Prevalence and upstream predictors of remedial education in Maryland community colleges

Mathew C. Uretsky
Stacey L. Shipe
Angela K. Henneberger
SSWR 2019 annual conference
January 20, 2019
Introduction

- A college-ready student should enter college with the expectation of passing college coursework.
- Underprepared students need to take remedial coursework to prepare for college level.
- Nationally, about 30-40% of students entering college need to take remedial coursework (NCES, 2014; Rose, 2012).
- May indicate a mismatch in high school academic preparation and college academic expectations.
Introduction Continued

- Minority students and low SES students are more likely to need remedial coursework (Attewell et al., 2006).
- High school academics also related to need for remedial coursework (Chen, 2016; Radford et al., 2012).
- Needing remedial coursework is associated with negative outcomes (Attewell et al., 2006; Clotfelter et al., 2015).
- Highlights the importance of early identification and intervention.
Prior Research from the MLDS Center
The Maryland Context: College Degree Outcomes

- Students who needed remedial coursework had lower rates of attaining a bachelor’s degree and higher rates of attaining an associate degree.

Data are from Maryland public high school graduates (2008-2009) who enrolled in a Maryland college (2009-2010).
The Maryland Context: Years to Degree

- Students who needed remedial coursework took longer to obtain a degree (5-6 years)

Data are from Maryland public high school graduates (2008-2009) who enrolled in a Maryland college (2009-2010)
The Maryland Context: Predictors of Needing Remedial Coursework

Data are from Maryland public high school graduates (2013-2014) who enrolled in a Maryland college (2014-2015).
The Current Study

- Focuses on Maryland Community College students
  - Represent the majority of students who need remedial coursework (Chen, 2016; Henneberger et al., 2016)
  - Have a common cut point to determine need (Halbach, 2015)
- Expands upon the prior study to include high school-level predictors of remedial coursework
- Disentangling the role of student- and high school-level factors will help policy makers to determine whether student-oriented or school-oriented prevention may be most useful.
Method: Data

○ Linked data sources postsecondary, college enrollment, and assessment data
○ 5 years of administrative records from MLDS
  ○ 18,800 students attending
  ○ 228 high schools across
  ○ 24 local school systems in Maryland
○ Inclusion criteria
  ○ Maryland public high school graduate AY 2013-2014
  ○ Enrolled in Maryland Community College AY 2014-2015
Sample Selection Criteria

*Figure 1. Sample Selection*

1. High school graduates: Regular diploma (2013-2014)
   \[ N \approx 58,000 \]

2. Enrolled in a Maryland community college (2014-2015)
   \[ N = 18,945 \]

3. Students with no missing data
   \[ N = 18,809 \]
Method: Measures

- Dependent variable - Need for remedial coursework in (1) math & (2) English

- Independent Variables
  - Individual student characteristics.
    - demographic characteristics
    - attendance and academic performance; and
    - placement characteristics
  - High School-Level characteristics
    - % FARMS
    - % English Learner (EL)
    - % fifth year graduate
    - Average weeks attended
Method: Analyses

- Multilevel logit models
  - Two-level model (Student nested within school)
  - Dummy variables for 24 Maryland jurisdictions
- Random effects to model the intercepts
- Fixed effects for the independent variables
- All continuous covariates were grand-mean centered log-likelihood difference test
Student-level Sample Characteristics \((N = 18,814)\)

<table>
<thead>
<tr>
<th>Category</th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female ((N = 18,809))</td>
<td>9,860</td>
<td>52</td>
</tr>
<tr>
<td>White ((n=18,814))</td>
<td>9,368</td>
<td>50</td>
</tr>
<tr>
<td>Hispanic ((n=18,814))</td>
<td>2,379</td>
<td>13</td>
</tr>
<tr>
<td>English Language Learner ((n=18,814))</td>
<td>1,037</td>
<td>6</td>
</tr>
<tr>
<td>FARMS Eligible ((n=18,814))</td>
<td>7,771</td>
<td>41</td>
</tr>
<tr>
<td>Special Education ((n=18,814))</td>
<td>1,758</td>
<td>9</td>
</tr>
<tr>
<td>GPA 3.0 or Above ((n=18,469))</td>
<td>5,476</td>
<td>30</td>
</tr>
<tr>
<td>Foreign Language Indicator* ((n=18,469))</td>
<td>7,533</td>
<td>41</td>
</tr>
<tr>
<td>Math Indicator* ((n=18,469))</td>
<td>5,275</td>
<td>29</td>
</tr>
<tr>
<td>Science Indicator* ((n=18,469))</td>
<td>3,314</td>
<td>18</td>
</tr>
<tr>
<td>Fifth-Year Graduate ((n=18,814))</td>
<td>347</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks Attended ((n=18,803))</td>
<td>34</td>
<td>4.658</td>
</tr>
</tbody>
</table>

*Note.* *Indicates student took two or more classes in the subject with a grade of B or higher.*
School-level Sample Characteristics (n=228)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>% FARMS</td>
<td>50</td>
<td>27.538</td>
</tr>
<tr>
<td>% English Language Learner</td>
<td>4</td>
<td>5.088</td>
</tr>
<tr>
<td>% Fifth-Year Graduate</td>
<td>10</td>
<td>15.358</td>
</tr>
<tr>
<td>Mean Weeks Attended</td>
<td>33</td>
<td>24.724</td>
</tr>
</tbody>
</table>

*Note.* *Indicates student took two or more classes in the subject with a grade or B or higher*
## Percentage, Distribution, and Subject level Overlap of Remedial Assessment Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Total ((N=18,814))</th>
<th>Assessed to Need Remedial (n =10,774)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(f)</td>
<td>%</td>
</tr>
<tr>
<td>Any Remedial</td>
<td>10,774</td>
<td>57</td>
</tr>
<tr>
<td>Math</td>
<td>9,925</td>
<td>52</td>
</tr>
<tr>
<td>English</td>
<td>5,315</td>
<td>28</td>
</tr>
<tr>
<td>Reading</td>
<td>4,738</td>
<td>25</td>
</tr>
</tbody>
</table>
Rates of Need for Remedial Coursework by Subject Area
### Results for the Multilevel Model - Student Characteristics (Math)

<table>
<thead>
<tr>
<th></th>
<th>( p )</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Student Characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>&lt;.0001</td>
<td>1.476</td>
</tr>
<tr>
<td>White</td>
<td>.410</td>
<td>.966</td>
</tr>
<tr>
<td>Hispanic</td>
<td>&lt;.0001</td>
<td>1.333</td>
</tr>
<tr>
<td>English Language Learner</td>
<td>&lt;.0001</td>
<td>.375</td>
</tr>
<tr>
<td>Free &amp; Reduced Meals</td>
<td>.031</td>
<td>1.088</td>
</tr>
<tr>
<td>Special Education</td>
<td>&lt;.0001</td>
<td>1.256</td>
</tr>
<tr>
<td>GPA 3.0 or Above</td>
<td>&lt;.0001</td>
<td>.609</td>
</tr>
<tr>
<td>Foreign Language Indicator*</td>
<td>&lt;.0001</td>
<td>.764</td>
</tr>
<tr>
<td>Math Indicator*</td>
<td>&lt;.0001</td>
<td>.420</td>
</tr>
<tr>
<td>Science Indicator*</td>
<td>&lt;.0001</td>
<td>.575</td>
</tr>
<tr>
<td>Fifth-Year Graduate</td>
<td>.001</td>
<td>.664</td>
</tr>
<tr>
<td>Weeks Attended</td>
<td>.834</td>
<td>1.037</td>
</tr>
</tbody>
</table>
### Results for the Multilevel Model - School Characteristics (Math)

<table>
<thead>
<tr>
<th></th>
<th>$p$</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% FARMS</td>
<td>&lt;.0001</td>
<td>1.089</td>
</tr>
<tr>
<td>% English Language Learner</td>
<td>.242</td>
<td>.932</td>
</tr>
<tr>
<td>% Fifth-Year Graduate</td>
<td>.029</td>
<td>.931</td>
</tr>
<tr>
<td>Mean Weeks Attended</td>
<td>.989</td>
<td>1.002</td>
</tr>
<tr>
<td><strong>Covariance Parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (School)</td>
<td>&lt;.0001</td>
<td></td>
</tr>
</tbody>
</table>
Results for Multilevel Model

English

- Similar patterns to those of Math
- Differences for English:
  - White students were less likely to need remedial coursework in English (OR = 0.81)
  - Fifth year graduate non-significant for English
  - Fifth year graduate (school-level) non-significant for English
Discussion

○ High levels of need for remedial coursework in Maryland community colleges
  ○ Highest rate for math
○ Both individual-level and high school-level characteristics predict need for remedial coursework
  ○ Indicates the potential for multi-layered intervention at both the student and school levels
○ Results were consistent for math and English with slight differences
Discussion - Student Level

- Student-level academic performance in high school had a larger influence on the odds that a student would need remedial education than socio-demographic factors.

- EL student placement and fifth-year graduation functioned as protective factors
  - The extra support provided to these students may help to alleviate the need for remedial coursework upon entering a Maryland community college.
Discussion - School level

- FARMs
  - Schools may be under-resourced in terms of preparing students for college-level coursework
- Percentage of fifth-year graduates
  - Additional supports may be provided in these schools
  - Schools with more experience with fifth year graduates may be better at preparing all students for college level math
Limitations

- Not able to control for confounders not included in the MLDS, found to be important in other studies
  - Behavioral variables
  - Parental education
  - School climate
  - Teacher professional development on college readiness
- Dichotomous yes/no outcomes
Future Research

- Fifth-year of high school vs. remedial in college
- Early identification - trajectories
- High school course taking patterns
- Subject overlap
- Measurement issues
  - Psychometrics
  - Regression discontinuity
For More Information

HTTPS://MLDSCENTER.MARYLAND.GOV/
Questions and Contact

Mathew C. Uretsky, Ph.D., MSW, MPH  
Assistant Professor  
Portland State University  
muretsky@pdx.edu

Stacey L. Shipe, PhD, MSc, MSW  
Assistant Professor  
Binghamton University  
sshipe@binghamton.edu

Angela K. Henneberger, Ph.D.  
Director of Research  
Maryland Longitudinal Data System Center  
angela.henneberger@maryland.gov
Acknowledgements

We are grateful for the data, technical, and research support provided by the MLDS Center and its agency partners. The views and opinions expressed are those of the authors and do not necessarily represent the views of the MLDS Center or its agency partners.

Thanks to the MLDSC Research Team and Research and Policy Advisory Board, participants at the MLDS Research Series and MD Connections Summit, and MSDE staff for helpful input.