Medical Student Education (MSE) Program Evaluation

Academic Years 2019-2023

The Health Resources and Services Administration (HRSA) is the primary federal agency for improving health care to people who are geographically isolated or economically or medically vulnerable. HRSA programs help those in need of high-quality primary health care by supporting the training of health professionals – focusing in particular on the geographical distribution of providers to areas where they are needed most.

In Fiscal Year 2019, HRSA initiated the Medical Student Education (MSE) program to increase the supply of primary care physicians who practice in underserved communities in states with the highest projected shortages of primary care physicians and with high proportions of federally recognized tribes. Qualifying states included Alabama, Arkansas, Indiana, Kentucky, Mississippi, Missouri, Oklahoma, and Utah. The program prepared and encouraged medical students training in the most underserved states to choose residencies and careers in primary care that serve tribal communities, rural communities, and/or medically underserved communities after they graduate.

This report summarizes the results of a retrospective outcome and cost-effectiveness evaluation on the MSE program from Academic Years (AY) 2019-2023.

Key Findings

- During the evaluation period, 1,181 MSE medical students graduated from their medical schools and matched to a residency program. The residency match rate for MSE graduates was 98%, which was significantly higher than the residency match rate of 92% for non-MSE medical students.

- 47% of MSE graduates matched to a primary care residency, which was significantly higher than the national match rate of 44% for non-MSE medical school graduates.

- MSE graduates from rural backgrounds were significantly more likely to match to a primary care residency compared with MSE graduates from non-rural backgrounds (54% vs. 43%).

- Both direct financial support and training in a medically underserved community were associated with higher likelihood of matching to a primary care residency.

- Cost effectiveness analysis showed that just over $37,000 in grant funding produces an additional medical student who matches to a primary care residency. Thus, additional funding for MSE has the potential to increase the number of medical students who match to primary care residencies and address primary care physician shortages.

Were MSE schools able to recruit students from tribal, disadvantaged, and rural backgrounds?

One goal of the Medical School Education (MSE) program is to recruit medical students from tribal, disadvantaged, and rural backgrounds and prepare them for primary care roles. Training primary care physicians with backgrounds similar to that of the diverse communities they serve helps retain them in those communities.[1] During the four-year evaluation period, awardees cumulatively trained 4,167 medical students of which 2% of medical students were from tribal backgrounds, 28% from disadvantaged backgrounds, and 31% from rural backgrounds.

Specifically:
- MSE trained over a quarter (27%) of all American Indian or Alaska Native medical students in AY 2022-2023.[2,3,4]
- The number of medical students from disadvantaged backgrounds grew from 125 in AY 2019-2020 to 1,023 in AY 2022-2023, an increase from 23% to 28% of all medical students in the program (Table 1).
- MSE medical students from rural backgrounds also grew during this period from 21% to 31%.

Table 1. Number of MSE Medical Students by Key Demographic Group

Demographic Group	AY 2019-2020 (N=551)	AY 2020-2021 (N=1,089)	AY 2021-2022 (N=2,553)	AY 2022-2023 (N=3,680)
American Indian or Alaska Native	36 (6.5%)	62 (5.7%)	81 (3.2%)	77 (2.1%)
Disadvantaged Background	125 (22.7%)	271 (24.9%)	717 (28.1%)	1,023 (27.8%)
Rural Background	113 (20.5%)	293 (26.9%)	816 (32.0%)	1,145 (31.1%)

Note: Categories are not mutually exclusive and may overlap with one another.

Did MSE graduates match to primary care residencies?

During the evaluation period 1,204 MSE medical students graduated from medical school and 1,181 had matched to a residency program. The residency match rate for MSE graduates was 98%, which was significantly higher than the residency match rate of 92% for non-MSE medical students.[5,6,7,8]

Matching to a Primary Care Residency

As the MSE is designed to prepare and encourage medical students to match to primary care residencies,559 MSE medical students matched to a primary care residency: 39% matched to internal

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[1] Katz, J. (2010). Retention of native American nurses working in their communities. *Journal of Transcultural Nursing. 21*(4) p. 393-401. https://doi.org/10.1177/1043659609360848

[2] American Association of College of Osteopathic Medicine. (2023). *Osteopathic Medical College Total Enrollment by Race/Ethnicity 2000-2023.* https://www.aacom.org/searches/reports/report/2000-23-TEbyCOM-RE

[3] American Association of Medical Colleges (2023). *2023 facts: Enrollment, graduates, and MD-PhD data.* https://www.aamc.org/media/6116/download?attachment

[4] Medical students who self-identified as American Indian or Alaska Native in combination with another race were excluded.

[5] National Residency Match Program (2021). *Results and data: 2021 main residency match.* https://www.nrmp.org/wp-content/uploads/2021/08/MRM-Results_and-Data_2021.pdf
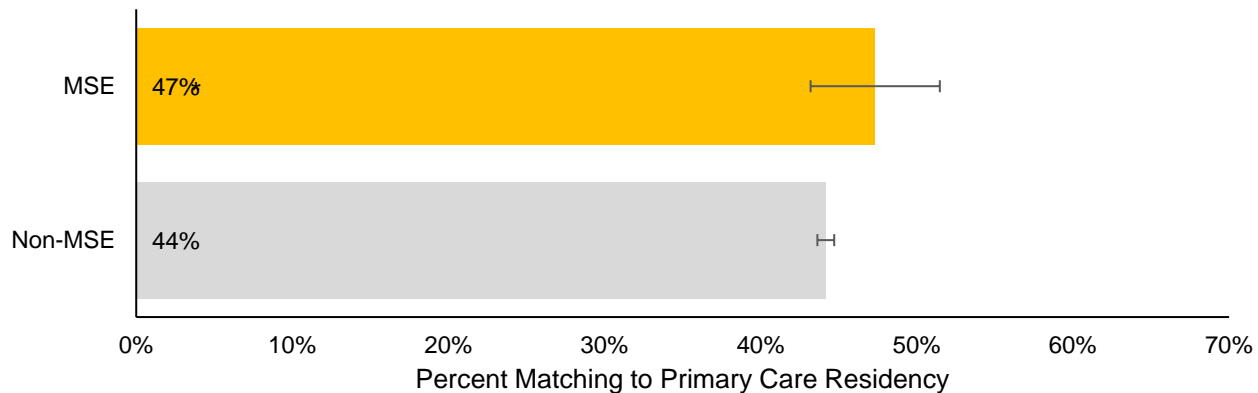
[6] National Residency Match Program (2022). *Results and data: 2022 main residency match.* https://www.nrmp.org/wp-content/uploads/2022/05/2022-Main-Match-Results-and-Data_Final.pdf

[7] National Residency Match Program (2023). *Results and data: 2023 main residency match.* https://www.nrmp.org/wp-content/uploads/2023/05/2023-Main-Match-Results-and-Data-Book-FINAL.pdf

[8] $\chi^2(1, 81,356) = 55.5$, $p < .001$

medicine, 37% to family medicine, and 24% to pediatric residencies. MSE graduates were significantly more likely to match to a primary care residency compared with all non-MSE medical school graduates (47% vs. 44%[9]; Figure 1).

Figure 1. Primary Care Residency Match Rates for MSE Graduates (N=1,181) Compared with Non-MSE Medical School Seniors (n=74,043), AY 2020-2023

Note: The data are adapted from the National Residency Matching Program in AY 2020-2023.[5,6,7] Comparisons were calculated using a 2-by-2 chi-squared test for independence. Error bars represent 95% confidence interval.[8]
* $p < .05$

Demographic characteristics of the medical school graduates were associated with differences in match rates. MSE graduates with disadvantaged or rural backgrounds matched to a primary care residency at higher rates than those who did not come from those backgrounds. Significant differences were found only for MSE graduates with rural backgrounds:

- 49% of MSE graduates from disadvantaged backgrounds matched to a primary care residency compared to 45% of MSE graduates not from a disadvantaged background.
- 54% of MSE medical students from rural backgrounds matched to a primary care residency compared with 43% of non-rural MSE trainees.[10]

Matching to a Primary Care Residency in Medically Underserved Communities

Another goal of MSE is to encourage medical students to provide primary care in medically underserved communities. 444 MSE graduates matched to a residency in a medically underserved community or rural area. In addition, 214 MSE graduates matched to a primary care residency in medically underserved or rural areas, which accounted for 18% of all MSE matches. These findings are important as students who complete their residency in underserved communities are more likely to practice in underserved communities.[11]

What factors increased the likelihood of MSE medical students matching to a primary care residency?

Beyond demographics, two factors were associated with matching to a primary care residency: receiving direct financial support and completing training hours in medically underserved communities.

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[9] $\chi^2(1, 75,224) = 4.72$, $p < .05$
[10] $\chi^2(1, 1,193) = 12.1$, $p < .001$
[11] Goodfellow A., Ulloa, J.G., Dowling, P.T, Talamantes, E., Chheda, S., Bone, C., and Moreno, G. (2016). Predictors of primary care physician practice location in underserved and rural areas in the United States: A systematic literature review. *Academic Medicine*, 91(9), 1313-1321. https://doi.org/10.1097/acm.0000000000001203

Direct Financial Support

Through the MSE program, 24% of graduates received direct financial support from the HRSA grant in various forms, such as stipends and scholarships.

- MSE graduates who received direct financial support were significantly more likely to match to a primary care residency as compared with those who did not receive direct financial support (60% vs. 42%[12]; Figure 2).
- On average, MSE graduates who matched to a primary care residency received $6,182 in direct financial support compared with $2,681 for MSE graduates who did not match to a primary care residency.[13]

Figure 2. MSE Medical Student Primary Care Residency Match Rates by Direct Financial Support Status, AY 2019-2023 (N=1,204)
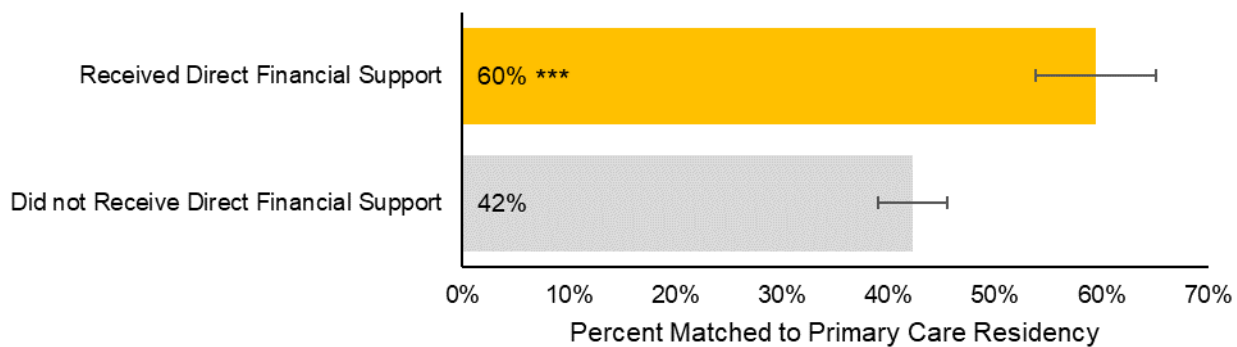
Note: Comparisons were calculated using a 2-by-2 chi-squared test for independence. Error bars represent 95% confidence interval.[14]
*** p < .001

Training Hours in Medically Underserved Communities

- MSE graduates who trained in a medically underserved community during their last year of medical school matched to a primary care residency at a significantly higher rate compared with MSE graduates who did not train in that setting during their final year (51% vs. 43%).[14]
- MSE graduates who matched to a primary care residency averaged significantly more training hours in a medically underserved community than MSE graduates who did not match to a primary care residency (127 hours vs. 76 hours).[15]

What were the outcomes from the investment of federal funds into the MSE grant program?

To further understand the cost implications of matching MSE medical students to primary care residencies and to primary care residencies in underserved areas, HRSA conducted a cost-effectiveness study. Specifically, the amount of HRSA grant funding received by the MSE awardees was divided by the total number of MSE graduates who matched to a primary care residency or a primary care residency in an underserved area to show the average amount of federal dollars needed for one additional graduate

[12] χ^2(1, 1,204) = 27.6, p < .001
[13] t(1202) = 2.3, p = .024
[14] χ^2(1, 1,204) = 7.0, p < .01
[15] t(1202) = 4.7, p < .001

to achieve the desired outcome[16,17] (Figure 3). Results showed that, on average, it would cost:

- $37,304 in grant funding for one additional MSE graduate to match to a primary care residency.
- $97,477 in grant funding for one additional MSE graduate to match to a primary care residency in a medically underserved community or rural area (an additional $60,173).

To put the value of this investment into perspective, health outcomes research shows one additional primary care physician per 10,000 people increases life expectancy by 51.5 days,[18] and by 64.3 days in a small community.[19]

Figure 3. Average Grant Funds for One Additional Primary Care Residency Match and for One Additional Primary Care Residency Match in a Medically Underserved Community and/or Rural Area, AY 2019-2023
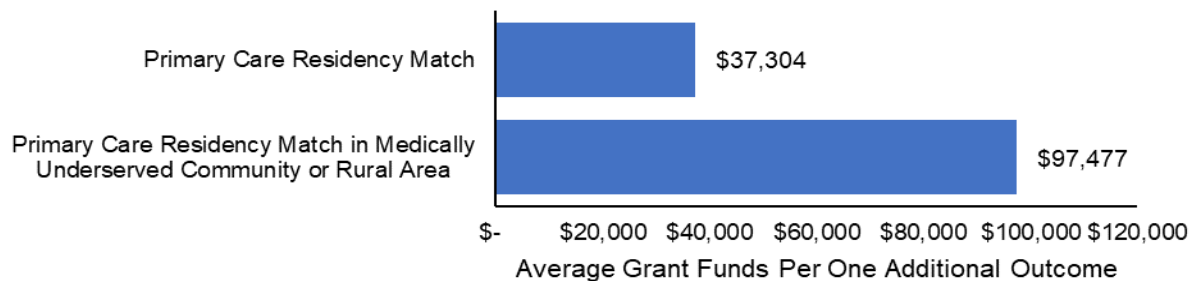
Note: Costs are based on the federal funding received by awardees and do not include program administration overhead.[20]

Conclusions

MSE graduates had a higher likelihood of both matching to a residency and matching specifically to a primary care residency compared with non-MSE medical school graduates, which indicates the MSE program prepares highly qualified medical students for primary care residencies. Direct financial support and training in an underserved community were two program components that appear to encourage medical students to apply for and subsequently match to a primary care residency.

The MSE program also demonstrated the potential to increase the supply of primary care physicians who practice in medically underserved communities in states with the highest projected shortages of primary care physicians, since an increase in funding was associated with a proportional increase in medical students. While the average grant funding necessary to match one additional MSE graduate into a primary care residency in an underserved area was $97,477, an increase of primary care physicians, especially in rural areas, has the potential to improve life expectancy and reduce health inequities.[21]

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[16] Center for Disease Control. (2024) Cost-effectiveness Analysis. https://www.cdc.gov/policy/polaris/economics/cost-effectiveness/index.html

[17] The comparable policy would be the status quo where there is no funding for MSE.

[18] Basu, S., Berkowitz, S.A., & Phillips, R.L. (2019). Association of primary care physician supply with population mortality in the United States, 2005-2015. *JAMA Internal Medicine,* 179(4), 506-514. https://doi.org/10.1001/jamainternmed.2018.7624

[19] Basu, S., Phillips, R.S., Berkowitz, S.A, Landon, B.E., Bitton, A., & Phillips, R.L. (2021). Estimated effect on life expectancy of alleviating primary care shortages in the United States. *Annals of Internal Medicine,* 174(7), 920-926. https://doi.org/10.7326/m20-7381

[20] Funding is in 2019 present value using the real discount rate provided by the Office of Management and Budget (OMB). The data are adapted from HRSA grant data and BLS.gov. Grant funding awarded amounts are deflated to AY 2019-2020 prices using the CPI Deflator CUUR0000SA0 from BLS.gov. Average estimated costs per outcome is the net present value of MSE funding divided by the projected outcomes. The analysis only includes awardees with at least one graduate.

[21] Starfield, B., Shi, L., & Macinko, J. (2005). Contributions of primary care to health systems and health. *The Millbank Quarterly*, 83(3), 457-502. https://doi.org/10.1111/j.1468-0009.2005.00409.x