

Evidence Based Changes in a Pipeline Special Masters Program

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Special Masters Programs

- Complete additional science coursework and demonstrate ability to perform at the graduate level
 - *new graduate GPA*
- Gain the opportunity to request current LORs from graduate or medical school faculty
- Gain skills and confidence that will prepare for success in professional school
- Earn an additional credential (residencies)



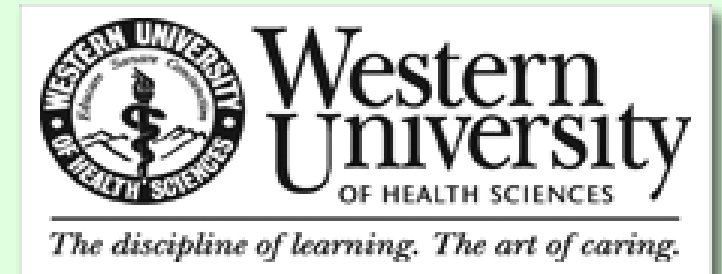
WesternU MSMS Program

Vision: The MSMS program is designed to assist individuals from *diverse* backgrounds in gaining acceptance to professional schools with the ultimate goal of increasing the number of health-professionals in underserved areas.



Mission Fit

- Underrepresented in Medicine (URiM)
- Low SES
- Educational: first generation college students
- HRSA indicators such as address in HPSA





But....

- Metrics are still the primary consideration for most health professions programs
- URiMs and first-generation college students often have a significant achievement gap which leads to lower matriculation numbers

URiM Student Matriculation In Medical School (Entering Class 2011)

URiM Admissions Data	Allopathic Medical Colleges Number (% of total)	Osteopathic Medical Colleges Number (% of total)	COMP Number (% of total)
Applicants	7636 (17.4%)	1682 (11.3%)	375 (9.5%)
Matriculants	3220 (16.7%)	356 (6.5%)	13 (3.7%)

Note: All of these numbers may vary as categories change over different application cycles.



The WesternU MSMS Program

MSMS Admissions

MSMS Alumni Performance in WU-COMP

MSMS Pre-DO Students

Cohort	Total Applicants	MSMS Matriculants % Mission Fit
MSMS 2011	~100	12/19 (67%)
MSMS 2012	~150	12/25 (48%)
MSMS 2013	216	10/23 (44%)
MSMS 2014	283	15/20 (75%)
MSMS 2015	233	19/22 (86%)
MSMS 2016	266	17/19 (89%)
MSMS 2017	278	17/19 (89%)

In August **2009**, only **4.12%** of the total COMP student body (all 4 years) were URiM, the lowest of any of the 9 colleges at WesternU. By August **2015**, that percentage had almost doubled, increasing to **8%**.

Entering DO Class	# Incoming COMP URiM enrollment	# URiMs matriculating from MSMS	% of total incoming URiM matriculants from MSMS
2011	13	5	38%
2012	11	3	27%
2013	18	1	6%
2014	28	9	32%
2015	25	11	44%
2016	26	11	42%



GPA /MCAT	18-20	21-23	24-26	27-29	30-32	33+	Totals
3.80-4.00		1					1
		1	1	1			3
3.60-3.79	2	1	6	1			10
	1	1	2		1		5
3.40-3.59	1	7	6	2	2		18
	1	7	7	4			19
3.20-3.39	3	8	8	9	3		31
	2	5	7	3	5		22
3.00-3.19	1	10	10	4	1		26
	1	9	10	6	1	2	29
2.80-2.99	2	9	3	1	1	2	18
	1	10	5	4			20
2.60-2.79		3	1		1		5
	2	4	2		1		9
2.40-2.59				1			1
	1	2					2
Totals	9	39	34	18	8	2	110

A typical incoming pre-medical MSMS student¹:

- MCAT between 21-26
- overall UG GPA between 3.0 and 3.4
- science GPA around 3.2

Overall UG GPA
Science GPA



Placement of MSMS Graduates

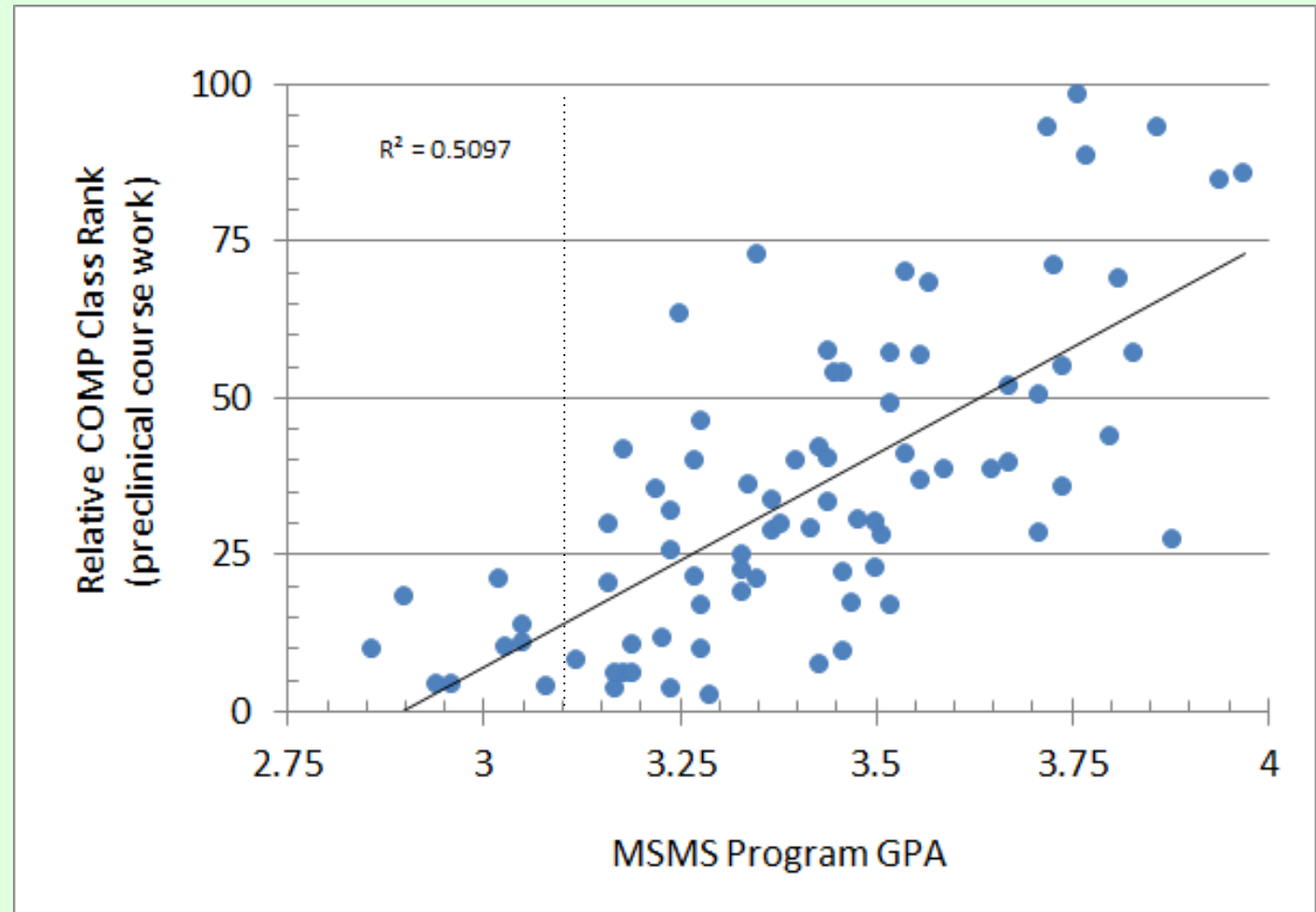
- To date, of 176 students, only 5 have not graduated from the MSMS program.
 - Of these, one started a PhD program in 2016 and two are attending foreign medical schools.
- **94% of MSMS graduates** have matriculated to a **professional school** (DO/MD, DMD/DDS, OD, PA)
- A total of **116 MSMS graduates** have matriculated to **medical school**, 109 at COMP

MSMS Student Performance in COMP

Performance in medical school is highly correlated ($P < 0.001$) with their MSMS program GPA¹

- Average program GPA for pre-DO is ~3.4
- Current program cut-off is an MSMS program GPA ≥ 3.1

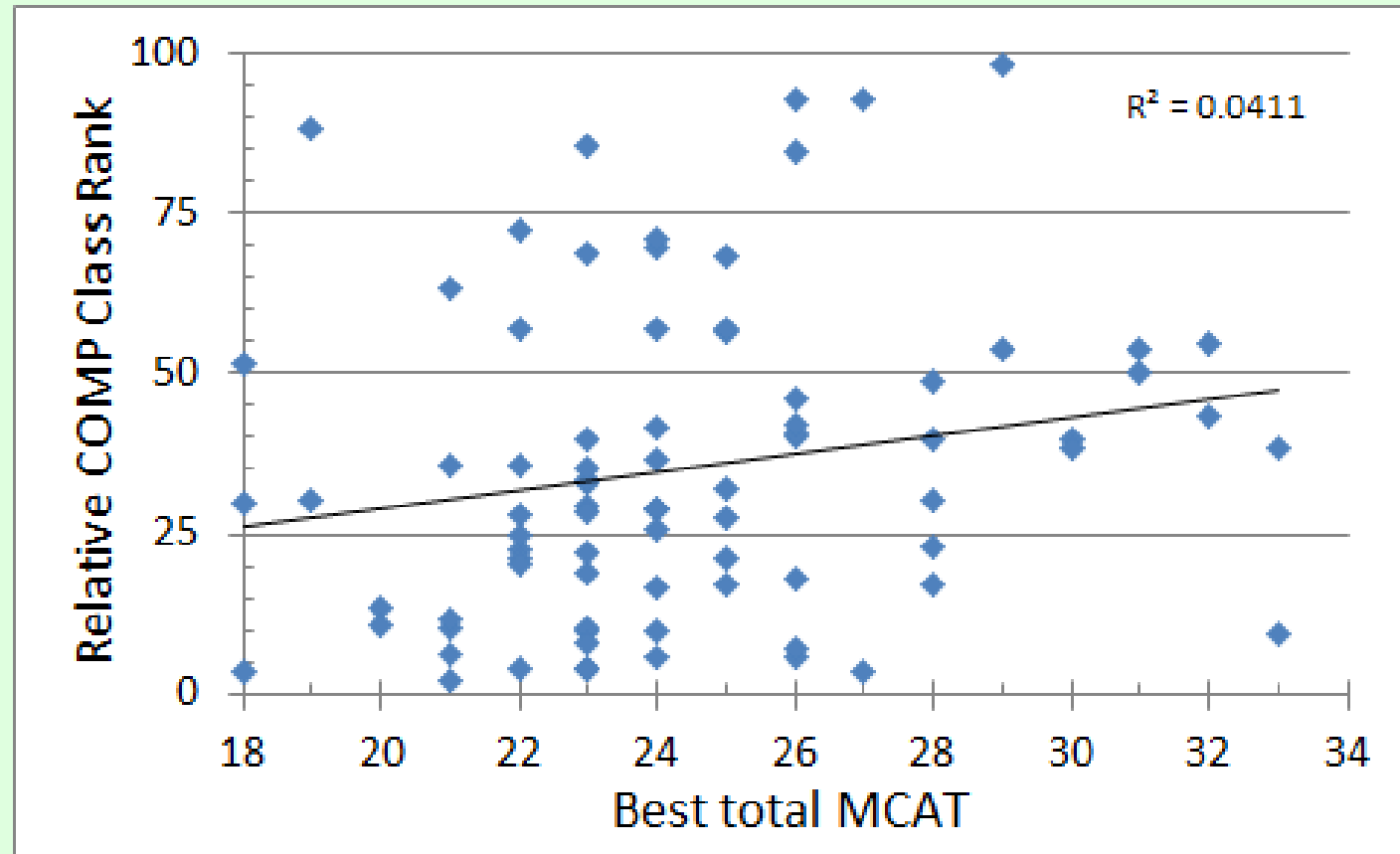
Class rank after pre-clinical coursework;
DO Classes 2015 - 2019*
N = 82



MSMS Student Performance in COMP

Performance in medical school is not correlated ($P = 0.71$) with their (old) MCAT¹

Class rank after pre-clinical coursework;
DO Classes 2015 - 2019*
N = 82





MSMS Alumni Residencies

Data from students in **MSMS 2011 - 2013** cohorts
(DO Classes of 2015-2017)

- 32 of 44 (**72.7%**) graduating MSMS students have gone into one of the **primary care fields**.
- 23 of the group matched into an ACGME or military residency
- 16 (36%) matched into their first choice residency
- An additional 14 (32% of total) matched into their top 3
- 6 (13%) were not initially matched and scrambled for placement




National Data

- URiMs take **longer to graduate**
 - 37% of students in 19 formal deceleration programs were URiM with the proportion of total URM students in these decelerated programs ranging from 0-43% (mean 10.5%)²
 - AAMC data from the 1995 matriculating class showed that African-Americans had 4- and 10-year completion rates of 60.6% and 90.0% respectively³
- **Attrition** for academic reasons is particularly prevalent amongst URiM students with AAMC data showing **6.7%** attrition for African-American students, **3.4%** attrition for Hispanic students compared to **0.9%** for White students³



MSMS Alumni Decelerations

- MSMS **URiM** alumni have taken **longer to graduate**
 - 22% of URiMs from the MSMS program have decelerated
 - 50% of African American (with 10% attrition)
 - 10.5% Hispanic and Pacific Islander (with no attrition)
 - **Educational disadvantages** can result in deceleration
 - 22% of non-URiM MSMS alumni have decelerated; many come from educationally disadvantaged backgrounds



URiMs and the Boards (USMLE)

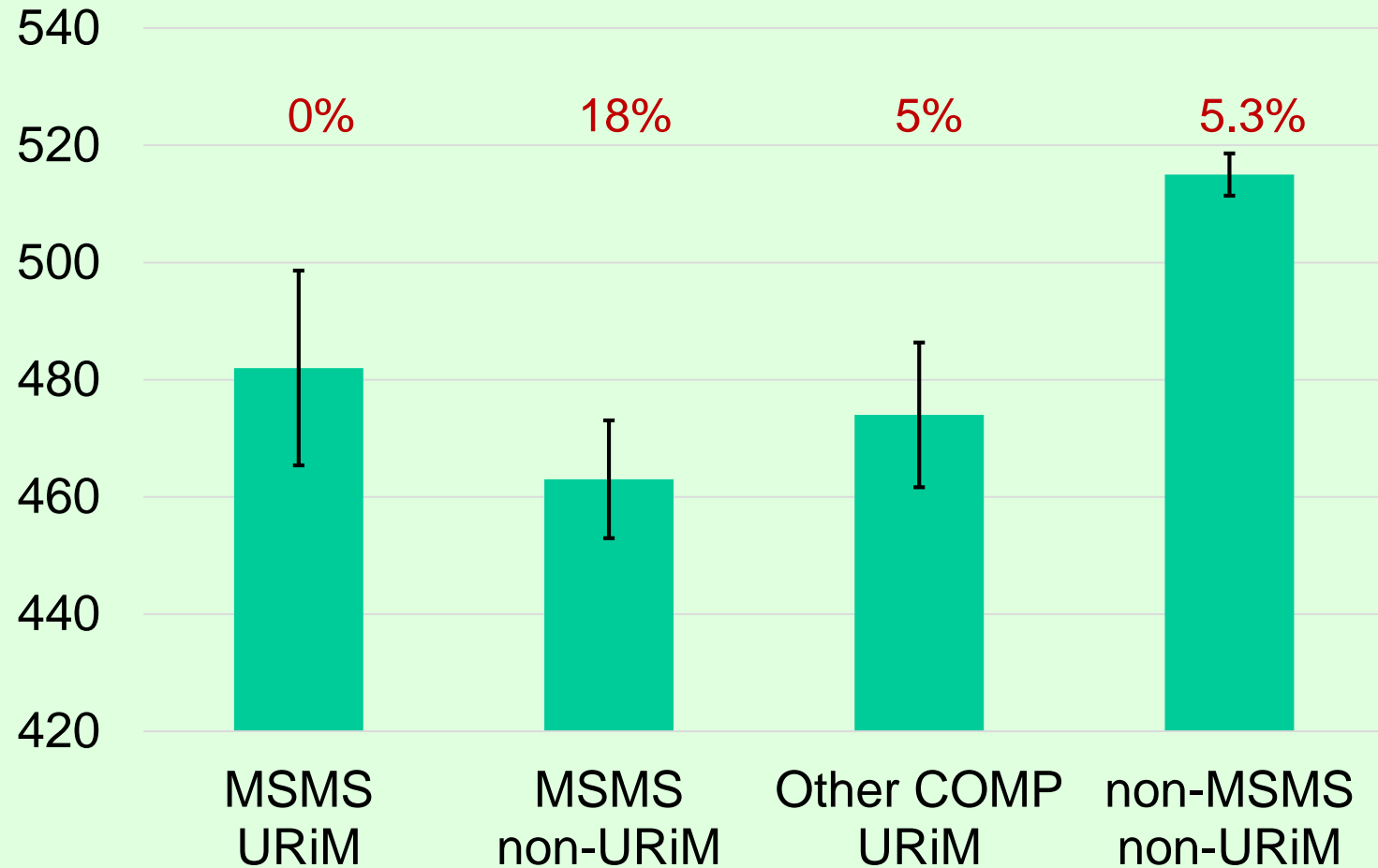
- 49% of African-American examinees (1986-1988) failed Step 1 boards compared to 12% whites⁴
 - >90% ultimately pass
- 48.5% of students in a national cohort who failed their first attempt Step 1 were URiM⁵
- Analysis of USMLE Step 1 first-time takers (n = 11,279) shows that the mean score was 210 ± 18 for white students, 187 ± 22 for African-American students and 196 ± 18 for Hispanic/Latino⁶



MSMS Alumni and COMLEX Level 1

- 66 MSMS alumni have taken COMLEX Level 1 (DO Classes 2015 – 2018)
 - 24% were URiM
- Average score: 463 ± 73
- 14 students (21%) failed their first attempt; only 2 were URiM (both African-American)

URiMs and the Boards (COMP)



Mean \pm SEM

DO 2015 – DO 2017
classes 1st attempt
COMLEX Level 1

- 7 URiM MSMS
- 38 non-URiM MSMS
- 36 other COMP URiM
- 515 non-MSMS non-URiM

% 1st time fail



Data Driven Changes to the MSMS Program

MSMS Admissions
Curriculum Changes

MSMS pre-DO students

Cohort	Total Applicants	MSMS matriculants % Mission Fit
MSMS 2011	~100	12/19 (63%)
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2011-2013 MSMS Application and Selection

- MSMS 2011-2013 (cohorts 1-3) applicants self-identified as “disadvantaged” and provided an essay
- Service commitment and involvement was used for selection
- **After cohort 3 (MSMS 2013) more objective selection criteria were used including federal assistance, and HPSA address**

MSMS pre-DO students

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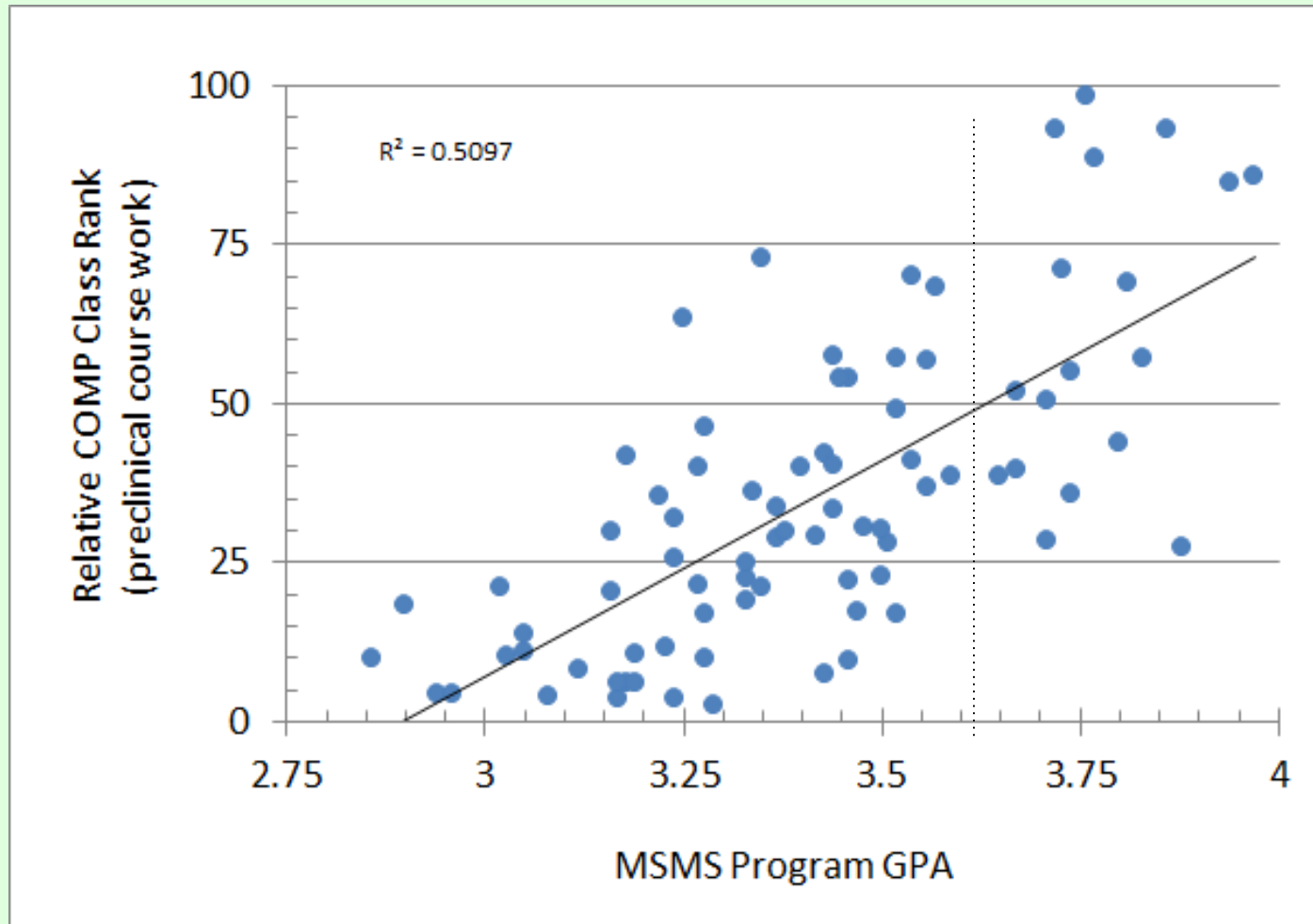
- A total of 55 students matriculated to COMP from cohorts 1-3 and **49%** were identified as URiM and/or mission fit
- From MSMS 2014-2016, 54 students matriculated to COMP and **87%** were objectively identified as URiM and/or mission fit
- ***Short term MSMS goal met: to assist individuals from diverse backgrounds in gaining acceptance to professional schools***




Data Driven Changes to MSMS Curriculum

- Intrusive advising and success plans (MSMS 2016)
- Expanded use of Osmosis (MSMS 2017)
- Longitudinal, cumulative exams (MSMS 2017)
- Physiology course added as requirement (MSMS 2017)
- Team-based learning (MSMS 2016)
- Using research to increase critical thinking skills (MSMS 2016)

MSMS Student Performance in COMP

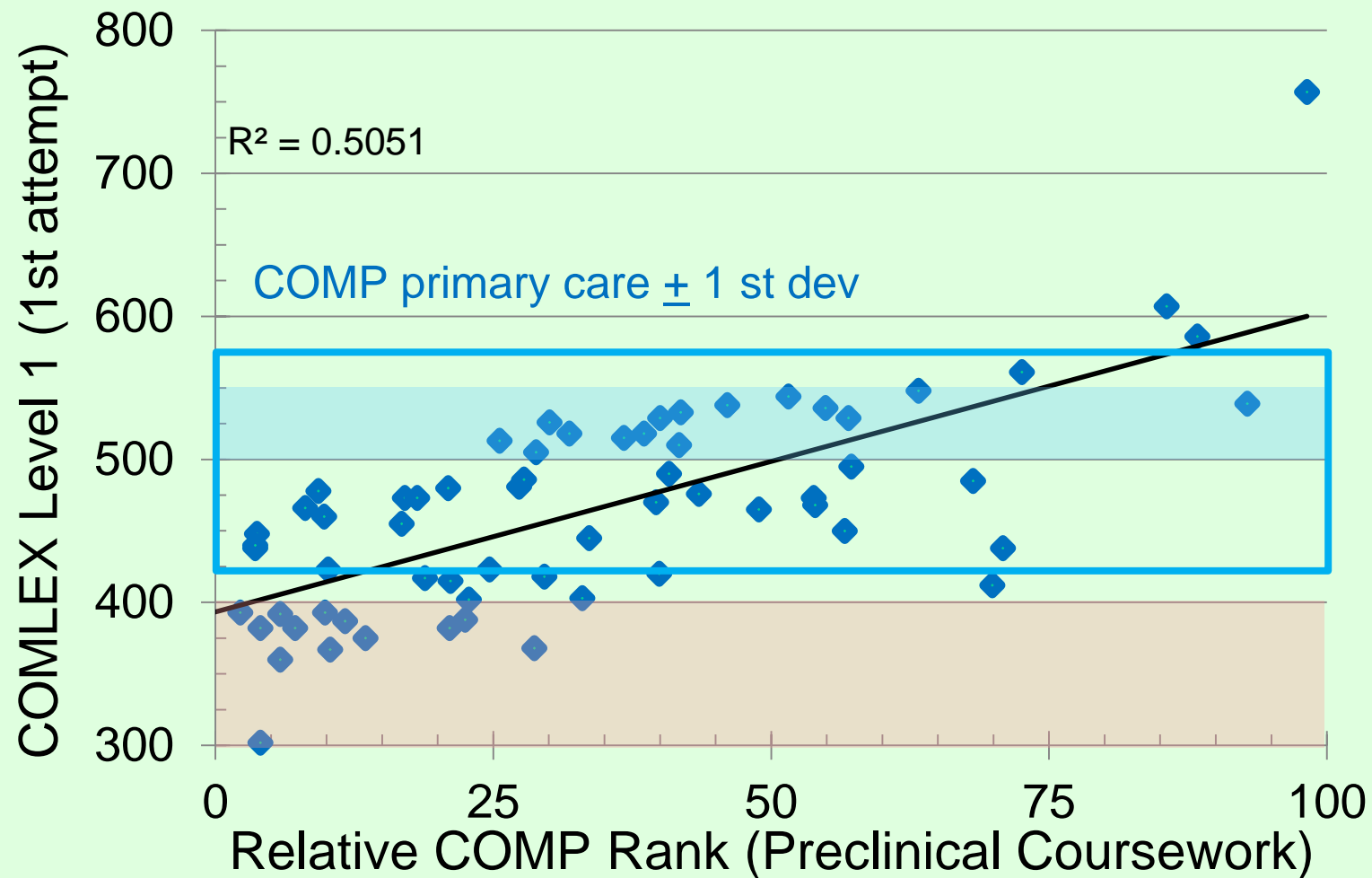




Data Driven Changes to MSMS Curriculum

- Intrusive advising and success plans (MSMS 2016)
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COMLEX Level 1 Performance



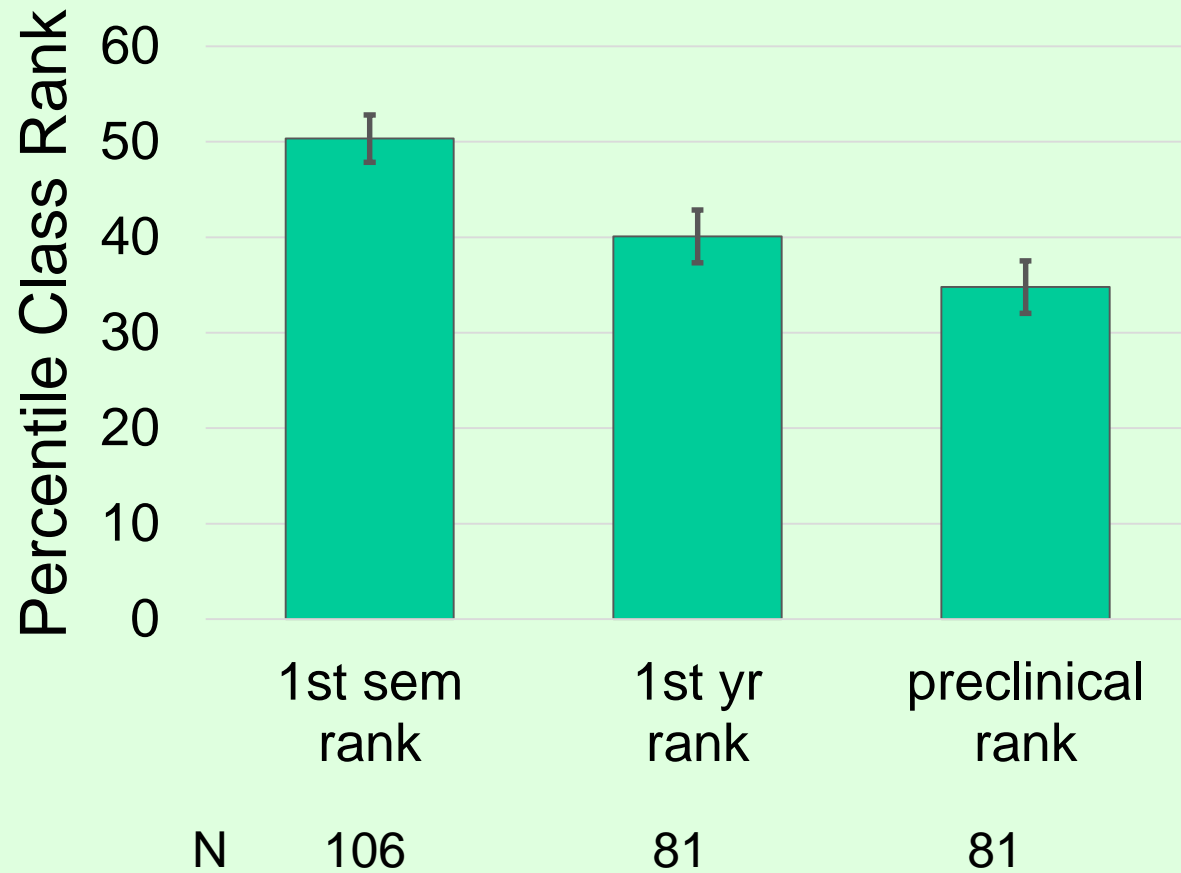
- MSMS performance correlates with relative rank in medical school.
- Medical school performance correlates with performance on the COMLEX Level 1
- However, MSMS graduates consistently underperform on the COMLEX Level 1



Data Driven Changes to MSMS Curriculum


- Intrusive advising and success plans (MSMS 2016)
- Required use of Osmosis (MSMS 2017)
- Longitudinal, cumulative exams (MSMS 2017)
- Physiology course added as requirement (MSMS 2017)
- Team-based learning (MSMS 2016)
- Using research to increase critical thinking skills (MSMS 2016)

Performance by Semester (Pre-Clinical)



Performance relative to peers decreases after 1st semester:

- 1st semester: Anatomy, Cell, Molecular and Biochemistry
- 2nd semester: Microbiology, some Immunology



Data Driven Changes to MSMS Curriculum

- Intrusive advising and success plans (MSMS 2016)
- Expanded use of Osmosis (MSMS 2017)
- Longitudinal, cumulative exams (MSMS 2017)
- Physiology course added as requirement (MSMS 2017)
- Small group learning (MSMS 2016)
- Using research to increase critical thinking skills (MSMS 2016)



Summary

- Changes have improved selection and admission of mission-fit students, thus meeting the goal of increasing diversity at WesternU-COMP
- Data indicates that performance of MSMS graduates in COMP is similar to comparative cohorts nationwide
- Changes have been implemented to improve longitudinal learning and critical thinking skills

References

1. Goode CA and Talbot, C, J Best Pract Health Prof Divers 2016, 9:1198
2. McGrath, B and McQuail, D., Medical Teacher 2004, 26:6, 510
3. AAMC AIB 2007;7(2)
4. Dawson B., J Am Med Assoc 1994, 272: 6749
5. Andriole DA and Jeffe DB. Acad. Med. 2012, 87:529
6. Koenig Acad Med 1998, 73(10)

This program would not be considered a traditional grade enhancement program

	Average Program GPA	Range
All premedical MSMS graduates 2010-2015	3.40 ± 0.21 (118)	2.65 - 3.97
Premedical MSMS graduates (mission fit)	3.44 ± 0.22 (82)	2.65 - 3.97
Premedical MSMS graduates (not mission fit)	3.33 ± 0.18 (36)	2.86 - 3.76

GPA for courses (2010-2016) – remediation grades are not included

ISAC	MCBL	PBS	Micro
3.04 ± 0.51	2.91 ± 0.47	3.05 ± 0.51	2.95 ± 0.47



National Data Decelerations

- URiMs take **longer to graduate**
 - 25% of URiMs take more than 4 years to graduate compared to 10% of non-URiMs
 - Educational disadvantages can result in increasing time to graduation due to deceleration
- **Attrition** for academic reasons is particularly prevalent amongst URiM students with data showing **6.7%** attrition for African-American students, **3.4%** attrition for Hispanic students compared to **0.9%** for White students