DIVISION REPORTS

GERIATRIC MEDICINE

NEIL M. RESNICK, MD

Division Chief and Thomas Detre Professor of Medicine
Associate Director, Aging Institute
Director, Hartford Center of Excellence in Geriatrics

Our mission is to enhance the health of older adults – by providing superb clinical care, training others to do the same, and conducting research to ensure that tomorrow's care is better than today's. With the national declines in funding, we have increasingly relied on *innovation* as our primary strategy for achieving our goals. This year, although the advent of COVID-19 effectively divided the year into two parts it also showcased each of these aspects. Highlights are described below, and details are provided in the sections that follow.

Clinically, prior to COVID, we enhanced our shared savings program with UPMC's Health Plan; by adding patients, exceeding quality benchmarks, and improving efficiency, we saved >$1 million. In addition, we built on the success of our telemedicine efforts, which had previously reduced unplanned nursing home transfers, contributed to our two successful $20 million CMS Innovation Center grants, and led UPMC Enterprises to sponsor our creation of Curavi Health™: in FY19, CuraviHealth acquired a New York telemedicine company; it now serves >150 nursing homes in 14 states and recently merged with 2 other companies to form Arkos.

We also employed several initiatives to help UPMC reduce readmissions: (1) we expanded our Geriatric Trauma Service, which provides a proactive approach to >2000 older trauma patients admitted annually to UPMC Presbyterian (PUH); propensity analyses showed that we cut readmissions by 42%. (2) Our delirium prevention (HELP) program at UPMC Shadyside continued to cut readmissions hospital-wide, consistent with its prior performance (*JAGS* 2018). (3) With radiology, we devised a new program to reinsert PEG tubes in NH patients and avoid ED visits. (4) We initiated a novel transition service for older TAVR and heart failure patients discharged to NHs. (5) With orthopedics, we enhanced our Fracture Liaison Service (*JBMR* 2017) to ensure that, in addition to fracture repair, older patients receive appropriate therapy for osteoporosis; the service, which reduced recurrent fracture from 10% to 1.5%, is now the model for the National Osteoporosis Foundation, and we are working with UPMC Health Plan to scale it.

We also continued two novel ambulatory geriatric subspecialty services: geriatric cardiology and geriatric chronic pain, and we partnered with nursing to sustain our delirium prevention rooms, both at UPMC PUH and Mercy hospitals. We also continued working with UPMC Mercy to create a Geriatric Center of Excellence; in FY20, Mercy achieved NICHE and Geriatric Emergency Department certification as well as Age-Friendly Health System recognition. Finally, we recruited a new Clinical Chief and a clinician, and we were again highly ranked by *U.S. News and World Report*.

COVID-19: Thus, when COVID arrived, we were well-positioned to lead key initiatives to help vulnerable older adults. We initiated eConsults and successfully transitioned our own patients to telehealth so that visit volumes and quality metrics returned to pre-COVID levels by June. We provided medical management to all of UPMC's 35 post-acute facilities, 24/7. We helped UPMC to create and deploy "swat teams" to test its SNF patients onsite, and we assisted its hospitals with difficult transfer decisions. We employed our telemedicine expertise to link the City's EMS service to ED doctors, often enabling them to test patients onsite and avoid the need for ED transport. By galvanizing Pitt's healthcare students, we were also able to respond to the state's plea to help the 600 post-acute facilities in Western PA with concerns regarding PPE sourcing, testing, management, admission and transfer decisions. In turn, the program's success provided an opening to work with legislators to craft and unanimously pass a bill that allocated $175M to create a similar program statewide, which allowed us to partner with local healthcare systems to lead it in the west. These efforts also forged alliances which -- combined with Pitt's expertise in virology and our own in SNF research -- enabled us to respond to NIH's requests to assist with COVID research focused on frail seniors, including trials of convalescent

plasma, vaccines, and diagnostic testing. Finally, one of our faculty members, Dave Nace, who also serves as President of AMDA, was asked to join the White House Coronavirus Commission for SNF Quality and Safety.

Educationally, we again filled our fellowship and T32 slots with excellent trainees. We substantially enhanced our rotation for medical residents, and our new geriatric pharmacist launched a widely circulated "Phast Phacts" newsletter. We also expanded and enhanced our required interdisciplinary medical school training course which now comprises >200 students from 10 healthcare disciplines; the course is led by Dr. Rollin Wright who also published her innovative hospitalist and dementia teaching modules in *Annals of Internal Medicine Online*. Finally, our Pepper Center provided a university-wide leadership training program for junior faculty members in aging.

In ***research***, we found that: (1) a low-intensity multifaceted educational approach can reduce inappropriate antibiotic use by 25% in nursing homes and cut the incidence of C Diff by two-thirds (Nace, *JAMA Int Med*); (2) nearly 40% of patients discharged from hospital to a nursing home suffer an adverse event, the majority of which could be prevented (Handler *JAMA Int Med*), (3) the state of the art approach to preventing falls among seniors at highest risk is of limited benefit (STRIDE [Greenspan, Resnick], *N Engl J Med*); (4) hospitals' focus on preventing falls is misguided and should instead focus on maintaining mobility (Rubin, *JAGS*); (5) among incapacitated ICU patients, discussions often fail to include the patient's own values and preferences (Scheunemann, *JAMA Int Med*); (6) by contrast with women aged 50-70, among those over age 80 who have taken a bisphosphonate for 5 years, it is more cost-effective to continue the drug for 5 years than to take a drug holiday (Greenspan, *Osteop Int*); (7) focusing on both nocturia and a behavioral approach to enlarge bladder capacity could provide a safer and possibly more effective approach to insomnia than drugs (Tyagi, JAGS);(8) contrary to USPSTF guidelines, screening for intimate partner violence among older women is warranted given its prevalence and impact (Makaroun, *JAMA Netw Open*); and (9) changing the paradigm of preclinical testing should improve the relevance of such testing for novel Alzheimers drugs (Rizzo, *Alz Dement*).

In addition, we continued our collaboration with Dr. Toren Finkel and UPMC's Center of Excellence in the Biology of Aging, expanded our NIH-funded Center of Excellence in Long-Term Care Research, and renewed our T32 in Gerontology as well as our NIH Center of Excellence in Aging (the "Pepper"). Finally, faculty members secured new NIH funding, won research awards; continued to serve on editorial boards as well as advisory boards of NIH, CDC, ACIP, AGS, and NOF, and as consultants to CMS, HEDIS and NQF, as well as the state. And Dr. Nace was appointed to the White House Coronavirus Commission for Safety and Quality in Nursing Homes.

Pittsburgh VA/GRECC: After receiving a prestigious GRECC 20 years ago, our VA reallocated its geriatrics services to other service lines. In April, it decided to rethink this approach and named one of our faculty members, Steve Handler, to the newly-created position of ACOS for Geriatrics. Dr. Handler will remain a key Division faculty member, and we will partner with him to build on the considerable accomplishments of our existing GRECC faculty. In fact, our first success was the joint recruitment in May of Jennifer Pruskowski, PharmD, an outstanding geriatric pharmacist.

CLINICAL ACTIVITIES

We focus on prevention and management of the complex medical and psychosocial problems that afflict older adults. Even excluding our VA efforts, we are responsible for thousands of ambulatory visits and hospital discharges, and nearly 15,000 long term care visits at 13 different facilities. In addition to our clinical volume, which is large for an academic geriatric Division, our effort comprises several special features:

- *Physician Excellence:* 15 of our faculty are now in *America's Top Docs* and/or *Best Doctors in America.* And of <50 UPMC physicians (of >7500) to receive UPMC's Award of Excellence in 2020, 3 were from our faculty.
- *Vertically-Integrated Care, Across the Entire Health Care Spectrum* for thousands of our patients.
- *Chronic Care Management (CCM):* We were the first NCQA-certified Patient Centered Medical Home designed specifically for *geriatric* patients (Gennari A et al. *Cleveland Clin J Med* 2012; 79: 359-66). We have now augmented it by creating a program to manage patients with multiple chronic conditions in compliance with the new CCM billing code. The program is based on patient goals, involves all members of the care team, and is designed to *anticipate* and *avert* problems in our most complicated patients.

- *Group Visits:* For >15 years, Dr. Towers has led one of the first such programs in an academic center.
- *Integrated Geriatric Subspecialty Care:* Consultative care is provided by fellowship-trained geriatricians, many of whom have additional training in cardiology, chronic pain, gait/mobility, sarcopenia, falls, osteoporosis, pulmonary/critical care, sleep disorders, incontinence, rheumatology, depression, dementia, audiology, or palliative care. DXA testing is provided by a dually-trained geriatric endocrinologist (Dr. Greenspan).
- *Geriatric Pharmacists and Social Workers:* Our geriatric pharmacists review medications, provide education, and counsel patients (cf: Gavini, Gennari, Ruby, *Consult Pharm* 2015;30:153). This service is especially important for patients recently discharged from the hospital or SNF and for those on warfarin. Our social workers serve both inpatients and outpatients. They help with care transitions, family conferences, and end of life/palliative care discussions. They also provide resources to address care deficits and financial issues, and they educate patients and families on a variety of topics including dementia and insurance coverage.
- *Emergency Care:* Both UPMC Magee and UPMC Mercy now screen for delirium in every older patient in the Emergency Dept., and pharmacists review the medications of every patient with a positive screening test.
- *Hospitalist and Consult Services:* At Shadyside, we staff a geriatrics hospitalist service and a consult service.
- *HELP Program:* Based on Dr. Inouye's program and led by Dr. Rubin, this service prevents delirium, reduces readmissions, and saves >$7 million/yr since 2008 at UPMC Shadyside (Rubin, *JAGS* 2006, 2011, and 2018)
- *UPMC Presbyterian (PUH) Geriatric Trauma Service:* Dr. Scandrett initiated this service in 2016 to meet the needs of >2000 older patients admitted annually to our Level 1 trauma hospital. Readmissions were cut 42%.
- *Fracture Liaison Service (UPMC PUH-Shadyside):* Dr. Greenspan created this national model to ensure that, in addition to surgical repair, those with a fracture are evaluated and treated for osteoporosis (*JBMR* 2017).
- *Telemedicine Service* for all of our institutionalized residents, both after hours and on weekends.
- *Teledementia service* created by Dr. Rossi for VA patients and caregivers too far away to come to Pittsburgh
- *Transitional Care Management/Readmission Prevention:* Each of our patients is contacted within 48 hours of hospital discharge to review their progress, medications, unanticipated problems, and plans for medical follow-up. *Uniquely, we have a similar process for our patients discharged from SNFs.* In addition, for each readmission, the clinicians involved (PCP, hospitalist, NH physician, pharmacist, social worker, and/or home care) strive to identify interventions to prevent future readmissions, both at the patient and the system level.
- *Advanced Heart Failure:* A new unit, created at UPMC's Canterbury SNF, is led by Drs. Hassan and Mathier and designed to reduce readmissions following discharge of patients with TAVR or advanced heart failure.
- *Program for All-Inclusive Care of the Elderly (PACE):* Directed by one of our adjunct faculty and working closely with the Division, this multisite program allows frail elderly to continue living at home.
- *Nursing Home (NH) and Assisted Living:* We provide care for hundreds of these residents, as well as training and medical leadership for more than 3 dozen facilities to improve care and reduce unnecessary admissions.
- *Provision of Non-Reimbursable Services:* our readmission prevention service, an anticoagulation program for frail patients, Lifeline® even for those unable to pay, 55 Alive (to assess driving safety), and respite care.

RESEARCH ACTIVITIES

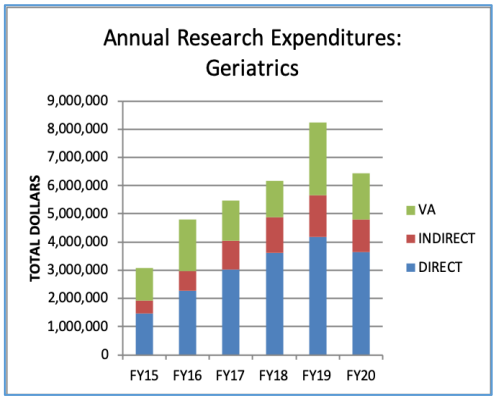
Our goals are to: conduct cutting-edge research to improve the health of older adults and train the next generation of investigators to do the same. Areas of inquiry include biology of aging, mobility/falls, frailty/sarcopenia, cardiology, chronic pain, osteoporosis, polypharmacy, incontinence, insomnia, rehabilitation, elder abuse, telemedicine, and long term care. Our funding contributed to Pitt's ***being among the nation's top recipients of NIH funding in aging***.

Our faculty was again recognized for its research. More than 50 of their abstracts were accepted for presentation at annual meetings of the American Geriatrics Society, Gerontological Society of America, and AMDA. Dr. Scheunemann won DoM's Research Day Award for Health Services/Epidemiology, Dr. Makaroun won AGS' Presidential Poster Award

for Epidemiology, Dr. Gurkar spoke at the TEDxPittsburghWomen event on chronological versus biological aging, and Dr. Nace received the 2019 ABIM/AMDA Choosing Wisely Champion award.

Division faculty also served on editorial boards and as visiting professors, committee chairs, and keynote speakers at national and international meetings. For instance, Dr. Newman is Editor of the *Journal of Gerontology: Medical Sciences* and Dr. Nace is Associate Editor of *JAMDA*; Dr. Greenspan is President of the National Osteoporosis Foundation. Drs. Greenspan and Newman served on NIA's Board of Scientific Counselors and NIA's External Advisory Council, respectively, while Dr. Greenspan served on NIA's Clinical Trials Advisory Panel; and Dr. Forman served as Chairman of the American Heart Association's Committee on Older Populations.

With departure of 5 investigators to prestigious positions elsewhere, we have been rebuilding for the past 6 years. Figure 1 solely reflects funding at Pitt for which we serve as PI. *It omits $1.5 million of our VA research funding, in addition to funding of the Aging Institute, of Dr. Newman, and of projects for which we serve as co-investigator*.



Current Division-led research: *(1)* ***NIH Centers/Program Projects***: a P30 Pepper Older American's Independence Center (Greenspan), a T32 to train in geriatrics/gerontology (Greenspan/ Finkel), a Center of Excellence in Chronic Pain (Weiner), and a Leadership K07 to create a Long-term Care Research Network (Greenspan); *(2)* ***NIH R01/R56/R21s***: Nitrite for HFpEF, and a modified approach to geriatric rehab (MACRO; both R01s [Forman]), PREVENTABLE (Forman, site PI), CNS mechanisms mediating treatment response in overactive bladder, and brain mechanisms involved in urge incontinence (two R01s, Resnick), pathophysiology and behavioral therapy of nocturia (two R21s, Tyagi), CNS mechanisms underlying situational urgency (R21, Clarkson), neural resilience in mobility impairment (Rosano/Hanlon), zoledronic acid for osteoporosis in institutionalized elderly (R01, Greenspan, Nace, Resnick), efficacy of denosumab for osteoporosis in long-term care (R01, Greenspan, Nace, Resnick), innovative approach to geriatric osteoporosis (R01, Greenspan), a PCORI trial of home- vs. center-based cardiac rehabilitation (Forman); STRIDE, a pragmatic NIH/PCORI-funded trial to prevent injurious falls among high risk elderly (Greenspan/ Resnick); R00 supplement (Gurkar); *(3)* ***CMS/CMMI-funded:*** RAVEN to reduce SNF transfers (Handler, Nace)*; (4)* ***VA:*** role of hip arthritis in chronic low back pain (Weiner), development and validation of clinical prediction rules in seniors with lumbar spinal stenosis (Weiner), patient-centered vs. image-directed treatment of chronic low back pain (Weiner), a telemedicine approach to improve care of community-based dementia patients (Rossi), and elder abuse in veterans (Makaroun); *(5)* ***Career Development:*** Dr. Nadkarni's K23 on Alzheimers; Dr. Scheunemann's K08 on ICU Survivors; *(6)* ***AHRQ grants:*** reducing adverse drug events in nursing homes (Handler, Hanlon), improving outcomes of UTI in long-term care facilities (Nace), telemedicine to transform medication review for high- risk drugs in the nursing home (Handler), and two complementary grants to devise and implement a novel antibiotic stewardship intervention for nursing homes (Nace); *(7)* ***Pitt/UPMC funding:*** factors involved in premature and delayed aging using next generation DNA sequencing (Greenspan/Resnick); transcranial stimulation to treat urge incontinence (Clarkson), and medical marijuana and chronic pain in older adult (Nadkarni/Weiner)

Collaborations with non-Division PIs include: *(1)* ***P01/P50s:*** Alzheimer's (ADRC, Lopez/Rodriguez, Nadkarni), Molecular Transducers of Physical Activity Centers [MotrPAC, Forman/Jakicik]); sarcopenia mechanisms (SOMMA, Forman/ Newman/Nadkarni); mechanisms of stochastic damage of aging (Robbins, Perera), new approaches to urinary tract dysfunction due to spinal cord injury (Kanai, Perera); biomechanical, biological and behavioral phenotypes (Weiner, Sowa); *(2)* ***R01s:*** a task-specific approach to improving gait and mobility (Brach, Perera), osteoporosis risk in smokers (Greenspan, Bon), activating patients with osteoporosis (Saag, Greenspan), aging's impact on urothelial function (Resnick, Birder), impact of obesity on body composition, gait, and function in older adults (Cham, Perera), assessing the impact of improved vitamin D status on vascular health and metabolic syndrome risk (Rajakumar, Greenspan), Reducing Sedentary Behavior RESET BP (Kline, Perera); investigating exercise-associated gains in neurocognition (Forman, Erickson); metformin for pulmonary hypertension (Forman, Simon) *(3)* ***R56/R21/R24/R18s****:* biomarkers to

predict lung function decline in physiologically normal smokers (Perera, Sciurba), establishment of the research infrastructure to facilitate analyses of Medicare Advantage plans (Gurwitz, Greenspan), dissemination of a diabetes prevention program in seniors (Venditti, Greenspan), and a PCORI-funded trial to examine exercise for fracture prevention in community elderly (Greenspan/McTigue) and another to devise and evaluate a novel group exercise program to reduce falls in assisted living facilities (Brach, Perera); (4) ***K01:*** to devise a falls risk monitoring algorithm using a data mining technique (Boyce, Perera); (5) 3 **VA Merit Reviews:** patterns, determinants, and consequences among veterans receiving opiates from VA and non-VA sources (Gellad/Hanlon), improving safety and appropriateness of prescribing for demented veterans who receive drugs within and outside of the VA (Hanlon/Gellad), and cumulative CNS drug dosage and serious fall injuries (Hanlon, Thorpe) (6) ***Pitt/UPMC Funding:*** Toolkit for nursing home care (Handler, Harris), immune fingerprinting signatures in predicting successful aging (Greenspan, Perera, De Vallejo).

Our **research training grants** support junior faculty, fellows, and medical students. Our T32, which was recently refunded, now includes collaboration with the Aging Institute and an initiative with Dr. Jonassaint, Vice Chair of Diversity and Inclusion, to recruit URM trainees. Dr. Studenski's former NIH K07 Leadership Award created an enduring Concentration in Aging Research for Pitt's Clinical Research Training Program. Our Pepper Center incorporates an REC core, led by Dr. Resnick, which trains junior faculty in leadership and administration. And Drs. Nace and Wright collaborated on the university's HRSA-funded Geriatric Education Center (GWEP).

TEACHING ACTIVITIES

In addition to the research training described above, Division faculty members teach trainees at every level, from high school student to practicing physician. We also teach advanced practice providers and trainees in pharmacy, nursing, psychology, chaplaincy, physical/occupational therapy, and social work.

Medical Students

Led by Dr. Wright, we teach an innovative and required week-long interprofessional geriatrics course for >200 students from the schools of medicine (MS-3), nursing, dentistry, pharmacy, and allied health (OT, PT, Speech, Social Work, Nutrition/Dietetics, Audiology, and PAs). Evaluation shows improved knowledge, attitudes, and skills in geriatric medicine and team-based practices. In addition, Drs. Scheunemann and Resnick direct a novel *Geriatrics Area of Concentration,* which enables medical students to "major" in geriatrics (12 in FY20). In FY20, Dr. Wright mentored 2 medical students; 1 received the 2020 David C. Martin award and was invited to give 2 poster presentations at national conferences. Finally, we sponsor scholarly projects for 3-7 students/year, many of whom are funded by our T32.

Medical Residents

All residents devote 6 weeks to geriatrics training in the clinic, home, hospital, and nursing home settings. In addition, we offer an innovative Geriatrics Track that enables 4-9 residents to "major" in geriatrics in which they base their continuity clinic in geriatrics and also care for panels of homebound patients. We also offer 4 advanced geriatrics rotations which, in FY20, attracted 3 track residents and 1 non-Track resident. Several of these innovations have been featured at national AGS meetings, including the "Roadmap," milestones, and pharmacology QI projects as well as a new curriculum to teach residents how to communicate and work with patients and families living with dementia. In addition, Dr. Wright helped mentor 1 track resident and 1 non-Track resident for their education research projects.

Geriatric Medicine Fellowship

In FY20, under Dr. Scandrett's leadership, we graduated 4 excellent fellows. Each submitted abstracts accepted for presentation at AGS, AMDA, and DOM's Research Day, and two published articles. Two are continuing in academic geriatric medicine positions, one began an endocrinology fellowship, and one accepted a J1 waiver position as a geriatric hospitalist at a community hospital. Three excellent new fellows matched for FY21, and we are developing a new initiative to recruit more fellows from our own residency program.

Advanced Practice Provider Students

We continue to train both Physician Assistant and CRNP students in acute care geriatrics.

High School Students (University of Pittsburgh Health Scholars Academy)
The Division teaches in this highly competitive — and highly rated — statewide summer program on aging; 25 elite high school students from throughout Pennsylvania are selected to participate each year.

Continuing Medical Education (CME)
Recognized by a national award from AGS, our annual CME course again attracted 400 attendees from >20 states. Dr. Greenspan continues to teach programs on osteoporosis which she helped to create for the American Academy of Family Medicine, ISCD, and the National Osteoporosis Foundation. Several faculty led "Meet the Professor" sessions at national meetings (e.g., ACP, AGS).

Other
Our faculty author chapters on aging for major textbooks, including *Cecil's Medicine* (Resnick; Greenspan), *UpToDate* (Weiner), Braunwald's *The Heart* (Forman), and *DiPiro's Pharmacotherapy* (Hanlon). Division faculty have also developed national geriatric curricula for surgical subspecialties, including ENT, urology, and gynecology.

QUALITY INITIATIVES
Our initiatives focus on each relevant setting. Some highlights include:

Ambulatory Care
Telemedicine : With COVID restrictions, we have incorporated telemedicine visits into clinical practice and plan to continue offering these visits to our high-risk patients next year. We also began offering *eConsults in EPIC*, which enables us to provide geriatric coverage to medical practices in surrounding and more remote areas.

Chronic Care Management (CCM): For patients with frailty and/or multimorbidity, we develop a care plan in the context of their goals, life expectancy, and functional status. By using this information to develop an action plan and to reach out between office visits to assess progress, we qualify for CMS' chronic care billing code. This enables us not only to defray the costs but also to provide targeted, multidisciplinary care from pharmacists, social workers, and CRNPs to additional patients, as well as same day appointments and continuity of care between care settings. These initiatives led to a 97% score on CG CAHPS. Based on our success, other departments have now begun to implement the model.

Transitional Care Management: In FY19, to determine whether Medicare's new TCM billing code could enable us to further improve our transitional care, we hired a pharmacy technician to identify, track, and coordinate transitions for all of our patients discharged from a hospital, rehabilitation facility, or SNF. This year we shifted the task to our LPNs who ensure that each patient is called within two business days of discharge to address questions, unexpected problems, and any anticipated difficulty in returning for follow-up within two weeks. The program has been well received by patients, staff, and physicians, and it won the "2019 People's Choice" award at the UPMC PUH-SHY Quality Fair. By tracking its efficacy and cost, we hope to be able to systematize the program and disseminate it.

Depression: We continue our CRNP-led depression screening and management program. Based on the PROSPECT study, which was developed by our geropsychiatrists' (JAMA, 2004), we screen each of our patients with the PHQ-2, followed as needed by the PHQ-9. A positive score triggers the provider to evaluate and treat the patient according to an algorithm that we adapted with input from our geropsychiatrists. Patients are followed for 6-12 months by an interdisciplinary team that monitors response and assists with problem-solving.

Annual Wellness Visits: To offer this valuable service to more patients, in FY20 we began scheduling patients to automatically see a CNP before or after their routine PCP visit. The focus is on preventive services, immunizations, diet and exercise, and advance directives. We continue to garner top scores for preventive services across UPP.

Dementia Care Assessment and Management Initiatives: Funded by HRSA's Geriatric Workforce Enhancement Program (GWEP), we (Dr. Wright, Dr. Nace, and Ms. Jones) collaborated with Geriatric Psychiatry (Dr. Whyte) and the School of Nursing (Dr. Mathews) to develop and pilot a new dementia assessment program using CMS' newly-approved cognitive assessment and non-face to face prolonged service codes. We are now expanding the program by training additional providers and by offering cognitive impairment eConsults to scale it across the UPMC Health System.

Emergency Care

In 2015, we and our colleagues in the Magee-Women's Emergency Department became one of just two US programs selected to work with leaders from the American College of Emergency Physicians and the Society of Academic Emergency Physicians to improve care of older emergency patients. Funded by the Hartford Foundation, our first project began with development of a quality improvement program to enhance detection and management of delirium. Repeated QI cycles improved nurse-administered screening of older adults from 33% to >90% and the rate of physician confirmatory testing to 85%, with a positive screen triggering a pharmacist review of medications. To enhance reliability, we incorporated the tools and process into the EMR, which also enabled us to disseminate the program to UPMC Mercy. We are now developing a standardized care plan for admitted patients and refining educational tools for patients and family. Follow up of patients with a positive score is underway to determine who can be safely discharged from the ED and the support required. A presentation of the MWH ED experience was accepted at SAEM conference in May 2020.A second project recently began to improve pain management for geriatric patients. The goal is to train ED physicians to provide regional anesthesia with femoral blocks for patients with hip fractures.

Inpatient Care

Magee Acute Care and Transitions Program (ACT): Our program was based on two tenets: optimal geriatric care requires *anticipating* problems and *preventing* them, and improved *systems* can help to do so. Led by Dr. Visoiu, over 8 years we identified new problems in medication reconciliation (Marcum et. al. *J Am Geriatr Soc* 2015 [2 articles]), expanded and enhanced our Geriatric Consult Service, and worked with orthopedics to improve protocols for all fracture patients. *Within 2 years, we documented ≥50% reduction across the entire medical service in ALOS, falls, complications, and readmissions (cut to 10%), which we sustained for years*. Unfortunately, faced with staff turnover, an unforeseen faculty shortage, and increased demand for our help on the UPMC PUH Trauma service, we had to suspend the MWH ACT although we continue to provide UPMC Magee with inpatient Geriatric consults.

Delirium Reduction: Led by Dr. Visoiu, we worked with leaders in psychiatry, nursing, ED, and IT to design a Pathway to improve the approach to delirium in older patients. The goal is *universal* screening, prevention, and enhanced interprofessional management, from the ED to the wards. As described above, we integrated ED screening of all patients >65 years old. Unexpected departures of key faculty and UPMC's CMIO delayed further intervention, so we switched our focus to reducing nursing documentation, partnering with UPMC's CNO (Lorenz) and CQO (Minnier). We found that documentation could be substantially streamlined; for instance, we reduced required nurse documentation for a new admission from 36 electronic screens to 8. The hope was to use the freed up time to enable enhanced screening and intervention – not only for delirium but for other problems as well. Unfortunately, the initiative was suspended owing to UPMC's new partnership with Microsoft and anticipated changes in the EMR. Fortunately, under Dr. Rubin's leadership, the successful HELP program continues to reduce delirium at Shadyside on 11 wards (*JAGS*, 2017). In addition, under Dr. Tadic's leadership, and with support of two grants from the Beckwith Foundation, we worked with nursing at UPMC Mercy to implement a delirium screening and prevention program for the medical service as well as a new activity room for demented patients who are at increased risk for delirium; both have been effective.

Supportive Services Program: Developed in partnership with UPMC's Health Plan and the Section of Palliative Care, early analyses proved that this program improved care and saved over $500,000/year. Based on its success at UPMC's PUH, Dr. Tadic launched a new base at UPMC Mercy in FY14 where, over the past 6 years, it has also generated a demand for consults on patients not insured by the Health Plan. Both sites are staffed by a nurse who is backed up by faculty members from geriatrics and palliative care. By identifying and consulting proactively on high risk patients, our goal is to minimize complications, ensure a seamless post-discharge transition, and reduce readmissions.

Geriatric Medicine Trauma Consult Service at PUH: We continue providing geriatric consultation for high risk patients at PUH, in partnership with general medicine. Propensity analyses by the Wolff Center in FY18 documented a 42% reduction in readmissions for such patients despite being selected for increased vulnerability. In FY20, we initiated a Geriatric Trauma Morbidity & Mortality conference, which generated quality improvement opportunities to: (1) improve delirium management; (2) revise order sets to reduce deliriogenic prescribing (e.g., remove diphenhydramine from the platelet transfusion order set); and (3) reduce inappropriate cervical collar use in frail older adults.

Fracture Liaison Service (FLS): As national pressure mounts to decrease length of stay, most fracture patients are now discharged without assessment or treatment of the underlying cause. With extramural funding, Dr. Greenspan designed this novel service, which increased bone density screening in such patients from 9% to 72% and appropriate medical treatment from 4% to 45%. This would have translated into an improved rating in the HEDIS measure from 1 star to 4 stars. More importantly, it was accompanied by reduction in the re-fracture rate from 10% to 1.3%. Based on these results, UPMC has supported the program which is now the model advocated by the National Osteoporosis Foundation.

Home Care

Living at Home (Dr. Rodriguez, Medical Director): This team-based preventive program collaborates with PCPs to provide advanced care coordination for roughly 500 high risk community-dwelling elderly with evidence of inadequate social support and cognitive and functional compromise. Nurses and social workers make home visits to assist with managing medications, keeping medical appointments, arranging in-home and community services, and defining goals of care. Results have been excellent (Castle, Resnick. *J Applied Gerontol* 2014), and participation in the program has been consistently associated with lower rates of emergency department visits, hospitalizations, and institutionalization.

Long-Term Care (LTC)

COVID-19: The Division played a critical role in COVID-19 management at LTC facilities, both within and beyond UPMC. Working with UPMC Senior Communities, we established a COVID-19 Command Center along with policies and processes to minimize infection. As of June 19, only one resident had become infected in UPMC's 36 facilities on 21 campuses. The lack of secondary cases reassured staff of the effectiveness of our PPE plans and usage. Also, in collaboration with the Wolff Center and Senior Communities, we implemented a PCR testing program. By July, 2020, >6000 tests had been completed (2100 residents and 3900 staff) with 0.85% and 0.77% positivity rates, respectively.

Impact beyond UPMC: The Division's work was shared with PA's Departments of Health and Human Services, and was also used to establish national guidance for long-term care (LTC) facilities through AMDA (paltc.org/COVID-19) and the CDC. In addition, it helped create a public-private collaboration with the PA Department of Human Services that we were asked to lead: the Educational Support and Clinical Coaching Program for Southwest PA (ESCCP-West UPMC). ESCCP provided consultative support and facility assessment related to COVID-19 to all 600+ regional long-term care facilities. It also served as a learning opportunity for medical and nursing students who participated in the outreach and consultations. Moreover, based on program's success, PA House Speaker Turzai asked us to submit a similar statewide proposal. The resulting Act 24 is providing $175 million to six regional health systems. Funds will be used over 6 months for testing, onsite assessment, and advanced clinical management in the Commonwealth's 1900 LTC facilities. UPMC and AHN are together overseeing the 600 facilities in SW and NW Pennsylvania.

Reducing Unplanned Admissions: Led by Drs. Nace and Handler, in collaboration with UPMC Senior Communities, we created a comprehensive program to reduce unplanned admissions from nursing homes (NHs) to the hospital. It focuses on 4 issues: a) better understanding of patients' care goals, b) earlier detection of deterioration, c) improved team communication, and d) use of clinical care pathways. The program reduced unplanned admissions across UPMC-owned NHs by 45%, from 4.9/1000 patient days in Jan 2010 to 2.7 in June 2013, with subsequent plateau. Its success led to our receiving a $19 million CMS Innovation Award ("RAVEN") to implement and evaluate the program in 20 non-UPMC facilities. Based on success of the new program, which netted savings of $5 million (Inger, *Health Affairs* 2017), CMS awarded us another $20 million to sustain the intervention in the same 20 NHs, replicate it in *another* 20 NHs, and test a new payment model for all 40 NHs that pays both them and their practitioners to provide higher-level care on site. The RAVEN program will continue through October 2020.

Telemedicine: Led by Dr. Handler, and in coordination with Curavi, in FY19 we expanded our telemedicine service still further. Acquisition of New York's TripleCare has enabled us to now cover >150 NHs across 14 states. In addition, we expanded our hours of coverage, from 84 to 108 hours of night and weekend coverage per week. As of July, 2020, our combined entity has conducted more than 65,000 consults resulting in >12,000 avoided hospitalizations.

Teledementia: Led by Dr. Rossi, we continued our innovative VA teledementia program (*JAGS* 2017) and added more VA partners from across the country. Together they are utilizing national VA and CMS databases to evaluate the novel program's health impact, as well as its effect on polypharmacy and under-prescribing. In 2017, Dr. Rossi added a new component: telesupport for those who care for these challenging patients. The program has decreased caregiver burden, and in FY20 she began expanding the intervention into patient's homes.

Dementia Care Management Initiative: Since 2011, the Division has led the Pennsylvania Dementia Care Partnership, which has effected a 30.1% decrease in antipsychotic use statewide. In addition, by emphasizing an interprofessional approach in our own UPMC Senior Communities facilities, we have reduced antipsychotic use across our own facilities to 14.6%, and the rate at two-thirds of our facilities is now below the state average.

Antimicrobial Stewardship – Under Dr. Nace's leadership, and funded by AHRQ, the Division is spearheading new approaches to antimicrobial stewardship in long-term care. First, he helped to develop a national antimicrobial toolkit (https://www.ahrq.gov/nhguide/index.html). Second, he and his colleagues completed the Optimizing Antibiotic Stewardship in LTC Settings (OASIS) project, which involved 12 sites in Wisconsin and PA. Employing a systems approach, they compared antibiotic prescribing workflows at each site. After identifying problems in communication and collaboration between nursing staff and prescribers as the highest priority, the team developed and implemented a post-prescribing review ("antibiotic timeout" [Ramly, JAGS 2020]). Third, since suspected UTI is the leading cause of inappropriate antibiotic use in the LTC setting, Dr. Nace launched the "Improving Outcomes of UTI Management (IOU)" project. As part of this study, the team developed the first evidence-based guidelines for diagnosis and treatment of uncomplicated cystitis and tested them in 25 facilities (12 intervention and 13 control sites). The intervention led to a 27% reduction in inappropriate treatment of asymptomatic bacteriuria, a 17% reduction in overall antibiotic use for UTI, and a 67% reduction in *C. difficile* infections, all without a change in mortality or hospitalizations (Nace et al, *JAMA Intern Med* 2020). The guidelines and tools have now been disseminated to all of the original control sites and to two more dissemination cohorts, reaching >50 homes across the country. Based on this work, Dr. Nace received a 2019 grant from the PA Department of Health to train nurses, prescribers and pharmacists to use the Modified Medication Appropriateness Index for Uncomplicated Cystitis (MMAI-UC), a modified version of a tool used in the IOU study. This work is important because current measures of antibiotic stewardship report utilization but not the more important aspect – appropriateness of use. Dr. Nace's team is now working to study implementation of the MMAI-UC as a quality measure with possible incorporation of the tool into the National Healthcare Safety Networks (NHSN) reporting system. For this work, Dr. Nace and his team received the 2019 ABIM/AMDA Choosing Wisely Champion award.

Optimal Influenza Vaccines for Older Adults – The Division is collaborating with the Pittsburgh Vaccination Research Group to evaluate the effectiveness of different influenza vaccines in non-frail, pre-frail, and frail older adults. Led by Dr. Nace, this research is also investigating the impact of sarcopenia in vaccine response.