Faculty
Under the chairmanship of Dr. Jay Magaziner, PhD, MSHyg, the Department of Epidemiology & Public Health (EPH) consists of 56 primary faculty and more than 100 secondary, and adjunct faculty--comprising a multidisciplinary environment of epidemiologists, clinicians, health economists, behavioral scientists, and occupational physicians. The faculty pursues interests in biostatistics and bioinformatics, cancer epidemiology, gerontology, health-care service delivery and outcomes research, toxicology, preventive medicine, maternal and child health, women's health, problem gambling, health disparities, population health, infectious diseases, and other subdisciplines.

Funded Research
The Department of Epidemiology and Public Health (EPH) was awarded $45 million in extramural funds in FY19, an increase of about 25% from FY18. This translates to $978,072 per faculty member. The 2018 Blue Ridge Report on NIH funding ranked EPH #4 among like departments in schools of medicine nationwide and ranked EPH #1 among public institutions. Two faculty, Owen White and Jay Magaziner, ranked among the top 20 NIH-funded faculty in schools of medicine nationally in 2018. Departmental faculty work closely with other units inside and outside the School of Medicine including the Center for Vaccine Development, the Division of Infectious Diseases, the Department of Obstetrics & Gynecology, the Division of Human Genetics, the University of Maryland Comprehensive Cancer Center, and the Departments of Medicine, Neurology, Surgery, and Rehabilitation Medicine. The Baltimore Veterans Administration Medical Center, the Maryland Department of Health & Mental Hygiene, the Baltimore City Health Department, the Maryland Office on Aging, serve as both placements for the EPH residency program and collaborators on EPH research projects.

The Division of Biostatistics and Bioinformatics
Members of the Division of Biostatistics and Bioinformatics are engaged in research in a wide variety of substantive and methodologic areas. The division serves as a resource to the University community by participating as collaborators in research projects with other investigators, generally contributing biostatistical or methodologic expertise to the projects; teaching biostatistics and epidemiologic methods to medical students, graduate students and researchers on campus; providing short-term statistical consultations; actively participating in the campus-wide "Statistical Interest Group", a campus-wide group which organizes seminars and consolidates resources of use to statisticians. Faculty interests include longitudinal data analysis, random effects models, methods for nonignorable dropout, biostatistical methods for clinical trials, categorical data analysis with misclassification or incomplete classification, evaluation of biomarkers, proxy reliability and validity, statistical methods in epidemiology, meta-analysis, infectious disease models, mixture models, survival analysis, recurrent count data, and segmented polynomial models.

The Division of Cancer Epidemiology
The Division of Cancer Epidemiology brings together faculty who conduct population research to identify environmental, lifestyle and genetic determinants of cancer risk and outcomes and to elucidate mechanisms underlying these associations. Faculty conduct research on a wide array of environmental and lifestyle exposures including viruses, pesticides, hormones, diet, and physical activity; inflammatory, metabolic, and endocrine responses; and germline and somatic genetic and epigenetic changes associated with cancer risk. The Division aligns closely with the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center where all faculty are members of the Population Science Program, which fosters collaborations across the University of Maryland Baltimore as well as with faculty at the University of Maryland College Park. The Division of Cancer Epidemiology has an international presence and partners with investigators in Nigeria to understand the basis for global disparities in cancer risk and outcomes and to identify remedies.

Division of Gerontology
The Division of Gerontology is an academic unit involved in research, teaching, and service in the areas of health and related topics relevant to older persons. Based in a unique interdisciplinary academic environment, the program emphasizes applications of epidemiological, gerontological, and biostatistical principles to understanding and managing the health and health care of older adults and maximizing function. The Division
of Gerontology comprises a core group of 9 doctoral-level faculty specializing in issues on aging. Staff includes four program coordinators and data analysts, a three-person administrative core, and technical/field staff members. Core research areas in the division include hip fracture recovery, Parkinson’s Disease, telehealth, mobile health technology, diabetes, multiple morbidities, and cognitive impairment.

The division has a long history of collaborative research with faculty in other departments in the School of Medicine and other schools on the UMB campus, as well as with faculty at the VA and other local universities, government and industry partners specializing in chronic and infectious diseases of the older persons, psychosocial aspects of health, and health services research. Given the complex intersection of aging and health, the division’s research is conducted across a variety of settings such as primary care, acute care, assisted living facilities, long-term care, and in the community. Division faculty conducts observational research and clinical trials using primary and secondary data. Close ties are maintained with other health professional schools and the Division of Gerontology and Clinical Geriatrics and other divisions in the Department of Medicine, Department of Neurology, Department of Physical Therapy and Rehabilitation Science, the Veterans Administration Geriatric Research, Education and Clinical Program (GRECC), the UMB Claude D. Pepper Older American Independence Center, and the UMB Geriatrics Education and Research Program (GGEAR). The division is administrative home to the UMB Center for Research on Aging, the Claude D. Pepper Older Americans Independence Center, and Doctoral Program in Gerontology.

**The Division of Genomic Epidemiology and Clinical Outcomes**

The Division of Genomic Epidemiology and Clinical Outcomes brings together a core group of faculty with expertise in outcomes research as it applies to the health care system. The division houses nationally-known experts in infectious diseases and genomic epidemiology.

Members of the division include physicians who direct Infection Control and Hospital Epidemiology at the University of Maryland Medical Center and the VA Maryland Healthcare System, as well as researchers from the Institute of Genome Sciences.

Faculty members have expertise in clinical and health care epidemiology, quality improvement research, technology assessment, clinical decision-making, healthcare administration, policy and economics. The research interests of the group are diverse and include: a) the study of infectious diseases; b) antibiotic-resistant organisms; c) healthcare-associated infections traumatic brain injury in the geriatric population. Sponsored funding for the division exceeded $5m for FY19.

**The Division of Translational Toxicology**

The Division of Translational Toxicology is an academic unit that conducts research on the environmental and human health effects of chemicals, serves as a resource for chemical risk assessment issues, and provides graduate level training through the Graduate Program in Life Sciences. Faculty in the Division have expertise in molecular, cellular, and behavioral neurotoxicology, neuroanatomy, and neuroendocrinology. The research interests of the group include: (i) action and effects of neuroactive drugs and toxicants on synaptic transmission and neurotransmitter receptors, (ii) health effects of organophosphorus insecticides in adult and developing organisms, (iii) endocrine regulation of cellular functions in the central nervous system, and (iv) neuroprotective effects of neuropeptides in various neurodegenerative disorders including Parkinson’s disease and Alzheimer’s disease. Research in the division relies on the use of a multidisciplinary approach that involves in vitro electrophysiology, behavioral toxicology and pharmacology, histology, and molecular biology. In addition, faculty have experience with studies compliant with the principles of good laboratory practices (GLP) to support development of drugs to treat ailments induced by toxicants.

The laboratories in the Division house four fully equipped patch-clamp recording set-ups with infrared-assisted videomicroscopy, one set-up for recording field potentials and LTP, sixteen units for telemetric electroencephalographic (EEG) recordings (Data Sciences International, St. Paul, MN). The EEG units are in a dedicated room with light-controlled settings near a surgical suite equipped with stereotaxic frames and anesthetic vaporizers. Laboratories for behavioral experiments using rodent models (mice, rats, and guinea pigs) are equipped with open field arenas, dark/light boxes, Plexiglas cylinders for the forced swim test, elevated zero mazes, Accuscan activity cages, Coulborn Instruments stations for passive avoidance, water mazes with custom-designed escape platforms and inserts for 8-arm radial water maze and water T-maze. All
laboratories dedicated to behavioral experiments are equipped with cameras and Any-maze video-tracking systems for online data acquisition and analysis. Wet laboratories are also equipped with a microtome, a vibratome, plate readers, HPLC systems, digital scales, spectrophotometers, osmometers, pHmeters, -80°C and -20°C freezers, microscopes for fluorescence imaging, and a Step-One-Plus instrument from Applied Biosciences for quantitative RT-PCR. Equipment for gel electrophoresis and transfers, in addition to a ChemiDoc XRS+ system from Bio-Rad for gel and blot imaging and analysis are also available in the laboratories. One of the laboratories has a fume hood dedicated for handling of hazardous organophosphorus chemicals. A culture room is fully equipped with biosafety cabinets and incubators for preparation and maintenance of primary cultures and cell line cultures.

The Division of Preventive Medicine
The Division of Preventive Medicine focuses on prevention of disease and promotion of well-being of children and adults in Maryland, the United States, and around the world. Faculty members are involved in training physicians in preventive medicine and public health, teaching epidemiology and prevention to MPH, medical and graduate students, and conducting research on risk factors and prevention of acute and chronic diseases and injury at home, in the workplace, and in the community.

Clinical and Translational Research Informatics Center (CTRIC)
The Clinical and Translational Research Informatics Center (CTRIC), led by Dr. Kathleen Tracy, offers a variety of services to help researchers gather high quality data and translate findings into meaningful outcomes. CTRIC provides assistance with research design, power and sample size calculations, data collection, data capture and storage, data management, data analysis, and scientific writing. Data can be captured using a variety of methods, including electronic scanning of paper forms, web-based data entry, manual keying of data and extraction of data from existing data sources (e.g., electronic medical records). Data are stored in a secure, relational database repository and appropriate audit trails for all changes are maintained. CTRIC adheres to robust research practices in order to provide maximum protection of the confidentiality, security and backup of data collected.

The Center maintains 6 Fujitsu scanners, software licenses for Teleform, SAS, Stata, StatTransfer, SPSS statistical analysis software, Oracle, and a Dell PowerEdge server that is used exclusively to run CTRICs programs and to securely store research data. Staff includes one data capture technician, one statistical analyst (MS level), one senior database engineer, one database programmer (MS level), one research supervisor (PhD level), one doctoral graduate student, and four research specialists.

Offices
The offices of EPH investigators are located on the first, second, and fourth floors of the UMB School of Medicine in Howard Hall and on the second, third and ninth floor of the Medical School Teaching Facility (MSTF) building. Office are fully equipped with a PC’s networked to a color, multifunction printers that serve as copiers and scanners.

Laboratory
The EPH has approximately 12,300 square feet of laboratory space on the 9th floor of the MSTF building and 800 sq ft of wet laboratory space in Howard Hall. This space consists of laboratories equipped for research utilizing whole animals, cell culture, and human samples.

Computer
Our LAN consists of approximately 30 servers (mostly virtual on ESX 6.X), 1300 workstations, 282 network printers and 1200 users. The LAN is spread out in 19 different buildings touching 3 different local networks (UMB, School of Medicine, FPI(Faculty Physicians Inc.) Each of these networks are secured with a firewall and Intrusion detection systems. All networks are inter-connected via high speed fiber. Active directory is used for authentication and security. Sql 2016, PostgresqI and mySQL are used for databases, EMC Isilon for file storage and Windows 2016 print services for network printing. Office 365/Outlook is used for email, calendar etc. Skype for business and OneDrive for business are also being utilized. All UMB campus policies are followed.
Security

All servers are located in a campus data center secured with lock and key and/or electronic badges systems. Security alarms, environmental controls and fire suppression are also standard. All data centers have conditioned air/power and servers/network equipment are elevated from the floor to help protect against floods. Server console screens are always locked when not in use. Server operating systems include Windows 2012/2016 Server and Linux appliances. All servers sit behind a campus firewall and other enterprise security solutions. All services open to the Internet are protected with 128-bit SSL encryption or VPN. Servers open to the public are in a DMZ and/or behind a firewall.

All servers and workstations are protected with Symantec Endpoint Protection 14 with weekly scans and real-time scanning protection. Virus definition patterns are updated continuously. A system-wide Anti-Spam/Anti-Virus solution is in place at the internet gateway as the first level of protection. E-mail is protected by Microsoft/office 365 to detect and eliminate spam, malware and phishing attempts. It is also used to automatically encrypt sensitive data if detected. Advanced Threat Protection by Microsoft is being tested to further enhance e-mail security. Multifactor authentication using Duo is used to protect all remote access systems. Servers utilize Nessus agents to scan for vulnerabilities and are remediated within 30 days.

“Strong cryptography and security protocols (e.g. TLS, IPSEC, SSH, etc.) are used to safeguard Confidential Information or PII during transmission over open public networks.”

PHI/Sensitive Data is secured on network attached storage in a “PHI Zone” network segment which implements enhanced access controls requiring multi-factor authentication and end-to-end encryption. Data is also stored on hardware encrypted drives to provide for encryption of data on physical media.

Mobile Device Management

Mobile devices are primarily used to access Outlook/Office 365 apps and are protected by Microsoft Intune. All communication is encrypted, a 4-digit pin is required to power on the device, 10 unsuccessful password attempts wipe all data and we have the ability to wipe the device if fallen into the wrong hands. A 4-digit pin or fingerprint technology is used to unlock a device. Authentication to privileged wireless networks on campus is done with 802.11x against our directory.

Patch Management

All Windows computers have Automatic Updates enabled. Every Windows computer is setup and locked down via policy to download and install all critical patches. MicroFocus Zenworks 17 Patch Management is also used for Windows and 3rd party application patch management.

Workstation/Workstation Security

Workstations are custom-built Windows 10 is the standard for desktop operating systems, however, we also have Apple. Symantec Endpoint Protection 12 is used to protect workstations from viruses/malware and each workstation runs a full virus scan weekly. Virus definition patterns are continuously updated and deployed to all workstations. Screen savers are enabled on each computer and are set to engage after 15min of inactivity. Users must enter their network password to unlock the screen saver. All of these settings are locked down by gpo and cannot be modified by the user. All users have general user security privileges and do not have administrator rights. All laptops are encrypted with SecureDoc or Bitlocker to protect sensitive data at rest. Workstations utilize Nessus agents to scan for vulnerabilities and are remediated within 30 days.

Software

Software licenses are the responsibility of the end user and/or division unless provided by IT. The I/S staff also provides limited support for UMMS clinical applications. Microfocus Zenworks Configuration Manager is used to distribute and maintain workstation software, hardware inventory, policy management and remote control capabilities. Micro Focus Service Desk 7.03 is used to track service requests from the end users.
New Accounts

Authorized users may request new accounts using an online portal secured by their network credentials.

Password Changes

The I/S staff will change passwords in the presence of the account owner or pin validation. Passwords meet and exceed UMB’s password policy. Intruder detection is in place to lock out an account after 7 failed attempts to minimize brute-force attempts at cracking passwords. A user portal is now in place to allow users to change/reset their own password securely using challenge response questions.

File System Rights Changes

All file system rights changes must be submitted to the users respective administrator and/or owner of the directory, who must approve the rights request.

Backups

Full backups are run on all servers weekly and incrementals are performed the rest of the week. Veeam is used to backup all servers to disk and tape. Monthly tapes are sent off-site to First Federal in the event of a major disaster and never over-written. Each backup job runs a verification process to ensure real data has been backed up. The last few days of data on departmental servers are copied to tape for airgap protection against Ransomware.

Disaster Recovery

All on prem servers and their data are replicated to a secondary datacenter blocks away from the primary site. In the event of server/san failure, we can failover to our secondary datacenter with a maximum data loss of 1 hour for our file server and 1 day for other servers.

Media Disposal

Media is disposed of and destroyed using UMB’s Hitech contract.