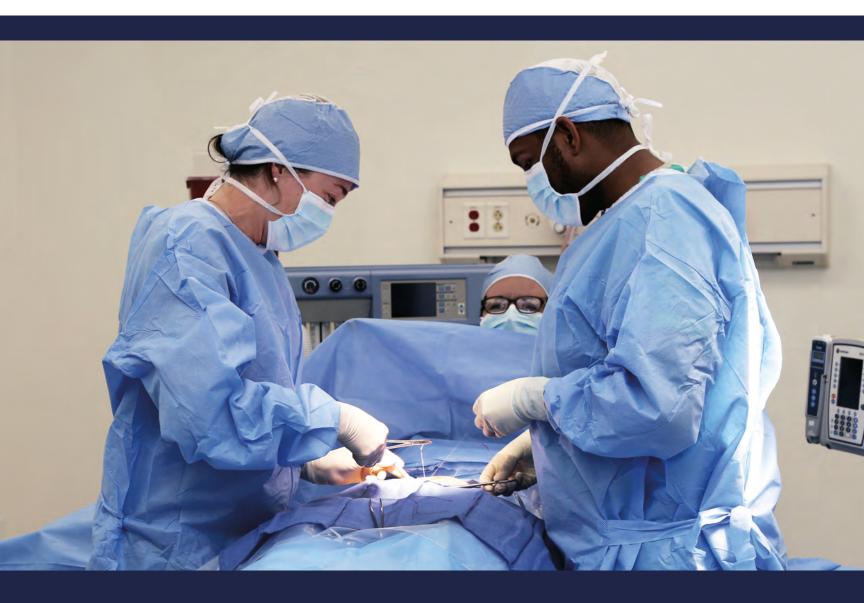


THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL



UNC Health Sciences at MAHEC



2018 Annual Report

When the Mountain Area Health Education Center (MAHEC) was established 44 years ago, it was with a clear mandate: to improve health across Western North Carolina (WNC) through innovative health education that creates a robust and well-qualified healthcare workforce. In service to this mission, MAHEC's programs and services have grown significantly since then, nearly doubling in size over the last four years.

State appropriations in 2015 and 2016, totaling \$18.6 million in recurring funds, have been critical for helping MAHEC address a growing national trend toward urbanization and away from rural primary healthcare, where there is the greatest need.

In 2017, we expanded a number of existing programs and launched new ones designed to transform rural healthcare across our region. These initiatives form the backbone of UNC Health Sciences at MAHEC, a unique interdisciplinary partnership with the University of North Carolina (UNC) at Chapel Hill's School of Medicine, Eshelman School of Pharmacy, and Gillings School of Global Public Health as well as UNC Asheville, Western Carolina University, and regional community partners.

This past year, we opened new residency programs in general surgery and psychiatry, expanded our family medicine and pharmacy residency programs, and increased the class sizes of the UNC School of Medicine Asheville Campus. We also invested in our research division, rural fellowships, a state-of-the-art medical simulation center, and the development of a top-ranked master of public health program in Asheville led by UNC Gillings that will train public health leaders to serve our region beginning this fall.

All of our programs encourage learners to train with rural professionals, develop a deep appreciation for rural values, and contribute to improving the quality of life and health in communities across our region.

I invite you to learn more about UNC Health Sciences at MAHEC in this annual report and to partner with us in these important rural health initiatives that will have a positive impact on our mountain communities, and rural healthcare across the country, for many generations to come.

On behalf of all the North Carolinians in the 16 counties we serve, thank you for your support.

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Jeffery E. Heck, MD President and CEO, MAHEC University of North Carolina Health Sciences at MAHEC Associate Dean, UNC School of Medicine Asheville Campus

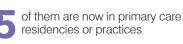
UNC School of Medicine Asheville Campus

The UNC School of Medicine Asheville Campus is a national leader in longitudinal integrated clerkships (LICs), which are the preferred educational model for UNC and medical schools across the country. The LIC curriculum provides a depth of knowledge and experience that enables third-year medical students to consistently score more than 10 points above the national average on the USMLE Step 2 clinical knowledge exam.

"LIC graduates identified multiple affordances they perceive contributed to learning during their core clinical clerkship year: continuity and relationships with preceptors, patients, place, and peers, along with integration of and flexibility within the curriculum."

> Academic Medicine (Latessa et al., 2017)

Of the 1117 students since 2009, (38 were Kenan scholars*) of them are now in primary ci





80 Projected to reach in the next four years

"The learning environment in Asheville was amazing. Wonderful teaching!"

-Asheville Campus MSIII student





*The Asheville Campus has partnered with the UNC Office of Rural Initiatives to place 38 Kenan Primary Care Medical Scholars in 9 rural WNC counties and 9 primary care residencies since 2013.

UNC SOM Asheville Campus Surgery Course Director Randy Johnson, MD, leads a suture lab with MSIII students.

66 rural preceptors across 12 counties

(an increase of 23% in 2017)

273 preceptors have UNC faculty appointments (an additional 37 are in process)

"The longitudinal nature of the course fully demonstrated the power of family medicine."

UNC Gillings MPH Program in Asheville

The UNC Gillings Master of Public Health (MPH) Program in Asheville is wellpositioned to address our region's unique rural health needs with a project-based curriculum that places students in WNC communities to develop, analyze, and implement interventions where they are needed most.

This MPH program, led by the nation's top-ranked public school of public health, is expected to become a joint program in 2020 in partnership with UNC Asheville and will be located on the UNC Health Sciences at MAHEC campus.

2017-18 Asheville-based planning team:

- Met with community stakeholders
- Developed place-based curricula
- Secured institutional approval
- Hosted 11 public health interns from UNC Gillings and UNC Asheville

WNC counties and region-wide initiatives supported with public health interns in 2017-18



Public Health Leadership Program Curriculum

Core and PHLP courses will be taught by UNC Gillings faculty. Weekly in-person discussions and WNC-specific courses will be led by UNC Asheville and UNC Health Sciences at MAHEC faculty.

- Curriculum includes place-based, rural focus
- Data analysis and solutions-focused program implementation
- Community and health systems transformation
- · Longitudinal community internships and projects
- Community partners and lecturers from all 16 WNC counties



Travis Johnson, MD, MPH, Interim Director of the UNC Gillings MPH Program in Asheville, facilitates an information-gathering session at the regional Rural Health Summit at MAHEC in fall 2017.

2017-18 Public Health Internship Projects

- Community-based chronic disease education
- Community health improvement presentations
- Improving access to medical services
- Community forums on health equity issues
- Regional health assessment data mapping
- Tribal health assessment support
- Opioid and hepatitis C education strategies
- Substance use service resource mapping
- Healthy food distribution/education program
- Public health PSA campaign development

The need for highly trained clinical pharmacists has never been greater in Western North Carolina where we have a rapidly aging population and a greater percentage of those with chronic complex health conditions, high medication burdens, and substance use disorders.

The UNC Eshelman School of Pharmacy and UNC Health Sciences at MAHEC have formed a unique partnership to address these critical rural health needs with residency program expansions and population health research partnerships.



Hien Nguyen, PharmD

I was raised and have worked in a small rural town in Pennsylvania with a population of only 5,000 people. My hometown is a close-knit farming community that has lower educational levels and health literacy than more urban areas in our state. I have enjoyed the challenge of working with rural and underserved populations and helping make medication information and usage easy to understand. I believe rural and geriatric pharmacy practice offers many great opportunities for learning, teaching, and improving health.

Hien will work on MAHEC's Center for Healthy Aging initiatives to support older adults in rural settings and also train at Cherokee Indian Hospital.



programs in NC

programs in the US



Tasha Woodall, PharmD, Associate Director of Pharmacotherapy - Geriatrics at MAHEC, discusses potential medication side effects with a patient.

2017-18 Program Expansion Initiatives

Geriatric Pharmacy Residency

- First resident starts July 2018
- Plans to expand to two residents in 2019

Ambulatory Care Residency

- Two first-year residents, two second-year residents
- Emphasis on WNC-specific needs including rural, geriatric, opioid stewardship, substance use disorders, mental health, and hepatitis C

Inpatient Pharmacist

- Faculty hired in 2018
- Provides inpatient training for 10 pharmacy students annually

Rural Pharmacy Health Scholars

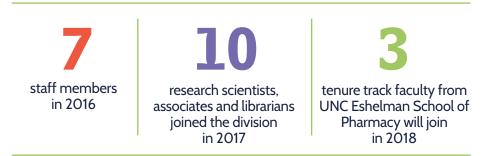
- Inter-professional education with UNC SOM Asheville students
- Clinical training at MAHEC rural family medicine practices

UNC Eshelman Research Partnership

- Three new UNC Eshelman faculty based in Asheville to conduct health economics, health services, and implementation science research
- UNC Eshelman/UNC Health Sciences at MAHEC faculty-led research on opioid use disorder, rural pharmacy workforce development, and integrated pharmacy services

UNC Health Sciences at MAHEC's Division of Research is committed to being the collaborative leader and primary source of information on rural health in Western North Carolina. The division's many interprofessional research initiatives involve faculty, residents, and academic and community partners and focus on healthcare workforce development, academic medicine, clinical research, and practice transformation to improve patient, community, and population health.







Harold Campbell, MD, PGY2 General Surgery Resident, presents his research on rib fractures at UNC Health Sciences at MAHEC's Annual Research Day.

Recent and Ongoing Research

- Longitudinal integrated curricula in medicine
- · Rural physician recruitment and retention
- Preceptor satisfaction and future trends
- Residents' desired vs. actual scope of practice
- Community-designed women's health screening tools
- Physician preparedness to treat opioid use disorder
- Fetal and maternal outcomes of MAT in pregnancy
- Integrating pharmacotherapy in primary care
- · Racial and rural health disparities in ob/gyn care
- Interconception health screening implementation

Research Partnerships

- UNC Chapel Hill School of Medicine
- UNC Eshelman School of Pharmacy
- UNC Sheps Center for Health Services Research
- UNC Asheville
- Western Carolina University
- Family Medicine Education Consortium and IMPLICIT Network
- National Preconception Health and Healthcare Initiative
- North Carolina Coalition Against Domestic Violence
- National Patient Advocate Foundation

The North Carolina Community Preceptor Experience

Latessa, RL, et al. The North Carolina Community Preceptor Experience: Third Study of Trends over Twelve Years. Under review for publication.

"This is an important piece of work on the value of health professional education in the community and the stresses it is under. UNC Health Sciences at MAHEC's work, supported by North Carolina AHEC, is making a critical contribution, surveying almost all of the preceptors, over almost all professions over an entire state—over a decade. These are unique data, with implications for us all."

> —Warren Newton, MD, MPH William B. Aycock Professor in Family Medicine Vice Dean and Director of North Carolina AHEC

Other national academic partnerships include Baylor Medical College, University of Chicago, Loyola University, Harvard University, Boston University School of Medicine, and Brown University.

Family Medicine Residency Program Expansions Asheville

UNC Health Sciences at MAHEC's family medicine residency programs located in Asheville and Hendersonville provide comprehensive team-based training to meet the needs of rural and underserved populations in Western North Carolina. In 2017, both programs expanded to train a total of 51 residents annually by 2019.

Residents receive training in rural medicine including women's health, geriatrics, community-based care, behavioral medicine, and complex conditions such as opioid and substance use disorders.

All residents are trained in medicationassisted treatment with buprenorphine (MAT) for opioid use disorders.

Faculty Expertise

Residents are exposed to full scope, evidence-based family medicine including

- Chronic pain
- Geriatrics
- Group visits
- Hepatitis C
- IDD primary care clinic
- Integrated behavioral health
- Interconception health
- Metabolic disorders
- Ob/gyn
- Opioid use disorder
- Osteopathic manipulation
- Osteoporosis
- Pharmacotherapy
- Sports medicine

FM Fellowships

- Hospice and Palliative Care
- Sports Medicine



medical and health sciences learners received clinical training in 2017

Diversity of learners:

- High school interns
- 2- and 4-year college interns
- Post-graduate fellows
- MedServe fellow
- Americorp VISTA

Asheville Family Medicine Residency Program



Rural Training Sites

- Angel Medical Center
- Blue Ridge Regional Hospital
- Cherokee Indian Hospital
- Hot Springs Health Program
- Mission Hospital McDowell

All residents receive training in rural emergency medicine.



"I already had MAHEC high on my list when I interviewed. I was impressed by the facilities we get to work in and the communication with the program coordinators and our program director."

-Kelly Garcia, MD, Maternal-Child Health Fellow, Haywood County, Class of 2017



Tyler Wellman, MD, PGY1 Family Medicine Resident, discusses developmental milestones with a parent during a well child visit.

- School of medicine
- Kenan medical scholars
- Family nurse practitioners
- Post-graduate dietetic interns
- Behavioral health
- Nurse educators
- Nurse leaders
- Advanced practice providersCertified medial assistants
- Radiology technicians

Rural Family Medicine Residency Program

UNC Health Sciences at MAHEC's Hendersonville program has a nationally recognized rural medicine curriculum that provides additional longitudinal exposure in a variety of rural inpatient and outpatient settings.

All residents are trained in medicationassisted treatment with buprenorphine for opioid use disorders. 8196 of residents have a rural background 9196 of current residents intend to establish a rural practice

100%

of 2017 graduates are in practice in WNC; 75% in rural areas



Robyn Restrepo, MD, examines a patient at Blue Ridge Health in Hendersonville, NC.

residents per class with the expansion (14 total in 2018)

graduates since 1996

graduates have participated in WNC-based fellowships

clinics across 5 rural WNC counties are training sites

"My catchword to describe the Hendersonville residency is community. The flexibility and longitudinal nature of the program allowed me to get involved with different rural communities and work with local leaders to improve health equity." —Robyn Restrepo, MD, 2017 Rural Fellow and Rural Family Medicine Residency Program graduate

General Surgery Residency Program

One in three counties in Western North Carolina is without a practicing general surgeon, the type of surgeon most needed in rural areas. UNC Health Sciences at MAHEC's new residency program addresses this critical gap by training general surgeons for rural practice. In 2017, the 5-year program welcomed its first 8 residents (PGY1 and PGY2) and expanded in 2018 with 5 residents per class for a total of 25 by 2020.

Surgical Rotations

- Acute care
- Breast
- Burns
- Colorectal
- Emergency
- Endocrine
- Endoscopy
- Hepatobiliary
- ICU
- Pancreatic
- Pediatric
- Rural hospital
- Transplant
- Trauma
- Vascular

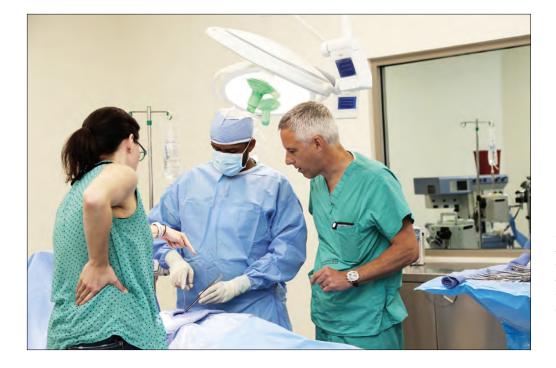
Impact of adding 1 general surgeon to a community:



- 50% of 2017 residents had NC connection; 60% in 2018
- More than 1,500 surgical procedures performed by residents in their first 6 months of the program
- Broad general surgical training at WNC and UNC hospitals: Angel Medical Center Charles George VA Medical Center
 - Chanes George va Medical Cern
 - Haywood Regional Hospital
 - Mission Hospital
 - Pardee Memorial Hospital
 - **UNC** Hospitals

"One of the reasons I applied to the MAHEC residency is because it focuses on underserved communities. I'm sold on staying here."

-Harold Campbell, MD, PGY2 General Surgery Resident



Marc Duverseau, MD, PGY2 General Surgery Resident, practices on a manikin in the Simulation Center as Rachel Morris, MD, PGY1 General Surgery Resident, and Michael Schurr, MD, Surgery Residency Program Director, look on.

Psychiatry Residency Program

Psychiatry Residency Program

UNC Health Sciences at MAHEC's Psychiatry Residency Program is one of the few in the nation where residents are provided with extended training in primary care settings where most rural patients typically receive support for behavioral health conditions.

Psychiatry residents will provide direct inpatient and outpatient care and consultative support for primary care physicians across the region treating more complicated behavioral health conditions including opioid and substance use disorders. All residents are trained in medication-assisted therapy for opioid dependence.

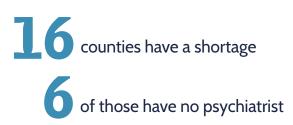
Generalist focus ensures rural behavioral health needs can be addressed for:

- Children and adolescents
- Elderly
- Pregnant women
- Primary care patients

WNC has higher rates of:

- Substance use disorders
- Suicide
- Depression and other behavioral health disorders
- Opioid-related injuries, hospitalizations, and overdose deaths

As of January 2018, all 16 WNC counties are considered Mental Health Professional Shortage Areas.



Residents in 2017

Residents in 2018 Residents in training annually by 2020

16



Program faculty Olgierd Pucilowski, MD, with PGY1 Resident Thomas Campbell, MD.

"I like this program's forward thinking approach to solving system-wide challenges through telepsychiatry and by working collaboratively with primary care physicians to expand mental health resources."

-Thomas Campbell, MD, PGY1 Psychiatry Resident



Simulation Center

UNC Health Sciences at MAHEC's stateof-the-art medical simulation center provides physicians, residents, and health sciences students with the opportunity to practice life-saving procedures without putting patients at risk.

Our new 15,000-square-foot simulation center was completed in May 2018 and has operating, trauma, and labor and delivery rooms that simulate real-life hospital scenarios with highfidelity manikins, task trainers, and surgery, endoscopy/ laproscopic bronchoscopy, ultrasound, and virtual reality simulators.

Medical Simulation Scenarios

- Emergency care
- Intensive care
- Obstetrical emergencies
- Psychiatric emergencies
- Trauma

Regional Trainings held in Sim Center

- Basic Life Support in Obstetrics
- Advanced Life Support in Obstetrics
- EM-FM Point-of-Care Ultrasound
- Neonatal Resuscitation Training
- Airway Management for Rural Providers
- School Nurse Clinical Competency
- Nurse Refresher Trainings
- UNC SOM Student Rotations

Rural Hospitals Receiving Training

- Angel Medical Center
- Blue Ridge Regional Hospital
- Cherokee Indian Hospital
- Harris Regional Hospital
- Transylvania Regional Hospital

EM-FM POCUS

across the region. Since January 2017, more than 100 providers from 8 WNC counties have received POCUS training.

1,735 learners from 15 WNC counties trained in the Simulation Center

> 223 simulation programs conducted **123** rural providers trained in emergency obstetrics

32 rural providers trained in life-saving airway management

"This was the most helpful 'class' I've ever taken."

-WNC Physician Assistant

Simulation instructors

trained in 2017



Scheduled for training in 2018



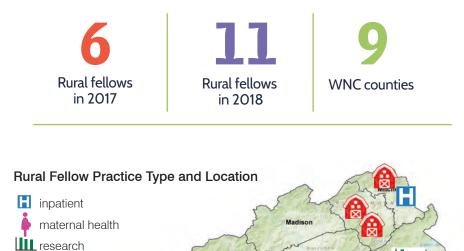
Katie Myrick, UNC SOM Asheville Campus MSIV student, performs point-of-care ultrasound in the Simulation Center.

Rural and Specialty Fellowships

Rural health fellowships help new physicians establish successful practices with extended faculty support, dedicated time for clinical training to support rural health needs, and preceptor development to increase the supply of rural teaching faculty.

Specialty fellowships allow physicians to develop specialized skills where rural resources are most lacking including pediatrics, pulmonary critical care, and hospice and palliative care.

Learning hubs are being developed with successive fellowship cohorts to provide mentoring support for rural physicians practicing in more remote areas.



Unique Features

Clay

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🚷 rural

- UNC Health Sciences at MAHEC faculty mentorship
- Cohorts reduce professional isolation
- Monthly Project ECHO® trainings

Jackson

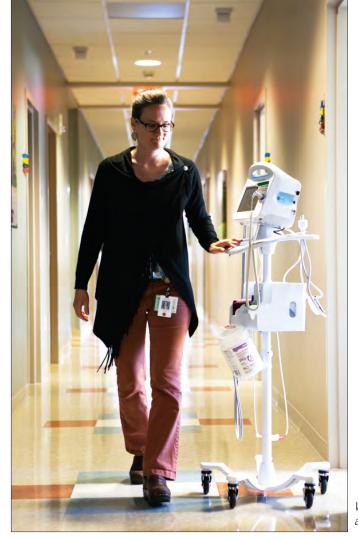
- Collaboration with Rural Pharmacy scholars
- Rural teaching tools for medical students

2018-19 Program Expansion

- Rural research fellowship
- Combined MPH degree option
- Rural inpatient/outpatient hybrid fellowship

"The greatest benefit of the rural health fellowship, for me, has been the gift of time. The first months in practice as a new physician can be overwhelming as you shoulder new responsibility for your patients. Having protected time to devote to deepening my understanding of the medical complexities I'm managing, and being able to focus some of my energy on thinking about broader issues particular to my practice has been invaluable. The connection back to UNC Health Sciences at MAHEC faculty, resources, and other learners has also been a great asset."

Winona Houser, MD, 2017 Family Medicine Residency Program graduate, practices and precepts medical students at Cherokee Indian Hospital in Swain County.



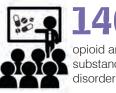
Although the UNC Health Sciences at MAHEC campus is located in Asheville, NC, our work to transform healthcare through scholarly research, education, training, and best practice models encompasses 16 primarily rural counties in Western North Carolina.

In 2017, we launched a number of state-funded rural health initiatives to address our region's most intractable healthcare challenges including rural health disparities, healthcare provider shortages, and the opioid epidemic that has affected Appalachia more than any other area in the nation.

Our rural teaching practice in Rutherford County provided training opportunities for family medicine residents and health sciences students from Western Carolina University.

WNC Opioid Education and Training since 2017





opioid and substance use disorder courses 365 pregnant women treated for substance use disorders



500+ patients supported with integrated care for opioid/substance use disorders (240 with buprenorphine)

Project ECHO®

This innovative virtual learning model connects UNC Health Sciences at MAHEC's medical experts with rural providers to share knowledge so they can effectively treat chronic and complex health conditions.

ECHO® training topics include:

- Asthma
- Autoimmune disorders
- Behavioral health conditions
- Chronic pain
- Diabetes
- Hepatitis C
- Hypertension
- Opioid use disorder
- Medication-assisted therapy
- School heath needsSeizure disorders



Josh Schachtman, MSW, LCSW, leads a Project ECHO® teletraining for school nurses from across WNC as part of a 10-session series on school health topics.





WNC counties

84

providers trained

UNC Health Sciences at MAHEC's Health Professions Center for Education provides opportunities that inspire and prepare students to pursue healthcare careers in Western North Carolina, where all 16 counties have been designated as health professional shortage areas. Our programs span K-12 through medical school to create a pipeline of well-trained healthcare professionals to improve health in our region for generations to come.

In 2017, more than

1,100 students,

including minority and under-represented students, were provided with clinical education, internships and fellowships



Misty Cox, MedServe Fellow at MAHEC, guides McDowell High School students through a Project PROMISE pig dissection workshop.

2017-18 Health Professions Pipeline

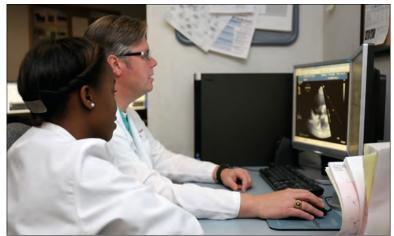
K-12 Health Careers Education

- More than 700 students participated in Project PROMISE workshops
- Education provided in 5 WNC counties with plans to expand in 2018
- 59 high school students have completed the Minority Medical Mentoring Program (MMMP) since 2006
- 5 pipeline students employed at UNC Health Sciences at MAHEC

9106 of Project PROMISE participants said the workshops encouraged them to pursue a healthcare degree

9296 of minority students felt the medical mentoring program was important in shaping their interest in healthcare

"It was a very informative workshop, and I would love to come back!" Project PROMISE participant



MMMP Intern Symone Simmons joins Todd Hansen, MD, in the cardiac cath lab.

Center for Health Professions Education Undergraduate/Graduate

College and Post-Graduate Internships

- 21 student interns and fellows in 2017; expanding to 27 in 2018
- 50 UNCA summer interns since 2013
- MedServe Fellow Misty Cox starts medical school (UNC SOM) fall 2018

23 UNCA Summer Interns

are enrolled in or have graduated from medical, pharmacy, dental, physician assistant, or nursing schools or are working in a medical field



2017 UNCA Intern Marcia Thacher shadows MAHEC Family Medicine faculty Melissa Hicks, MD.

"This internship has confirmed and solidified my decision to go into medicine...It's a hands-down, 100% YES!"

-Marcia Thacher, 2017 UNC Asheville summer intern

Clinical Training for Health Sciences Students

- WCU program expanded from family nurse practitioners to include nurse leadership, behavioral health, dietetic students
- WCU health sciences students increased from 12 to 21 (75%)
- WCU clinical rotations increased from 20 to 39 (95%)

250 health sciences students

were supported with rotations, preceptors, and housing

"I applied for this program because I knew I'd have exceptional training. UNC Health Sciences at MAHEC has a strong focus on education. I knew I wouldn't be treated like an afterthought."

—Angela Zarella, RN, WCU FNP Scholar



Kristie Ponce, RD, LDN (far left), and Fred Stichel, RD, LDN (far right), precept two WCU Dietetic Interns at the MAHEC Family Health Center at Biltmore.

UNC Health Sciences at MAHEC Building Opens Spring 2019

Construction began in December 2017 on a new 37,000-square-foot building on MAHEC's Biltmore Campus to house the interdisciplinary programs that are the foundation of UNC Health Sciences at MAHEC including the UNC SOM Asheville Campus and the UNC Gillings MPH Program in Asheville.

The new building will be completed in spring 2019 and will include classrooms, an inter-professional learning café, and incubator spaces that will bring together family medicine clinicians, pharmacists, public health professionals, researchers, residents, medical students, health sciences learners, and community partners from across the region.

Our academic health center will encourage collaborative innovation on a campus that also houses family medicine, dental, and ob/gyn practices, residency programs, a research department, a state-of-the art medical simulation center, and continuing professional development programs across healthcare disciplines.

UNC Health Sciences at MAHEC is uniquely poised to transform rural healthcare in Western North Carolina and across the state and nation.



UNC Health Sciences at MAHEC

Strategic Initiatives UNC School of Medicine - Asheville Campus Expansion	Tota \$	I Expenditures 1,300,000
UNC Gillings Master of Public Health Program in Asheville		1,536,000
Pharmacy Residency Program Expansion Pharmacy Research Partnership with UNC Eshelman		809,000 918,000
Research Division Expansion		1,837,000
General Surgery Residency Program Psychiatry Residency Program Rural Family Medicine Residency Program Expansion Family Medicine Residency Program Expansion		2,618,000 1,694,000 976,000 490,000
Simulation Center		642,000
Rural and Specialty Fellowships Rural Health Initiatives Rural Teaching Center		2,020,000 1,249,000 622,000
Center for Health Professions Education Programs		1,816,000
UNC/MAHEC Faculty Collaborative Partnerships		114,000
Annual Recurring Expenditures for UNC Health Sciences at MAHEC	\$	18,641,000





For more information about UNC Health Sciences at MAHEC or any of MAHEC's programs or services, visit www.mahec.net.