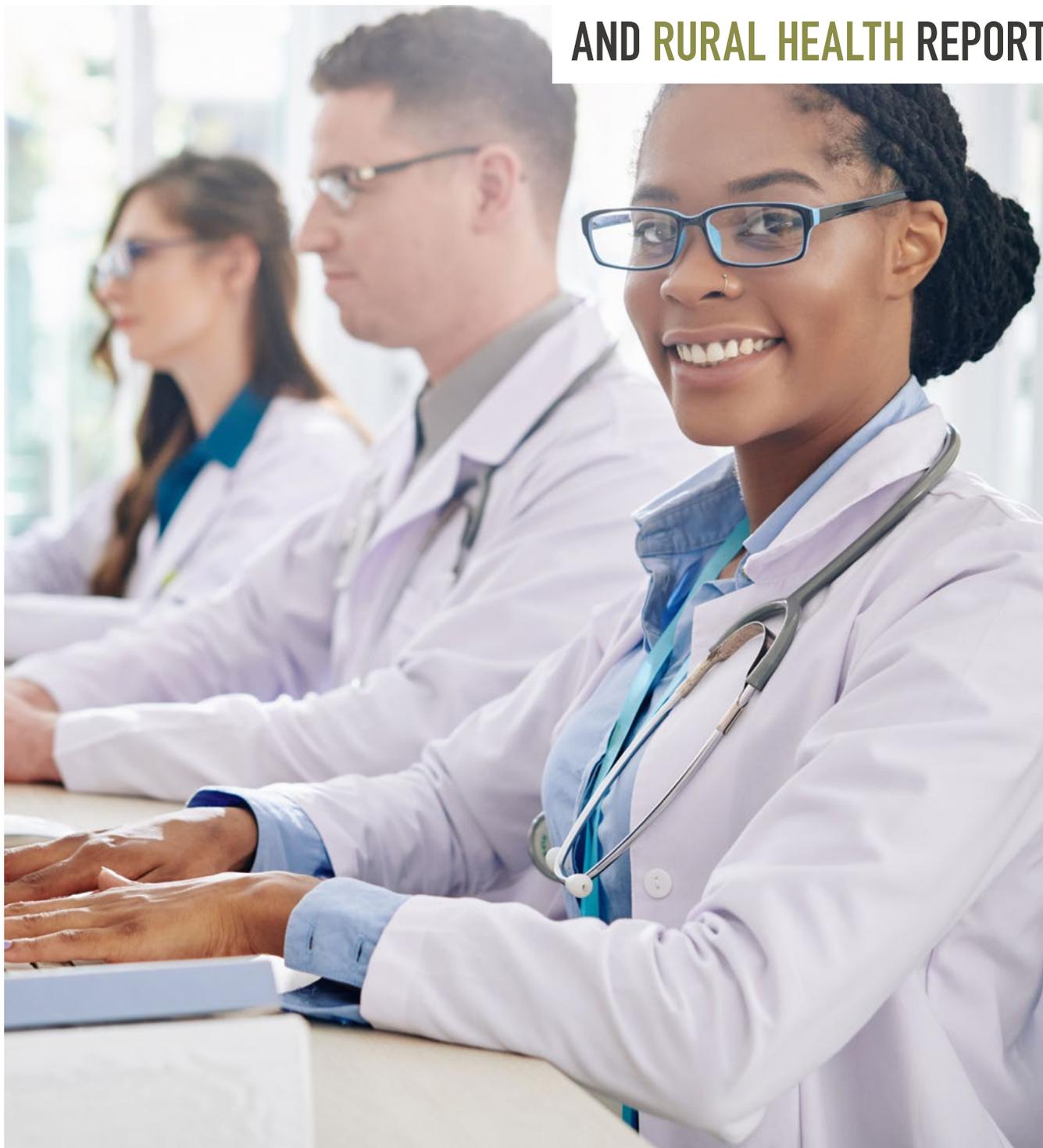


2021 WEST VIRGINIA

HEALTH SCIENCES

AND RURAL HEALTH REPORT



WEST VIRGINIA HIGHER EDUCATION POLICY COMMISSION

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About the

DIVISION OF HEALTH SCIENCES

The Division of Health Sciences at the Higher Education Policy Commission leads by leveraging expertise, fostering collaboration, and supporting innovation to improve the health of West Virginians, particularly rural and underserved populations. Our initiatives grow and strengthen the healthcare workforce of the future through promoting equitable access to health sciences and behavioral sciences education and support of research, practice, and policy. The Division coordinates health sciences programs, particularly those involving the state's three academic health centers at Marshall University, the West Virginia School of Osteopathic Medicine, and West Virginia University. The Division collaborates with stakeholders around key topics in the state's healthcare landscape. Current topics include behavioral health workforce development, graduate medical education, nursing workforce development, mapping primary care and behavioral health access, and community based clinical research. The Division also oversees the Rural Health Initiative, a statewide program directed at improving the recruitment and retention of healthcare providers to rural areas of the state. In addition, the Division administers the Health Sciences Service Program, the Choose WV practice program, the Medical Student Loan Repayment Program, and the new Mental Health Loan Repayment Program which began in 2021. During 2021, the Division played a key role in supporting the response of colleges and universities to COVID-19.

EXECUTIVE SUMMARY

West Virginia's three state-funded medical schools enroll more medical students per capita than any other state in the country. Due to its large number of medical student slots, the state typically is able to offer all qualified West Virginians the opportunity to complete their medical education in the state. In the academic year of 2020-2021, 43 percent of the 399 medical students who enrolled in the first year classes of the state's three medical schools were West Virginia residents. (Pages 2-8)

In-state tuition at West Virginia medical schools is among the most affordable in the nation. In addition to affordability, all three schools continue to well prepare students to succeed as practitioners and report licensure exam passage rates ranging from 91-100 percent for the last five years. (Page 9)

Retaining medical school graduates in the state for their residencies is one of the most proven strategies for eventually recruiting them to practice in the state. The Commission and the three medical schools all offer programs to incentivize the state's medical students, particularly those students interested in primary care and rural practice, to complete their residency training in West Virginia. Among all 2021 medical school graduates in West Virginia, 52 percent chose to do primary care residencies. (Pages 13-17)

In recent years, West Virginia higher education institutions have expanded the number of health professions programs offered. West Virginia has experienced growth in social work, pharmacy, public health, occupational therapy, psychology, and physical therapy. It is hoped that graduates of these programs will assist in better addressing healthcare needs of the state's rural and underserved communities. (Pages 20-21)

The Commission administers three financial aid programs for students in health professions. These programs help to keep healthcare practitioners in West Virginia by providing incentives. Since its inception in 1995, the Health Sciences Service Program has had 225 participants complete the service program. The Medical Student Loan Program provides needs-based loans each year to the state's medical students. Loans are forgiven for service in underserved areas of the state or in shortage specialties. The newest program, the Choose WV Practice Program, began in 2019-2020. This program provides a tuition waiver to non resident West Virginia Medical Students who agree to remain in WV to practice in an underserved area of the state. (Page 18-19)

West Virginia medical school graduates select primary care residencies at a rate higher than the national average. Many of these graduates remain in state to practice, however, a maldistribution of primary care physicians persists especially in rural and low income areas. The Commission and the medical schools, through the Rural Health Initiative and other programs, develop innovative models and engage underserved communities to help redistribute the primary care physician workforce. (Pages 22-29)

MEDICAL SCHOOL PROFILES

The Marshall University Joan C. Edwards School of Medicine and the West Virginia University School of Medicine are allopathic medical schools, and the West Virginia School of Osteopathic Medicine is an osteopathic medical school. The structure and content of allopathic and osteopathic medical education and training are similar in many ways, while different in others. For this report, where similarities exist, the three schools are discussed together, and where differences exist, the information for allopathic and osteopathic programs is broken out.

All medical school applicants complete the Medical College Admission Test® (MCAT®) as part of the application process. In 2015, the Association of American Medical Colleges redesigned the MCAT®. As a result, some West Virginia medical schools still accept scores from either the new and old versions of the MCAT®. The new MCAT® consists of four multiple choice sections each worth between 118 and 132 points (Biological and Biochemical Foundations of Living Systems, Chemical and Physical Foundations of Biological Systems, Psychological, Social, and Biological Foundations of Behavior, and Critical Analysis and Reasoning Skills). The old version of the MCAT® consisted of three multiple choice sections each worth 15 points (physical sciences, verbal reasoning, and biological sciences) and a writing sample.

The new national combined mean MCAT® score for students entering allopathic medical schools during the 2020-2021 academic year was 511.5. For students entering osteopathic medical schools, the score was 502. National performance data on the old MCAT® for students entering medical schools is no longer reported.

For the 2020-2021 academic year, the national mean grade point average (GPA) for students matriculating to allopathic medical schools was 3.60, and the national mean grade point average for students matriculating to osteopathic schools was 3.61 (Association of American Medical Colleges and American Association of Colleges of Osteopathic Medicine).

Marshall University Joan C. Edwards School of Medicine



ENTERING CLASS ADMISSION RATE

	2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
<i>In-State</i>					
Acceptances/Applicants	95/209	88/190	88/189	81/160	98/207
Admission Rate	45%	46%	47%	51%	47%
<i>Out-of-State</i>					
Acceptances / Applicants	15/1922	29/2,015	27/1,807	44/1,800	17/1,575
Admission Rate	0.8%	1%	1%	2%	1%
Total Acceptances / Applicants	110/2131	117/2,205	115/1,996	125/1,960	115/1,782
Total Admission Rate	5%	5%	6%	6%	6%

ENTERING CLASS ACADEMIC QUALIFICATIONS

	2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
Mean GPA	3.61	3.65	3.70	3.60	3.60
Mean MCAT [®] (Old Version)	-	-	-	30.0	28.8
Mean MCAT [®] (New Version)	502	502.0	504.0	503.0	501.0

ACADEMIC YEAR DATA

		2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
<i>First Year New Enrollment</i>	In-State	69	63	62	49	73
	Out-of-State	11	17	17	26	10
	Total	80	80	79	75	83
Total Graduates		74	79	61	68	73
Total Medical Students		315	335	340	305	304
Tuition and Fees	In-State	\$24,004	\$23,904	\$23,904	\$22,154	\$21,104
	Out-of-State	\$56,788	\$56,888	\$54,772	\$52,542	\$50,074

West Virginia School of Osteopathic Medicine



ENTERING CLASS ADMISSION RATE

	2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
<i>In-State</i>					
Acceptances/Applicants	53/139	57/131	62/126	52/121	66/148
Admission Rate	38%	44%	50%	43%	45%
<i>Out-of-State</i>					
Acceptances / Applicants	412/5290	374/5,081	378/4,591	391/4,581	401/4,703
Admission Rate	8%	7%	8%	9%	9%
Total Acceptances / Applicants	465/5429	431/5,212	440/4,717	443/4,702	467/4,851
Total Admission Rate	9%	8%	9%	9%	10%

ENTERING CLASS ACADEMIC QUALIFICATIONS

	2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
Mean GPA	3.58	3.59	3.55	3.51	3.52
Mean MCAT [®] (Old Version)	21.8	24.7	20.6	23.5	23.3
Mean MCAT [®] (New Version)	500.7	500.8	499.6	498.3	496.8

ACADEMIC YEAR DATA

		2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
<i>First Year New Enrollment</i>	In-State	41	42	43	46	52
	Out-of-State	166	158	158	158	160
	Total	207	200	201	204	212
Total Graduates		178	194	208	192	182
Total Medical Students		800	809	841	849	847
Tuition and Fees	In-State	\$21,472	\$21,472	\$21,472	\$21,472	\$20,950
	Out-of-State	\$52,710	\$52,710	\$52,710	\$52,710	\$50,950

West Virginia University School of Medicine



ENTERING CLASS ADMISSION RATE

	2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
<i>In-State</i>					
Acceptances/Applicants	75/212	79/208	88/226	77/182	64/227
Admission Rate	35%	38%	39%	42%	28%
<i>Out-of-State</i>					
Acceptances / Applicants	90/4841	78/5,356	74/5,062	89/4,370	112/4,623
Admission Rate	2%	1%	1%	2%	2%
Total Acceptances / Applicants	165/5053	157/5,356	162/5,288	166/4,552	176/4,850
Total Admission Rate	3%	3%	3%	4%	4%

ENTERING CLASS ACADEMIC QUALIFICATIONS

	2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
Mean GPA	3.8	3.8	3.86	3.80	3.72
Mean MCAT [®] (Old Version)	-	-	-	-	29.0
Mean MCAT [®] (New Version)	510	509.0	508.0	507.0	507.0

ACADEMIC YEAR DATA

		2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
<i>First Year New Enrollment</i>	In-State	63	67	73	66	55
	Out-of-State	49	45	39	46	55
	Total	112	112	112	112	110
Total Graduates		117	101	93	100	106
Total Medical Students		456	446	432	427	441
Tuition and Fees	In-State	\$32,643	\$32,643	\$32,373	\$31,023	\$30,348
	Out-of-State	\$64,152	\$64,152	\$63,342	\$60,642	\$58,914

MEDICAL LICENSURE EXAMS

All medical students must complete a series of licensing exams in order to become licensed physicians. Allopathic students take the United States Medical Licensing Exam (USMLE), and osteopathic students take the Comprehensive Osteopathic Medical Licensing Examination (COMLEX)-USA.

These exams have multiple parts. Students typically take the final USMLE or COMLEX soon after graduating from medical school. The data reported below is for the final exam for first-time test takers who took their respective licensing exam within two years of graduation. In evaluating the data presented below, it is important to consider some of its limitations:

- ▶ The data is for first-time test takers.
- ▶ Graduates can elect to not report their results to their medical schools.
- ▶ The data does not reflect graduates who take the exam more than two years after graduation.
- ▶ Not all graduates enter residency programs and therefore do not sit for these exams.

Allopathic Medical School Graduates

The USMLE, Step 3 is the final of three tests completed by allopathic medical students. Graduates normally take USMLE, Step 3 at the end of their first year of residency. The national average passage rate for first-time test takers for the graduating class of 2017 is 97 percent.

NUMBER PASSING/NUMBER OF EXAMINEES, USMLE, STEP 3 GRADUATING CLASS

	2018	2017	2016	2015	2014
Marshall University	64/65	66/69	59/59	53/58	64/65
	98%	96%	100%	91%	98%
West Virginia University	92/93	99/101	89/90	94/99	77/78
	99%	98%	99%	95%	99%

Osteopathic Medical School Graduates

Osteopathic graduates take the final COMLEX, Level 3 as early as six months into residency training. They must complete Level 3 before starting their third year of residency training. The national average is not available.

NUMBER PASSING/NUMBER OF EXAMINEES, COMLEX, LEVEL 3 GRADUATING CLASS

	2018	2017	2016	2015	2014
West Virginia School of Osteopathic Medicine	188/192	168/178	169/181	189/200	175/183
	98%	94%	93%	95%	96%

MEDICAL SCHOOL INDEBTEDNESS

The average indebtedness of each graduating medical school class is calculated from all loans, public and private, accumulated while pursuing medical degrees. It does not include pre-medical school debt. Members of the graduating class who do not have any debt are excluded from the calculation. The difference in graduate indebtedness among the schools can be attributed in part to differences in the proportion of students paying out-of-state tuition and fees. Historically, the West Virginia School of Osteopathic Medicine has had classes composed of more out-of-state students, although the number of out-of-state students at both West Virginia University and Marshall University has grown in recent years.

AVERAGE MEDICAL STUDENT DEBT, BY GRADUATING CLASS

Class	Marshall University	West Virginia School of Osteopathic Medicine	West Virginia University
2021	\$160,827	\$271,200	\$194,955
2020	\$149,691	\$253,341	\$201,334
2019	\$158,731	\$240,727	\$197,999
2018	\$147,414	\$249,870	\$196,694
2017	\$153,435	\$250,378	\$165,289

RESIDENCY TRAINING

Upon graduation from medical school, physicians complete specialized residency training programs (also referred to as graduate medical education) before beginning practice. Residency training typically takes three to five years to complete. The federal Medicare program is the major funder of residency programs nationwide. In West Virginia, the Bureau for Medical Services (Medicaid) and the Public Employees Insurance Agency also provide funding for residency training.

Through a computerized process referred to as “the match”, medical students rank their top residency program choices, and residency programs rank the top medical students they would like to recruit. Based on these rankings, an algorithm then matches each medical student with a residency program. Previously, there was an allopathic matching program and an osteopathic matching program. In 2020, the “Single Match” represented the first time that all allopathic and osteopathic applicants participated in one matching program. The Single Match comes after the creation of a single accreditation system forged by the Accreditation Council for Graduate Medical Education (ACGME), the American Osteopathic Association (AOA), and the American Association of Colleges of Osteopathic Medicine. In 2014, those organizations approved an agreement to recognize the ACGME as the primary accrediting body for graduate medical education programs by 2020. As part of that transition, the AOA Match ended in 2019 (National Resident Matching Program). Across West Virginia, more than 50 different residency programs exist. Although many of these programs are for primary care specialties such as family medicine and pediatrics, training programs for other critical non-primary care specialties are offered that help ensure West Virginia has providers practicing critical specialties such as dermatology, anesthesiology, psychiatry, ophthalmology, and surgery.

WEST VIRGINIA RESIDENCY PROGRAMS

Sponsoring Institution	Primary Site	City	Specialty	Filled Residency
Access Health THC	Access Health Teaching Health Center	Beckley	Family Medicine	12
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Emergency Medicine	18
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Urological Surgery	11
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Family Medicine	20
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Internal Medicine Categorical	31
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Internal Medicine Preliminary	6
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Internal Medicine/Psychiatry	10
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Obstetrics and Gynecology	13
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Pediatrics	20
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Psychiatry	16
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Surgery Categorical	20
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Surgery Preliminary	1
Charleston Area Medical Center	Charleston Area Medical Center	Charleston	Vascular Surgery Integrated	5
Greenbrier Valley Medical Center	Greenbrier Valley Med Center	Ronceverte	Family Medicine	13
Greenbrier Valley Medical Center	Greenbrier Valley Med Center	Ronceverte	Osteopathic Neuromusculoskeletal Medicine	9
Marshall University	Cabell Huntington Hospital	Huntington	Family Medicine	24
Marshall University	Cabell Huntington Hospital	Huntington	Internal Medicine	65
Marshall University	Cabell Huntington Hospital	Huntington	Internal Medicine/Pediatrics	8
Marshall University	Cabell Huntington Hospital	Huntington	Neurology	9
Marshall University	Cabell Huntington Hospital	Huntington	Obstetrics and Gynecology	12
Marshall University	Cabell Huntington Hospital	Huntington	Orthopedic surgery	15

Data was obtained October 2021

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Sponsoring Institution	Primary Site	City	Specialty	Filled Residency
Marshall University	Cabell Huntington Hospital	Huntington	Pediatrics	18
Marshall University	Marshall University/University Physicians and Surgeons Clinics	Huntington	Psychiatry	24
Marshall University	Cabell Huntington Hospital	Huntington	Surgery	24
United Hospital Center	United Hospital Center	Bridgeport	Family Medicine	21
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Anesthesiology	36
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Dermatology	6
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Emergency Medicine	30
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Family Medicine	18
West Virginia University School of Medicine	West Virginia University Rural Family Medicine	Harpers Ferry	Family Medicine	18
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Internal Medicine	73
West Virginia University School of Medicine	Camden Clark Medical Center	Parkersburg	Internal Medicine	18
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Internal Medicine/Pediatrics	16
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Neurosurgery	7
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Neurology	26
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Obstetrics and Gynecology	12
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Ophthalmology	12
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Orthopedic surgery	20
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Otolaryngology	12
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Pathology-Anatomic and Clinical	12
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Pediatrics	16
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Plastics - Integrated	6
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Psychiatry	29
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Radiation Oncology	4
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Radiology-Diagnostic	24
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Surgery	26
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Transitional Year	13
West Virginia University School of Medicine	Ruby Memorial Hospital	Morgantown	Urology	9
West Virginia University School of Public Health	WVU School of Public Health	Morgantown	Preventive Medicine - Occupational Medicine	4
West Virginia University School of Public Health	WVU School of Public Health	Morgantown	Preventive Medicine - Public Health/ General Preventive Medicine	1
Wheeling Hospital	Wheeling Hospital	Wheeling	Family Medicine	24
Total Filled Slots				897

Key indicators related to residency choice affecting the supply of physicians across West Virginia are:

- ▶ Location: graduates who complete residencies in West Virginia are much more likely to remain in the state.
- ▶ Specialty: primary care fields generally are most needed in rural West Virginia.

Graduates of all three West Virginia medical schools typically enter primary care residency programs at a rate at or above the national average for these same programs. Among all three medical schools, 52 percent of 2021 medical school graduates chose a primary care residency. Nationally for the 2021 single match program, 49% of US graduates matched with a primary care residency program (National Resident Matching Program).

Selecting a primary care residency program does not always translate to practicing primary care, particularly in an outpatient setting. For example, individuals entering internal medicine residencies often forego a general internal medicine track, and instead subspecialize in fields not traditionally viewed as primary care such as cardiovascular disease, gastroenterology, and infectious diseases. Additionally, primary care graduates frequently elect to work as hospitalists in inpatient settings. Thus, some of the graduates reported below ultimately may not practice in an outpatient, primary care setting.

NUMBER AND PERCENTAGE OF GRADUATES CHOOSING PRIMARY CARE RESIDENCIES, BY GRADUATING CLASS

	2021	2020	2019	2018	2017
Marshall University	37 (50%)	36 (46%)	30 (51%)	38 (58%)	38 (54%)
West Virginia School of Osteopathic Medicine	100 (56%)	117 (60%)	119 (59%)	124 (66%)	119 (66%)
West Virginia University	65 (56%)	51 (50%)	50 (55%)	47 (47%)	54 (51%)

MEDICAL SCHOOL GRADUATE RETENTION

for practice in West Virginia

Retention denotes the number or percentage of West Virginia medical school graduates who remain in the state to practice. Retention is tracked annually for a six-year cohort of medical school graduates who have completed residency training. The data in this section focuses on retention of West Virginia medical school graduates in primary care and/or rural practice.

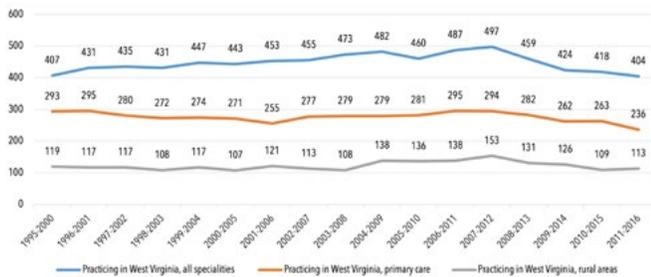
- ▶ Primary care is defined as family medicine, internal medicine, internal medicine/pediatrics, obstetrics/gynecology, and pediatrics.
- ▶ Rural areas include all areas of the state with a 2006 Rural Urban Commuting Area (RUCA) code of 4.0 or higher. These codes classify U.S. Census tracts using measures of population density, urbanization, and daily commuting.
- ▶ Data is provided only for graduates who have completed their residency training.

Between 2011 and 2016, 1,984 graduates of the state's three medical schools completed residency training, either in West Virginia or out of state, and 20% (404) of these graduates are now practicing in West Virginia. Six percent of the graduates (103) in this cohort are practicing in rural West Virginia, and 12 percent (236) are practicing primary care in the state (either in a rural or urban location). The growth in medical school class sizes in recent years is supplying more graduates to practice in West Virginia; however, issues still persist in recruiting graduates to practice in both outpatient primary care and rural settings.

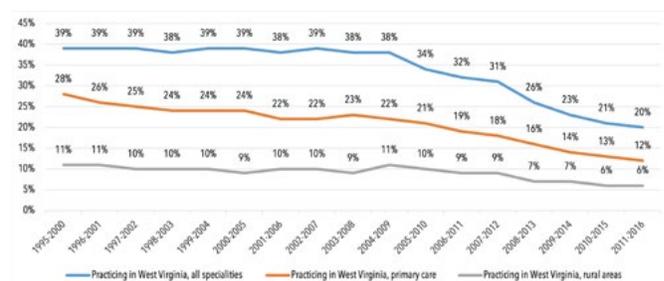
MEDICAL SCHOOL GRADUATES RETAINED, BY INSTITUTION, GRADUATING CLASSES OF 2011–2016

	Total with completed training	Total in practice in West Virginia	Total in primary care in West Virginia	Total in rural areas of West Virginia
Marshall University	379	87 (23%)	49 (13%)	14 (4%)
West Virginia School of Osteopathic Medicine	1078	160 (15%)	110 (10%)	72 (7%)
West Virginia University	527	157 (30%)	77 (15%)	27 (5%)
Total	1,984	404 (20%)	236 (12%)	113 (6%)

NUMBER OF WEST VIRGINIA MEDICAL SCHOOL GRADUATES RETAINED, GRADUATING CLASSES OF 1995–2016

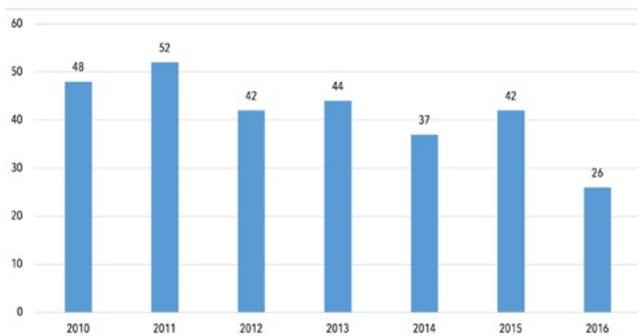


PERCENTAGE OF WEST VIRGINIA MEDICAL SCHOOL GRADUATES RETAINED, GRADUATING CLASSES OF 1995–2016

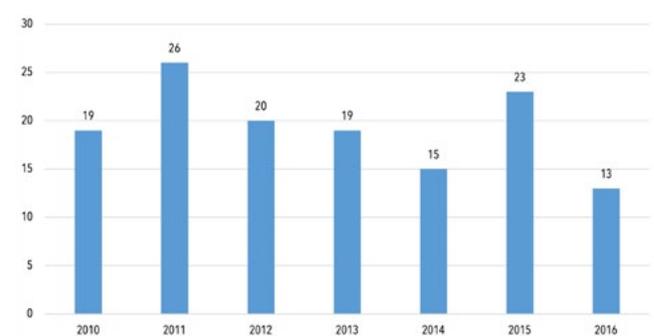


NUMBER OF WEST VIRGINIA MEDICAL SCHOOL GRADUATES PRACTICING PRIMARY CARE OR IN RURAL AREAS, BY GRADUATING CLASS

Practicing Primary Care in West Virginia



Practicing in Rural Areas of West Virginia



* These numbers only reflect those graduates who have completed their residency training.

County of Practice of Recent West Virginia Medical School Graduates

West Virginia continues to focus on recruiting more physicians to the state, especially to rural areas. Having physicians who practice primary care and/or in rural areas is crucial to ensuring communities across the state have access to health care.

The table below illustrates recruitment of the most recent six-year cohort of West Virginia medical school graduates to all 55 counties of West Virginia. This information must be interpreted carefully. It is a snapshot of the placement of the most recent West Virginia medical school graduates over a six-year period only and does not include graduates of out-of-state medical schools or physicians who graduated prior to 2011 who are practicing in these counties. Thus, a zero listed in any column does not necessarily indicate that a county is underserved. At the same time, tracking this type of information over an extended period can help inform education and training program activities and physician recruitment priorities.

WEST VIRGINIA MEDICAL SCHOOL GRADUATES PRACTICING IN WEST VIRGINIA BY COUNTY, GRADUATING CLASSES OF 2011-2016

County	Number in Practice	Number Practicing in Rural Areas	Number Practicing in Primary Care
Barbour	0	0	0
Berkeley	18	0	14
Boone	5	5	4
Braxton	1	1	1
Brooke*	1	0	0
Cabell*	56	0	30
Calhoun	0	0	0
Clay	1	1	1
Doddridge	1	1	1
Fayette	5	3	4
Gilmer	0	0	0
Grant	2	2	2
Greenbrier	19	19	17
Hampshire	0	0	0
Hancock	2	0	2
Hardy	0	0	0
Harrison	17	17	9
Jackson	1	1	1
Jefferson	6	6	6
Kanawha*	60	1	28
Lewis	3	3	1
Lincoln	0	0	0
Logan	4	4	3
Marion	3	3	2

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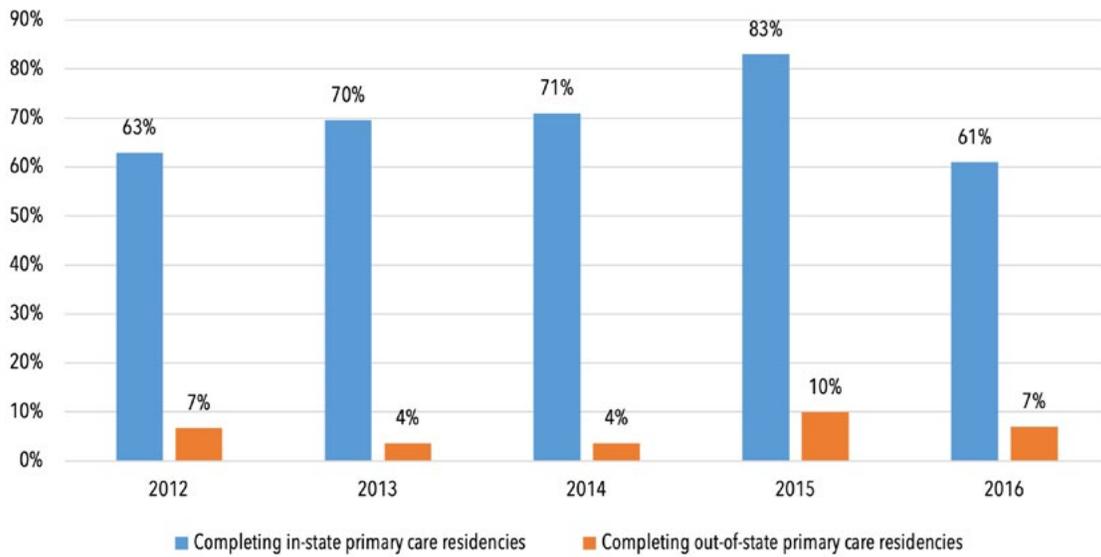
County	Number in Practice	Number Practicing in Rural Areas	Number Practicing in Primary Care
Marshall *	0	0	0
Mason	6	6	6
McDowell	2	2	2
Mercer	10	10	8
Mineral	2	2	1
Mingo	0	0	0
Monongalia*	119	1	48
Monroe	0	0	0
Morgan	0	0	0
Nicholas	2	2	2
Ohio*	10	1	6
Pendleton	0	0	0
Pleasants	0	0	0
Pocahontas	2	2	2
Preston	3	3	3
Putnam*	7	3	6
Raleigh	11	0	10
Randolph	1	1	1
Ritchie	0	0	0
Roane	0	0	0
Summers	0	0	0
Taylor	2	2	2
Tucker	0	0	0
Tyler	1	1	0
Upshur	5	5	4
Wayne	4	1	3
Webster	2	2	2
Wetzel	0	0	0
Wirt	1	1	1
Wood*	7	0	2
Wyoming	2	2	2
Total	404	114	237

* Denotes urban/non-rural county with a 2006 Rural Urban Community Area Code (RUCA) of less than 4.0, and therefore, the county has no rural areas.

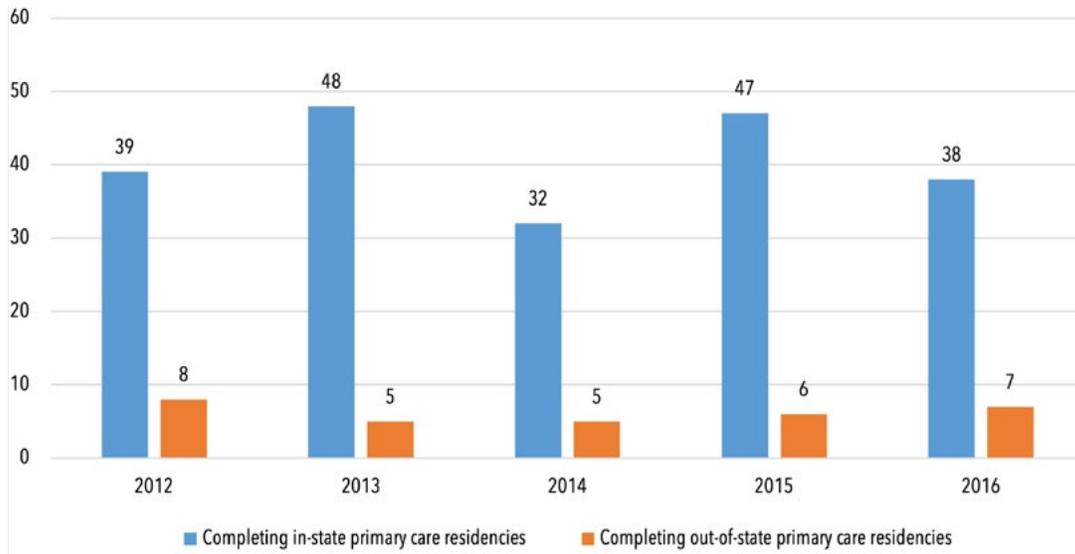
Retention of West Virginia Medical School Graduates Completing Primary Care Residencies

The location of a medical school graduate's residency program frequently predicts whether that graduate will practice in West Virginia. For the 2016 graduates of West Virginia medical schools, 202 graduates went on to complete primary care residency programs. Upon completing residency, 61% of those who completed in-state primary care residencies were retained in West Virginia to practice, while only 7% of graduates who completed out-of-state primary care residencies returned to West Virginia to practice.

PERCENTAGE OF WEST VIRGINIA MEDICAL STUDENTS GRADUATES COMPLETING PRIMARY CARE RESIDENCIES RETAINED, BY GRADUATING CLASS



NUMBER OF WEST VIRGINIA MEDICAL SCHOOL GRADUATES COMPLETING PRIMARY CARE RESIDENCIES RETAINED, BY GRADUATING CLASS



LOANS AND INCENTIVES

Health Sciences Service Program

The Health Sciences Service Program is a state-funded incentive program and is administered by the Commission. The program provides financial awards to health professions students who agree to practice in underserved areas of the state upon completion of their education and training. Participants complete either two years of full-time service or four years of part-time service. Medical and dental students receive a \$30,000 award. Doctoral clinical psychology, licensed independent clinical social work, nursing education, nurse practitioner, physical therapy, occupational therapy, public health, pharmacy, and physician assistant trainees receive a \$15,000 award.

Since 1995, 225 participants have completed their service obligation. In the 2020-2021 academic year, 16 awards totaling \$330,000 were offered to:

- ▶ 3 medical students
- ▶ 3 dental students
- ▶ 4 physical therapy students
- ▶ 1 nurse practitioner student
- ▶ 1 clinical social work student
- ▶ 1 occupational therapy student
- ▶ 1 pharmacy student
- ▶ 1 public health student

Medical Student Loan Program

The Medical Student Loan Program, which is funded from student fees, is a need-based program for students at West Virginia medical schools and administered by the Commission. Institutions award loans of up to \$10,000 each year per eligible student, and a student may receive a loan in more than one year of medical school. Upon graduation and once in practice, borrowers either must repay the loan or seek loan forgiveness. Borrowers are eligible for loan forgiveness of up to \$10,000 per year for each year they practice in West Virginia in an underserved area or in a medical shortage field. Borrowers are permitted to reapply for loan forgiveness in subsequent years.

MEDICAL STUDENT LOAN PROGRAM ACTIVITY, BY PROGRAM YEAR

	2020-2021	2019-2020	2018-2019	2017-2018	2016-2017
Loans awarded in Fiscal Year	352	242	246	240	247
Total amount awarded	\$1,712,559	\$1,801,000	\$1,732,612	\$1,830,125	\$1,424,846
Amount of unexpended funds*	\$3,143,604	\$2,760,525	\$2,628,242	\$2,643,084	\$2,535,240
Loan postponement**	10	11	16	35	12
Loan forgiveness***	315	300	300	255	33
Default rate on previous awards	6.74%	7.97%	7.17%	7.16%	2.50%

* Amount of unexpended funds includes loan repayments.

** Loan postponement is the number of borrowers who applied for the first time in a given year to begin practicing toward earning loan forgiveness. If these borrowers complete one year of service, they receive up to \$10,000 in loan forgiveness, and then, are included in the subsequent year's loan forgiveness count.

*** Loan forgiveness is the number of borrowers who received up to \$10,000 in loan forgiveness in a given year.

Choose WV Practice Program

The Choose WV Practice Program is a state funded incentive program administered by the Commission. The program provides a tuition waiver to non-resident WV medical students who agree to remain in WV to practice in an underserved area of the state upon completion of their education and training. Two students from each WV medical school are eligible to be awarded each academic year and receive a tuition waiver for the difference between in-state and out of state tuition (approximately \$30,000). The first awards were provided in 2019-2020.

CHOOSE WEST VIRGINIA PRACTICE PROGRAM 2020-2021

	Marshall University	West Virginia School of Osteopathic Medicine	West Virginia University	Total
Number of New Awards	1	2	2	5
Number of Awards Renewed	1	1	2	4
New Tuition Waivers	\$32,784	\$62,476	\$63,018	\$158,278.00
Renewed Tuition Waivers	\$32,784	\$31,238	\$63,018	\$127,040.00
Total School Awards	\$65,568.00	\$93,714.00	\$126,036.00	\$285,318.00

Mental Health Loan Repayment Program

The Mental Health Loan Repayment Program is a state-funded incentive program and is administered by the Commission. The program provides approximately 30 awards annually for loan repayment to practicing mental health professionals who agree to complete a service obligation to deliver therapy or counseling services in underserved areas of West Virginia. The award amount will be at least \$10,000 (depending on outstanding debt) and is renewable up to three (3) years based on availability of funds and continued eligibility for the loan repayment program.

Eligible disciplines include: Licensed doctoral level clinical psychologist, Master’s level licensed psychologist, Licensed independent clinical social worker, Licensed certified social worker, Licensed professional counselor, Licensed marriage and family therapist, or Psychiatric mental health nurse practitioner. Other mental health disciplines identified by the Senior Director of Health Sciences as experiencing a shortage of practitioners may be considered.

In 2020-2021, 29 awards totaling \$290,000 were offered to:

- ▶ 3 Licensed doctoral level clinical psychologists
- ▶ 1 Master’s level licensed psychologist
- ▶ 6 Licensed independent clinical social workers
- ▶ 8 Licensed certified social workers
- ▶ 11 Licensed professional counselors

RURAL HEALTH INITIATIVE PROGRAM

The West Virginia Rural Health Initiative (RHI) Program is derived from West Virginia Code §18B-16-1 et seq. and focuses on several goals, including:

1. Increasing the recruitment of healthcare providers to rural areas.
2. Increasing the retention rate of healthcare providers in rural areas.
3. Developing pipeline programs to enhance student interest in rural healthcare careers.
4. Supporting the involvement of rural areas of the state in the health education process.

Overall responsibility for the RHI Program rests with the West Virginia Higher Education Policy Commission. To carry out the goals, the Commission grants the majority of funding to the Joan C. Edwards School of Medicine at Marshall University, the West Virginia School of Osteopathic Medicine, and the West Virginia University Health Sciences Center (the academic health centers). In FY 2021, each academic health center received \$587,000.

The Commission also uses RHI Program funding to make smaller grants to other higher education programs, healthcare facilities, and nonprofit organizations to further advance RHI activities across the state. Examples of projects funded during FY 2021 include:

- ▶ WVU Department of Geography-Expansion of the Healthlink project, a geo-mapping system to identify rural health, behavioral health, pharmacy, and COVID testing sites and travel time for the population across WV.
- ▶ WV Alliance for Creative Health Solutions to support a practice based research network engaging rural health providers in clinical research and retaining them in rural practices.
- ▶ WVU Health Sciences Center to support the statewide WV Vaccine Administration, Collaboration, and Support (WV-VACS) team, including over 1000 health sciences and other higher education students across the state of WV to support the COVID-19 vaccine efforts throughout the state.

The following pages contain a profile of the statewide student housing system for clinical rotations and program overviews for each of the academic health center's RHI activities during FY 2021.

Statewide Housing System

The RHI statewide housing system for health sciences students has allowed students to complete clinical rotations away from the main campus and immerse themselves in a rural or underserved community. The housing is open to all health sciences students, but in FY 2021, the housing was most frequently used by medical, pharmacy, physician assistant, pathologists' assistant, and dental students. The typical length of stay for students utilizing housing is about 4 weeks.

The 19 housing locations are primarily leased houses or apartments, which are property managed by West Virginia University. Housing locations are identified based on demand for clinical rotations in certain geographic areas, as well as the ability to secure the appropriate type of rental property. The operating costs of the program are supported through the Commission's RHI funding and a \$150/week fee paid by students utilizing the housing. Often, the cost of housing is covered by the student's institution. A total of 1,532 weeks were utilized across all housing unit locations in FY 2021.

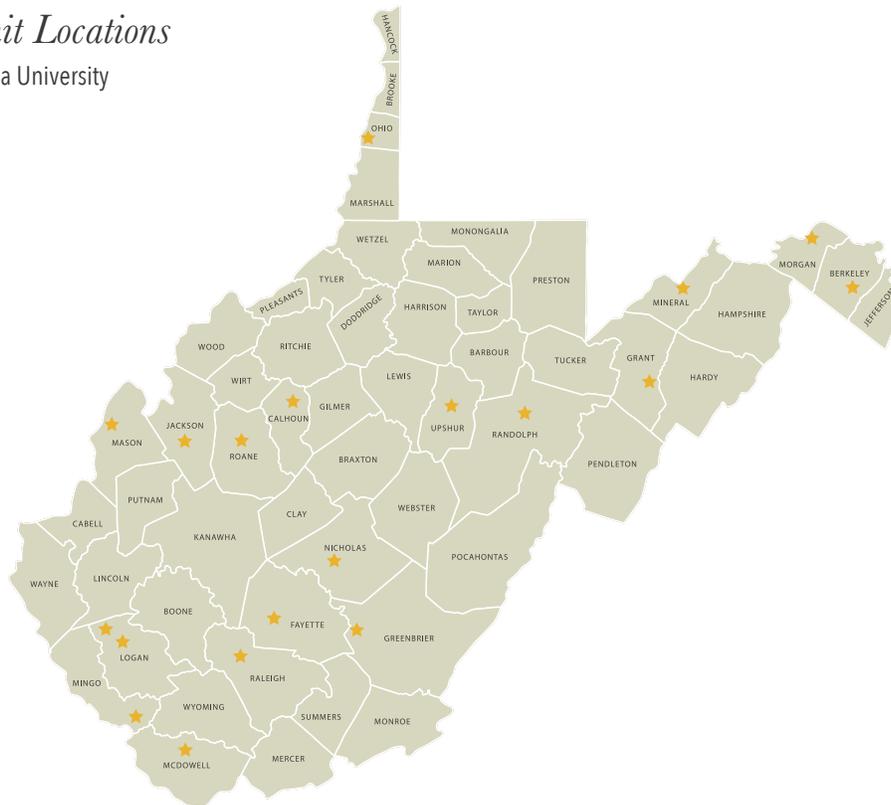
Students enrolled in training programs in West Virginia receive priority for housing. Students from out-of-state programs are accommodated based on availability. In FY 2021, students from the following institutions utilized housing: Alderson Broaddus, Marshall University, University of Charleston, West Virginia School of Osteopathic Medicine, West Virginia University, Marietta College (OH), Shenandoah University (VA), and University of Maryland Eastern Shore (MD).



Housing is provided across West Virginia where health sciences students from varied disciplines, which includes, dentistry, medicine, occupational therapy, pharmacy and physical therapy, complete community-based rotations. Students utilizing housing were from both in-state and out of state universities: Marshall University, University of Charleston, West Virginia School of Osteopathic Medicine, West Virginia University, Wheeling Jesuit University, Spalding University in Kentucky, University of Pittsburgh in Pennsylvania and Shenandoah University in Virginia.

19 Housing Unit Locations

Managed by West Virginia University





Marshall University Joan C. Edwards School of Medicine

Marshall University Joan C. Edwards School of Medicine (Marshall) is dedicated to providing high quality medical education and postgraduate training programs to foster a skilled physician workforce to meet the unique healthcare needs of West Virginia. Marshall is committed to the development of innovative rural initiatives that encourage and prepare students and residents to practice in rural communities.

Increase the recruitment of healthcare providers to rural and underserved areas.

Health Policy Fellowship: A program for resident physicians to develop leadership skills and foster interest in health policy with an emphasis on rural issues. Residents host educational forums, participate in activities during the legislative session, and in addition have opportunities to attend state/national conferences. Two family medicine residents participated in the 2021 West Virginia Legislative session. This is the second session for the residents and they were able to participate in more meetings and were utilized by members as a reference source. They worked with legislative members on health care issues that included but were not limited to legislation regarding needle exchange, medical evaluations for psychiatric hospitalizations and non-compete clauses in physician contracts that can often disrupt care in a community. They worked with legislative members in crafting amendments, rebuttals and understanding the work of lobbyists. They also gained valuable insight from elected officials who also practice medicine.

Increase the retention rate of healthcare providers in rural and underserved areas.

Rural Health Service Program: An incentive program that provides financial assistance to third and fourth-year medical students committed to rural practice in exchange for a rural practice service obligation upon completion of residency. This year five students were chosen. Two residents who received funding have completed their education and are currently working and serving rural and underserved patients.

Rural Health Fellowship: A year-long training program that allows a newly practicing physician to participate in community-based projects, community-based research, and supports training that will enhance the physician's clinical skills. The physician participating this year worked on cardiovascular and pulmonary issues.

Develop pipeline programs to enhance student interest in rural and underserved healthcare careers.

High School Pipeline Programs: Marshall's Center for Rural Health collaborates with multiple organizations to reach rural, minority and underserved students through initiatives that build awareness and eliminate barriers for college and the pursuit of healthcare careers for high school students. Due to pandemic restrictions during the school year of 2020-2021, Center for Rural Health staff members were unable to visit schools in person for activities, or bring groups to campus; however, staff engaged schools in 14 counties, reaching about 400 students, via a variety of individual and group virtual events.



Marshall Bachelor of Science/Doctor of Medicine (BS/MD) Program: This program allows students to complete the requirements for both the Bachelor of Science and Doctor of Medicine program in an accelerated seven-year program that provides enrichment activities, tuition waivers for medical school and guaranteed acceptance into medical school. The pandemic created barriers to many outreach activities; however students were still able to participate in activities in rural communities by volunteering, shadowing and working as pharmacy technicians. One student was selected as a student representative on the West Virginia Rural Health Association board of directors and has also become involved in the Association's Diversity and Inclusion Committee. In 2021, the program welcomed 9 West Virginia high school students bringing the program total to 71 undergraduate and medical students.

Virtual Summer Academy: Historically, this program is hosted on Marshall's campus as a residential week-long camp for pre-med college students to provide educational activities to help prepare these students for medical school. Due to the pandemic this event was moved to a virtual format. The Virtual Summer Program was held over two days for 21 participants from variety of West Virginia colleges and universities. Students responding to the survey reported an 88% satisfaction with the virtual academy and 94% found the content helpful.

Support the involvement of rural and underserved areas of the state in the health education process.

Collaborative Program with West Virginia School of Osteopathic Medicine and Coalfield Health Center: Marshall's Center for Rural Health is collaborating with the West Virginia School of Osteopathic Medicine and Coalfield Health Center (Coalfield) in Logan County, one of the most underserved regions in the state. The goals of this collaboration are to use joint resources to help achieve positive health outcomes for the community, to conduct community-based research, and to help entice medical students to consider practice in rural West Virginia. Coalfield provides a hub that enables both medical schools to combine forces to better attack the problems faced by southern West Virginia. Due to the pandemic, outreach activities this year were limited; however medical students assisted in the development of surveys for school health programs, provided factual vaccine information using social media and participated in a clinic vaccinating over 700 people.



West Virginia School of Osteopathic Medicine

The Rural Health Initiative's (RHI) mission is to enhance the rural primary care curriculum at the West Virginia School of Osteopathic Medicine (WVSOM) in order to produce graduates uniquely qualified to practice medicine in underserved communities of West Virginia. In addition to offering rural training opportunities to all students, WVSOM operates an intensive RHI program, which provides special training and enrichment opportunities to its students who express the strongest interest in rural practice.

Increase the recruitment of healthcare providers to rural areas.

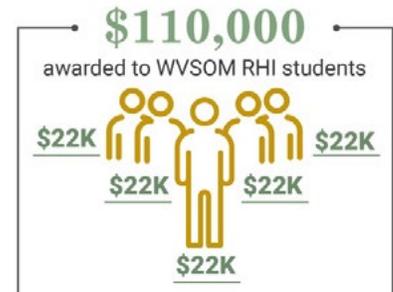
RHI Rural Practice Day 2021: WVSOM hosted its 10th annual Rural Practice Day to 232 attendees including WVSOM students, spouses/significant others, faculty, staff and speakers who joined the live streaming event on Jan. 29, 2021. The theme for this year's Rural Practice Day was "Keeping Rural Populations Healthy." Future doctors heard from experienced rural physicians, a physician politician and a rural hospital chief executive officer on the efforts and opportunities to keep rural communities healthy.



RHI Student Rotations: RHI students complete rotations in four different WVSOM Statewide Campus regions. Five hospitals serve as four RHI base sites in rural/underserved areas. RHI base sites for the 2020-21 academic year included:

- ▶ Davis Medical Center/St. Joseph's Hospital
- ▶ Grant Memorial Hospital
- ▶ Logan Regional Medical Center
- ▶ Princeton Community Hospital

Rural Physician Service Program: The Rural Physician Service Program incentivizes WVSOM students to remain in West Virginia to practice. Students selected receive a monetary award in exchange for agreeing to practice in an eligible rural/underserved service site within West Virginia for one year. Additionally, students receive enhanced rural health training during medical school through the Rural Health Initiative program. Through the Rural Physician Service Program and the Rural Physician Scholarship Program, \$110,000 was awarded to five WVSOM medical students during fiscal year 2021.

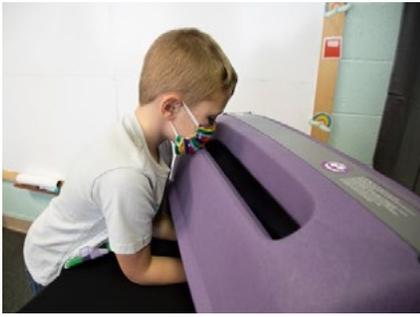


Increase the retention rate of healthcare providers in rural areas.

Residency Sign-on Incentive: Two of the 12 RHI program graduates from WVSOM's Class of 2021 each received a \$6,500 sign-on incentive for acceptance into a primary care or emergency medicine residency within West Virginia. Two graduates accepted primary care residencies (one at Charleston Area Medical Center in Charleston, W.Va., and one at AccessHealth in Beckley, W.Va.).

Mentor Program: During fiscal year 2021, 39 RHI and RHI pipeline students received a rural practitioner mentor. The mentorship program goals for RHI students include:

- ▶ Participation in rotations that will enhance rural primary care training
- ▶ Reinforcement of students' interests in rural primary care through mentor interactions
- ▶ Exposure to the quality of life offered by rural communities

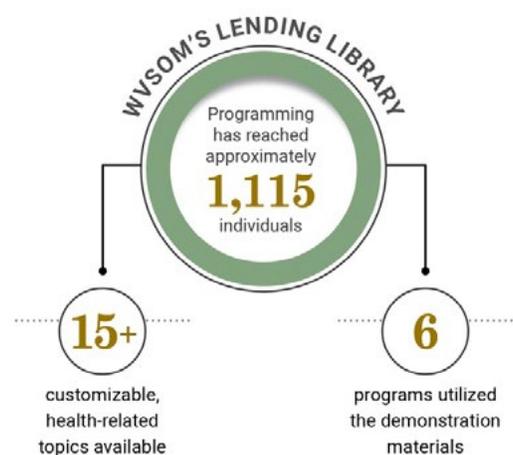


Develop pipeline programs to enhance student interest in rural healthcare careers.

Green Coat Programs: The WVSOM Green Coat Program provides undergraduate students who are interested in medical school or a health care profession an opportunity to gain exposure to clinical responsibilities in a hospital environment. The sixth cohort of Davis Health System Green Coat students was composed of eight students.

Health Education Resource Library: RHI's Health Education Lending Library expands upon the health education supplies available to community groups, medical students and schools through RHI for in-state health education related events. The resource library provides education and demonstration materials geared toward various age groups. To address concerns related to the COVID-19 pandemic, the library has resources available to educate people on the prevention of the spread of respiratory viruses, such as COVID-19. Additionally, items such as handwashing stations and thermometers are available to facilitate proper sanitation and screening at educational events.

High School Pipeline: A week-long Just Say KNOW educational camp for 26 high school students took place virtually from the Lewisburg campus in June. The theme for the camp was "Combating a Pandemic: Careers in Health Care." RHI was proud to co-sponsor the event.



Support the involvement of rural areas of the state in the health education process.

RHI Industry Activities: Rural Health Initiative activities seek to acquaint RHI students with statewide industries to understand environmental exposures that could cause injury or disease to rural patients. Four RHI industry activities occurred during fiscal year 2021:

- ▶ Emotional Health in the Mountain State: Then and Now in Weston on Sept. 25, 2020
- ▶ Exploring the Timber and Logging Industry in Smoot on Oct. 23, 2020
- ▶ A Taste of the Wilderness: live stream from Lewisburg on Nov. 23, 2020
- ▶ FARMacy off the Grid in Lewisburg on April 9, 2021

Coalfield Collaboration: The Rural Health Initiative has begun collaborating with the Coalfield Health Center (Coalfield) and Marshall University's Center for Rural Health in an outreach effort in Logan County. Coalfield is a strategic member of the Wild, Wonderful and Healthy Logan County initiative, which is working to change the poor health outcomes for Logan County and the surrounding areas. Coalfield, a Federally Qualified Health Center look-alike, has served as a hub for outreach opportunities for medical students from Marshall University Joan C. Edwards School of Medicine and WVSOM. The goal of the collaboration is to use resources to assist Coalfield to reach its goal of more positive health outcomes for their community, provide opportunities for community-based research, support an underserved area and encourage health care students to consider practice in the region. The collaboration intends to explore joint clinical opportunities to further medical education, health care, and pursue projects to improve the quality of education and opportunities for their medical students. Funding will provide contractual support for a chronic care management position through Coalfield. This contract would serve as an outreach to the community, and as an opportunity for enrichment training for RHI students.

From RHI student to WVSOM graduate: Lucas Hamrick took full advantage of rural programs

Lucas Hamrick, D.O., thought about attending medical school long before he got accepted. The native of Clay, W.Va., worked to fulfill his dream of practicing medicine in underserved communities while still in college by utilizing programs that would propel his acceptance to medical school and thus as a primary care physician.

Hamrick was heavily involved with rural programs and teaching opportunities before and during his time in medical school. He was a participant in the pilot year of WVSOM's Green Coat Program before he was accepted to the medical school; he mentored high school students in a Just Say KNOW to Drugs pharmacology camp; he was involved with the Community Outreach and Relief Effort (C.O.R.E.) program that involves working with hospice; and was a member of the RHI program during his time at WVSOM.

As a fourth-year student, Hamrick received an award for "Outstanding Rural Health Student of the Year" during the West Virginia Rural Health Association's Rural Health Conference in 2017. The award recognizes extraordinary student activities within the field with significant accomplishments in rural health.

"I have learned a great deal during my medical education. I will continue to be dedicated to the practice of medicine in West Virginia and I hope to be part of innovation in health care as a whole, as well as expanding access to all services for our rural populations," Hamrick said. "Quality health care in West Virginia is on the rise – everywhere across the state we are improving and innovating. I look forward to being a part of that in the years to come."

After graduating from WVSOM in 2018, Hamrick served as a panelist during Rural Practice Day and as a mentor to RHI students. Hamrick is completing an internal medicine residency at WVU Medicine. He will then begin a pulmonary and critical care medicine fellow at Charleston Area Medical Center in July. He remains an example of how college pipeline programs in West Virginia can be the launchpad for educating future physicians who will practice in rural communities.



West Virginia University Health Sciences Center

Increase the recruitment of healthcare providers to rural areas.

A.H.E.C.: The WV Area Health Education Centers Program (WV AHEC) developed by Congress in 1971, is a program to recruit, train and retain a health professions workforce committed to underserved populations. WVU co-sponsors with AHEC to conduct continuing education, pipeline programs, and rural immersions throughout the state.

WVAHEC Rural Community Health Scholars: The WVAHEC Rural Community Health Scholars program (RCH Scholars) provides supplemental and interprofessional educational experiences for graduate health professions students interested in practicing in rural and/or medically underserved communities. In FY-21 thirty-three students from four institutions were recruited into the third cohort of the WV AHEC Rural Community Health Scholars Program, and 51 Scholars graduated in June 2020. Sixty-three scholars from cohort two are completing their second year of the program.

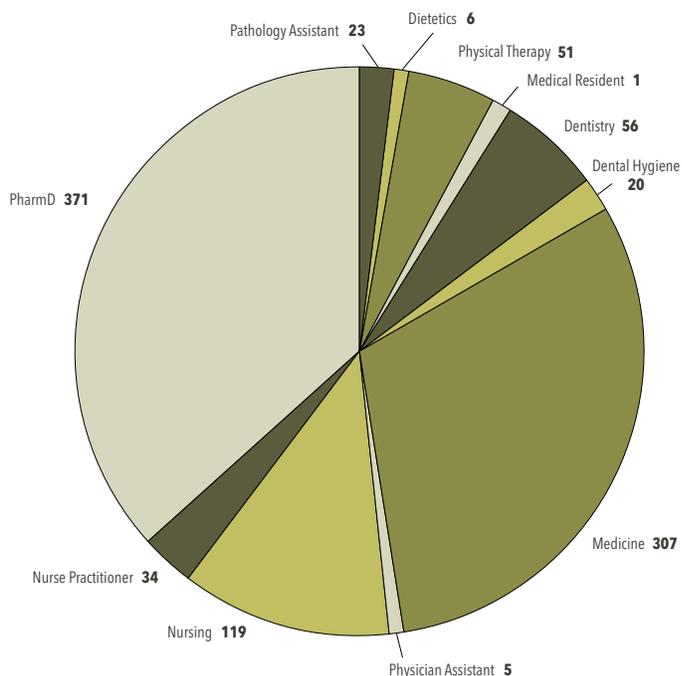
Rural Track: The WVU Rural Track Program's goal is to better prepare enrolled students to enter primary care residency and ultimately to practice in a rural primary care setting. There are 39 graduates with 34 committing to primary care residencies. There have been 12 WVU Rural Scholars, 11 class officers, and 10 residency specialists represented.

Rural Immersions: In-depth experiences for health professions students, which allow them to learn about community health and disease processes while immersed in a rural community. In FY21, Scholars participated in six immersions focused on rural nutrition, global health and pandemics, COVID-19 and community health response, integrated primary care, social determinants of health, and rural opioid misuse.

R.H.I.G.: The Rural Health Interest Group is a student-led group of health professions students of different disciplines who learn about rural health issues through guest speakers and activities. In FY-21, eight meetings were held all via Zoom. Topics covered included telehealth, drug courts, COVID-19 vaccines and Appalachian culture, and opportunities for healthcare outreach in West Virginia. Students also participated in a service-learning project by organizing a raffle for the food bank in Preston County, WV.

WVU: Collaborated with WVAHEC to coordinate five interprofessional team activities that included students from medicine, master of public health, nursing-RN, pharmacy, physical therapy, physician assistant and master of social work. Issues addressed by the students during these activities included disability awareness, addiction awareness education among adolescents, community vaccination clinics for COVID-19, implementation-evaluation of COVID-19 vaccinations and behavioral medicine intake process.

WVU STUDENT ROTATIONS IN COMMUNITY BASED CLINICAL ACTIVITIES, BY DISCIPLINE 7/1/20 – 6/30/21



MEDICAL AND DENTAL STUDENT SERVICE PROGRAMS AWARDED 2011-2021

\$2.4 MILLION

WHERE OUR AWARD RECIPIENTS ARE TODAY

25 DENTAL STUDENTS



22 PRACTICING IN WV

21 MEDICAL STUDENTS



4 IN SCHOOL

6 RESIDENCY

8 PRACTICING IN WV

WVU Service Program Outcomes: Fifty-five percent of medical student awardees currently have their commitments deferred while completing medical school. Eighty-four percent of dental student awardees have completed their obligation and 86% are still practicing in West Virginia, 89% of which continue to practice at rural and/or underserved locations. The retention rate for medical and dental providers that complete their obligations and remain in a rural and/or underserved area is 83%.

Support the involvement of rural areas of the state in the health education process.

Project R.E.A.C.H.: Project Rural Education Alliance for Community Health is a student-run outreach program that provides education and health information throughout the state. In FY21, students participated in eight health education events that served 280 people from Raleigh, Preston, Greenbrier, Clay, Wyoming, Kanawha, and Mingo counties.

CARRS: Community and Rural Rotations Support Program provides financial support for health professions students interested in rural practice and offers the opportunity to contribute to impacting health outcomes through community-based projects. Historically, the CARRS student is in their 3rd year of medical school or 4th year of dental school and 3rd year pharmacy students will be added in FY22. In FY21 thirteen students completed CARRS rotations including three that were postponed due to COVID-19 restrictions. Current community mentor partners include Health Sciences Technology Academy and WV Project ECHO. Future projects include community engagement with Try This WV.

Newsletter: Provides annual updates on WVU health profession students' educational and outreach activities to nearly 800 field faculty across the state.

2021 COVID-19 RESPONSE AT OUR WEST VIRGINIA COLLEGES AND UNIVERSITIES AND HEALTH SCIENCES PROGRAMS

In March 2020, the threat of COVID-19 was recognized. With the declaration of a State of Emergency in West Virginia by Governor Jim Justice in 2020 and the gradual lifting of the stay-at-home order in 2021, West Virginia colleges and universities, and in particular health sciences programs continued to work to accomplish four goals:

1. Protect the health of students, faculty, and staff;
2. Support the continued education of students in a safe manner;
3. Provide health care and health care services where needed; including vaccine administration in 2021;
4. Innovate to support the needs of the citizens of the state.

With the availability of COVID-19 vaccines beginning in December of 2020, West Virginia colleges and universities stepped up to strategically vaccinate as many campus members as possible using criteria set by the **Joint Interagency Task Force on Vaccine Administration (JIATF)** and designed to first protect the most vulnerable of our population, thereby decreasing deaths and hospitalizations.

All schools continued to use innovation, evidence, and dedication to their educational goals to guide their actions. While a complete accounting of the strategies used by colleges and universities to meet these goals is beyond the scope of this report, examples of strategies from schools are found below.

Protect the health of students, faculty, and staff.

In 2021, colleges and universities continued the work of their COVID-19 taskforces, college Presidents worked together to share best practices, and the WV Higher Education Policy Commission (HEPC) provided continual support. Colleges and universities made evidence-based decisions regarding operations following state and national guidelines as they emerged. Each campus made decisions related to campus operations during 2021 based on their community, environment, and particular needs of their student population. The HEPC worked with the **West Virginia National Guard** and **WV DHHR Emergency Command** to assure adequate supplies needed to mitigate risk were available. With a statewide mask mandate, all schools implemented masking policies, continued social distancing measures, and managed testing, contact tracing, and implemented quarantine and isolation protocols where positive cases of COVID-19 were found. The emergence of COVID-19 variants such as the delta variant caused schools to continually evaluate policies and processes for protection of their campuses. Schools worked closely with their local health departments to implement evidence-based protocols and to continually reevaluate those protocols with changing conditions.

Governor Justice's office provided the HEPC funding for COVID-19 testing for all students during the Spring 2021 semester. A statewide contract for testing proved to be seamless in providing rapid results to campuses from their testing events. The HEPC assured that appropriate contact tracing, quarantine, and isolation protocols were in place at all colleges and universities and helped campuses trouble shoot when necessary. The HEPC also worked closely with the Mountain East Athletic Conference to assure that sports could resume in the Spring of 2021 (including sports delayed from the Fall semester) with testing that met rigorous NCAA guidelines for all athletes, coaches, and referees.



With the resumption of regular academic activities, the WVHEPC worked closely with Rural Health Initiative leadership (RHI) to assure that students on rural rotations were protected as well. Traditionally, housing for these students involved “double” rooming assignments, with students sharing sleeping rooms in the housing facilities in rural areas. Out of an abundance of caution and given that students on rural rotations may be coming to rural housing from different communities with differing viral positivity rates, additional housing was secured so that all students in RHI housing had single occupancy rooms. Approximately 161 weeks of alternate housing was used by students from WVU (69 weeks), WV School of Osteopathic Medicine (81 weeks) and Marshall (11 weeks). Additional funding for these housing arrangements was provided by the WVHEPC and from RHI funds unused during the Spring 2020 semester.

Of course, the big news of 2021 was the availability of COVID-19 vaccines beginning in December 2020 and continuing through 2021. With the creation of the WV Joint Interagency Task Force on Vaccine Administration (JIATF), the WVHEPC (as the JIATF higher education representative) began working to strategically vaccinate the campus community using guidelines set by JIATF leadership. The first doses of COVID-19 vaccines were offered to faculty and staff over the age of 50 during the week of December 27, 2020. Due to limited quantities of vaccines available at that time, vaccines were limited to those personnel who were in front-line, on-campus activities. As vaccines became more available, additional populations were added, including health sciences faculty, staff and students, campus police, resident advisors, and eventually to the general college population. By the end of the semester in May 2021, vaccines were available to any campus member who wanted to be vaccinated. Schools held on-campus vaccine events, provided consistent messaging provided by the JIATF, ramped up social media and print campaigns on campus, and provided guidance to dispel misinformation. This effort resulted in more than 56,000 doses of vaccines being deployed to campuses by May 2021. COVID-19 Task Forces, student health services, local health departments, local clinics and hospitals all participated in the effort to smoothly deploy vaccines to college communities thereby mitigating risks as students returned home to their communities for the summer, allowing summer sessions to occur on campus, and allowing schools to plan for a more “normal” return to campus in the Fall 2021 semester. Hundreds of campus personnel and students were involved in this effort.

Support the continued education of students in a safe manner.

With the return to campus by many schools in 2021, innovations to support education that were developed during the State of Emergency and Stay at Home orders continued. For instance, at the **WV School of Osteopathic Medicine**, small groups using team-based learning techniques were continued on virtual platforms that allow high levels of interaction, such as Microsoft Teams. Online testing continued using proctoring software. Anatomy labs for first year students used instructive videos, dissections, and models until it was safe for students to return in larger numbers to the lab. Skills labs were done in smaller groups than usual.

Schools continued to support the recruitment and pipeline activities they typically offer in the Spring and Summer for aspiring health sciences students. **Marshall University** carried out virtual meetings with high school students interested in health sciences careers. Staff participated in a virtual college fair, **Upward Bound** regional meetings, and the **National Physics Educators Conference for the Appalachian Region**. A virtual conference for pre-health advisors was held with advisors and faculty from 12 WV colleges and universities in attendance. A virtual summer program for students interested in health careers was also held, with 21 participants from 7 different WV colleges and universities in attendance. The program was highly rated by participants with an 88% satisfaction rate and 94% of the participants reporting that the content was helpful to them.

Provide health care and health care services where needed.

Health sciences students and faculty are well attuned to the health care needs of the communities in which they learn. Faculty and students continued to identify where needs existed due to the pandemic and worked to fulfill those health care needs. One of the largest efforts undertaken to support the needs of communities was the **WV Vaccine Administration, Collaboration, and Support (WV-VACS)** team. Funded by the WV HEPC via a grant to **West Virginia University** for coordination of the effort, the WV VACS team included over 1000 higher education student volunteers from across all public and private colleges in WV who were trained to assist with vaccine efforts. Prior to working in communities, students complete an online curriculum that is designed to enhance their knowledge about COVID-19 vaccines and their administration. Once fully trained, groups of students work under supervision with local health providers to give vaccines and support data entry. Higher education institutions determine whether students participate in this voluntary program for either course credit or community service. Funding provides reimbursement for student travel if students are serving as volunteers. After training, students are able to volunteer for available vaccine events across the state. Students whose scope of practice allows vaccine administration assist at events by actually putting “shots in arms”, and other students participated in support events, including everything from data entry to traffic control, monitoring patients after vaccines, and providing general assistance at large events. The WV-VACS team was honored to be awarded the **2021 George E. Thibault Nexus Award** from the National Center for Interprofessional Practice and Education. The award celebrates exemplary interprofessional collaboration in the United States and those who are thinking and acting differently where practice and education connect in health systems.

A collaboration between **Marshall University’s Joan C. Edwards School of Medicine, the West Virginia School of Osteopathic Medicine** and the **Coalfield Health Center** in southern West Virginia also continues to meet the health care needs of the community during the pandemic. Health Sciences students work with local high schools with ongoing health promotion events including a curriculum to decrease the use of sugary beverages, and another targeted toward middle schools to prevent vaping. Students post health education information on social media as a part of the Wild, Wonderful and Healthy Logan County initiative. The partners, including student representatives, were selected to present a paper entitled **“A Wild and Wonderful West Virginia Collaboration”** at the **National Rural Health Association** conference held virtually in May of 2021.

At the intersection of experiential education and providing health services to the campus community, the West Liberty University College of Sciences conducted a research study to evaluate the presence of the SARS COV-2 virus on campus using a pooled surveillance testing technique. They utilized equipment provided by **West Liberty University** alumnus, Fred Kinder, CEO of eHealthcare, Inc., to initially evaluate the campus community (students, faculty, and staff) voluntarily, on a weekly basis. They utilized 6 COVID -19 analyzers, donated by Mr. Kinder, in two locations on campus. The novel approach to COVID-19 testing was sensitive and accurate, taking only 55 minutes to run a test. The study involved faculty and student researchers from the Biology and Medical Laboratory Science Programs and served as an experiential learning experience for students in both disciplines. The goal was to expand surveillance testing to help identify asymptomatic carriers of COVID-19, including those vaccinated or unvaccinated.

Innovate to support the needs of the citizens of West Virginia.

The pandemic prompted our higher education facilities to coalesce resources for immediate and continued pandemic response, including bringing foundational science expertise to positive impact. While it is impossible to highlight all of these projects in this publication, several projects are of note given their impact on current needs related to COVID-19 and future potential to continue to impact the way that WV, the US, and the world react to viral illnesses.

Three efforts of the WVU Health Sciences Center and their statewide partners are important to highlight. These projects have been the result of work of the WVU Health Sciences Center COVID Scientific Task Force, established in mid-March of 2020 to bring the technical and intellectual expertise of diverse research teams to address acute issues. While the task force includes over 40 scientists, three specific efforts have been essential to WV’s pandemic response.



Rapid Response Development Laboratory (RDL)

WVU Health Sciences Center (HSC) has established a collaborative laboratory that is capable of rapidly developing diagnostic testing outside of traditional pathways. Teams of scientists from diverse disciplines (Biochemistry, Microbiology and Immunology, Biology, Engineering, etc.), clinicians, military personnel with efforts led by the **West Virginia National Guard**, and technical support staff quickly mobilized to bring diverse talent to address the challenge of COVID-19 testing shortages. The scientific task force meets weekly to address/troubleshoot immediate testing needs but also to bring collective expertise to emerging projects. The **West Virginia Rapid Response Development Laboratory** provides the intellectual capital, laboratory medicine expertise, instrumentation, space and technical support to develop, validate and implement complex diagnostic testing. Regulatory burdens are minimized by adhering to good laboratory practices in an established CLIA-compliant environment. The group of laboratories include PCR and antibody/serology focused initiatives with each having a companion Research and Development lab to continually inform development of testing strategies in the CLIA-certified space. Assays were developed to be less vulnerable to supply chain bottlenecks with the benefit of several reagents being generated in house (WVU) to provide both quality and flexibility. WVU-RDL is currently running hundreds of tests per day with turnaround time of 24 hours and typically within 8 hours of receiving the sample. The number of tests performed every day is progressively increasing and will continue to be an essential part of the statewide testing strategy.

While current focus is on COVID associated testing needs, from the onset equipment purchases, personnel training and space modifications and technical strategies that were adopted were forward looking with emphasis on flexibility to respond to various future needs with increased efficiency. Recently, the need has focused in part on sequencing positive samples from WV. The rapid evolution of SARS-CoV-2 variants with enhanced pathogenicity has emphasized the importance of case-tracking and early identification of emerging pathogens. Partnership has again been critical and includes colleagues from WVU Departments of Biochemistry, Pathology and Laboratory Medicine, and Microbiology and Immunology. Across the state partnerships between the RDL at WVU, **leaders of the Genomics and Bioinformatics Cores at Marshall University**, and the **WVDHHR** allowed rapid establishment of an effective SARS-CoV-2 surveillance network. This network sequences CoV-2 genomes from patient samples, calls viral variants and reports the dynamics of the epidemic and the spread of variants to the **WV Governor's office** and the **CDC** on a weekly basis.

WVU Health Sciences Center Vaccine Development Center (VDC)

The mission of the VDC is to stimulate pre-clinical vaccine research, partner with industry, and to enhance STEM education. The VDC is supported by the WV HEPC through the Division of Science and Research and approximately \$20M of extramural grants and contracts. Almost all funded projects include animal models of disease including mice, rats, and non-human primate studies (with partner institutions).

The VDC has worked collaboratively with the Rapid Response Development Laboratory to develop the assays mentioned earlier, avoiding supply chain issues. The VDC houses and maintains a research automation instrument that allows for development of high throughput assays to determine amounts of antibodies in humans or animals that are either infected with virus or immunized with vaccines. The antibody assay automation instruments are flexible platforms and can be pivoted for new assay development when needed.

The VDC, supported by HSC leadership, has established a COVID-19 model using mice who have been challenged with SARS-CoV-2. They are continuing to use this model to investigate how vaccines can protect against SARS-CoV-2. In particular, they aim to study nasal vaccination. The world will need many different vaccines to fight this pandemic and vaccines for the developing world have been neglected. The VDC has several vaccines that are of low cost, but high efficacy and the mouse model will continue to generate essential data to light the way towards these important and necessary vaccines.



iTOX-Inhalation Facility

The core of the WVU HSC Center for Inhalation Toxicology (iTOX) is the Inhalation Facility 2.0. The Facility came online in September 2017, and is a free-standing facility with dedicated HVAC, electrical, emergency power, and plumbing systems. It comprises ~2200 square feet, with capacity for approximately 140 rats or 400 mice across six exposure hoods. This multiple-hood setup allows for simultaneous execution of multiple research projects and includes dedicated rooms for nanomaterial, cigarette/vape, and combustion emission inhalation exposures.

Rodents are exposed to various aerosols in whole-body exposure chambers or nose-only exposure systems. Aerosols are generated by state of the art, patented devices developed at WVU (Nanoparticle Aerosol Generator: U.S. Patent #8,881,997. 2014), and the National Institute for Occupational Safety and Health (Acoustical Generator: U.S. Patent, #8,875,702. 2014). The method of exposure is dependent upon variables such as the amount of bulk materials available for aerosolization, target concentration, duration, and target deposition. One of the key technical strengths of the Inhalation Facility 2.0 is the ability to fully characterize (in real-time, during an exposure) the artificial atmospheres we create. This allows real-time dosing, and can only be done by a handful of other facilities across the country.

Using their skills, the iTox staff have directly participated in COVID-19 support activities including regular fit testing and material testing of masks and materials (NIOSH, National Guard, WVU, WV citizens), general PPE material evaluation for mask, gown and barrier use, decontamination assessments, COVID surrogate aerosolization (atomizer/nebulization), collection, and detection, mask development including the Montana mask, WV mask, Singing mask, the creation of educational demonstrations, including droplet transmission videos, myth busting, and public outreach, and finally, working with industry to test products for the future.

From the beginning of the pandemic, West Virginia's colleges and universities have innovated, collaborated with internal and external partners, and worked to lessen the impact of COVID-19 on their campuses, their communities, and the state. To be sure, health sciences education continued to look different in 2021, but the goal of educating the health care workforce of the future has never been more important.

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