entry-level mathematics courses to serve the needs of students in clusters of academic programs (e.g., the social sciences, business and finance, allied health and other STEM disciplines) AND Develop, implement and evaluate co-requisite strategies to support underprepared students

Remediation Free Standards College Readiness: ACT 22

High School Curriculum

Influences content and prerequisites of

Influenced by

Developmental Track

leads to

New Pathways
Quantitative Reasoning
TMM010 Elementary Statistics

TMM001 College Algebra

Can lead to
TMM003 Trigonometry
TMM005 Calculus 1

Can lead to
TMM002 Precalculus

TMM013 Business Calculus

Can lead to
TMM006 Calculus 2

Can lead to
What are the subgroup relationships?
Expanding the notion of consumers of communication

Subgroup 3: Communication, Outreach and Engagement
The true complexity of the endeavor
Complete College America (CCA) General Grant Timeline and Key Outcomes

Phase 1: Prepare for a successful task force

Phase 2: Task Force creates vision for the state

Phase 3: Address policy barriers
- Align math requirements with programs of study
- Plan for engagement of colleges

Phase 4: Colleges implement with students
Complete College America (CCA) General Grant Timeline and Key Outcomes

CCA Next Steps:

- Complete Phase 3 Activities by Designing Alternative Gateway Math Courses
- Complete Phase 4 Activities by Articulating Gateway Math Courses to Programs of Study
What is our charge for today?

- Determine what is the low-hanging fruit that we can accomplish quickly.
- Given the Grant’s timeline, what is an appropriate Subgroup Committee timeline to address its goals?
- Determine what technical support does each committee need to achieve its goals?
  - What resources are needed?
  - What data/information is needed and/or wanted?
  - What national/state/local perspectives are needed?
  - What areas of overlap does your subgroup have with others?
  - What communication plan does your subgroup need to implement?
  - What meeting schedule does your subgroup need to have?
  - What other entities/barriers impinge upon accomplishing the goals?