

BLUE SKIES FACULTY FOLIO

# INSPIRED





## Family Influence

Life experiences sparked a passion for geriatric medicine

As a young girl growing up in Berlin, Germany, Elizabeth (Liz) Goldberg decided she wanted to enter the world of medicine. It would not be long before that world entered hers.

The daughter of an Austrian mother and American father, Goldberg recalls attending a German-American school, where she befriended a girl in first or second grade whose mother was a nurse. Liz was fascinated by the stethoscopes and other “medicine-related stuff” lying around the nurse’s home and settled on a faraway goal.

“I think that’s when I realized this is something I could really see myself doing, like really helping people,” Goldberg says.

The early insight later aligned with her natural affinity for science, statistics and problem-solving. She has applied all these skills to helping people with illness and injury – especially older adults – as

Associate Professor of Emergency Medicine at the University of Colorado School of Medicine.

Beyond her childhood aspiration, there were other powerful influences, born of adversity and tragedy, that spurred Goldberg toward medicine and service to others.

### FORMATIVE PERSONAL EXPERIENCE

At 13, she fell critically ill from a ruptured appendix, which led to pancreatitis, IV-administered nutrition, a central line and a month-long hospital stay that included a week and a half in the ICU. During that unhappy time, she found an unlikely source of inspiration: a diary written by an 18th century ancestor on her father’s side who was a midwife in Germany before immigrating to America and settling in Shelby County, Ohio.

Her paternal grandfather, who had a keen interest in the history of



the county, unearthed the book. In it, Goldberg's midwife ancestor recounted how she applied self-taught medical skills she learned in Germany to helping the fledgling New World community. The book included practical insights about caring for people, including the importance of wound care and hygiene.

Lying in a hospital bed more than 200 years later, Goldberg seemed to feel her ancestor speaking to her. "I was like, 'Wow, this is meant to be. I need to become a physician,'" Goldberg recalls.

She ultimately stuck to that intention, but a formative personal experience awaited her. She was just 16 when her mother was diagnosed with breast cancer. As the oldest daughter of three, Goldberg helped to relieve pressure on her father, whose work required frequent travel. She became her mother's primary caregiver during an arduous course of treatment.

"I was her constant companion for all of her appointments," Goldberg says. She drove, communicated with providers and took detailed notes to shield her mother from being overwhelmed by the

barrage of information about her chemotherapy and other treatments.

The final chapter of that care came near the end of Goldberg's undergraduate work at Miami University in Oxford, Ohio. She was preparing to apply for medical school in 2005 when cancer brought her mother near death. Goldberg withdrew from school, returned home to be by her mother's side during the last six weeks of her life. The loss was painful, but eventually helped to fuel an ongoing interest in and commitment to geriatric emergency medicine that has made Goldberg an innovator in the field.

**"A LOT OF THE REASON THAT I WAS ATTRACTED TO [THE DISCIPLINE] WAS BECAUSE I HAD THESE EARLY LIFE EXPERIENCES WITH COMPLEX COMORBIDITIES, END OF LIFE, AND DYING," GOLDBERG SAID.**

After finishing medical school in 2009, Goldberg began her residency in Emergency Medicine at Brown University in Providence,

Rhode Island. The seeds of that choice were planted years before, during her undergraduate years at Miami University. She worked in a research lab, where an emergency physician she met agreed to let Goldberg shadow her during a solo shift in a tiny emergency department in Oxford.

Goldberg was supposed to spend two hours there but was enthralled and stayed the whole night, watching the physician confidently treat patients with nose bleeds, abdominal pain, leg fractures and anything else that came up. Goldberg decided she wanted to be that kind of physician.

"I said, 'I want to be able to treat everything and have a solution for everything at hand,'" she said. "I liked that kind of inventive spirit."

### **NARROWING FOCUS FOR BROADER EFFECT**

The diverse patient population in Providence, which included many Spanish speakers and people of Portuguese descent, gave Goldberg plenty of opportunities to hone her emergency medicine skills. She also built her administrative acumen as chief resident. But during a two-year stint in clinical practice that followed, she concluded that while her residency training had made her confident in her skills as a physician, many of her patients faced broader challenges that she couldn't fully address at the bedside.

"Many people have completely uncontrolled blood pressure and then they come to us with a stroke," Goldberg said. "Wouldn't it have been wonderful if we could have picked up on that 10 years earlier and started them on the right medications and nutrition and things like that? There were these big

questions in public health and injury and prevention that need a more systematic approach.”

That realization led her to pursue a Master of Science in Epidemiology degree at Brown’s School of Public Health, beginning in 2015. The program offered rigorous coursework in statistical methods – skills Goldberg knew she was lacking and that were essential if she wanted to design systems and tools that would help to detect and prevent common issues, like hypertension and diabetes, before they cascaded into even more serious health issues.

At the same time, another door opened: fellowship work at Brown’s Center for Gerontology & Healthcare Research that not only offered her access to mountains of medical information from the Medicare database and other electronic health records, but also sparked what became her career-long passion: improving care for and protecting older people.

**“THAT’S WHEN EVERYTHING REALLY TOOK OFF BECAUSE I REALIZED, ‘OH, I REALLY LOVE AGING,’” GOLDBERG SAID. “THERE ARE SO MANY OPPORTUNITIES WITHIN EMERGENCY CARE TO IMPROVE HOW WE CARE FOR OLDER ADULTS, AND NO ONE IS REALLY FOCUSING ON THIS POPULATION OF COMPLEX PATIENTS THAT OFTEN HAVE REALLY POOR OUTCOMES.”**

Her interest in the personal and professional commitment to those patients became the driving force of Goldberg’s career. She has



served on the Academy for Geriatric Emergency Medicine since 2019 and is currently its past president. She arrived at CU’s Department of Emergency Medicine in 2022 with the goal of exploring innovative ways to protect older patients from their greatest health risks, especially falls, with notable success.

Goldberg’s past ultimately shines a powerful light on her professional path. In addition to youthful memories of glimpsing nurse’s equipment in Berlin, she fondly recalls summers spent with her siblings on her grandparents’ farm in Sidney, Ohio. It was treasured time, especially with her history- and

civic-minded grandfather, a World War II veteran who died recently at 99, leaving her with a sharp appreciation of the past.

“We had really good summers with him,” Goldberg said. “He influenced me a lot.”

While her mother passed away at just 51, the years Goldberg spent caring for her also helped to nurture an appreciation for those in the waning years of life.

“I think both of those factors really played a role in my career,” she said. “And I’ve always enjoyed the older patients I’ve cared for.” ■



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# IMPACT

## Golden Years

Combining practical methods and emerging technology to improve geriatric healthcare and prevent falls

During her emergency medicine residency at Brown University, Elizabeth (Liz) Goldberg recalls working 24-hour trauma shifts at Rhode Island Hospital in Providence. People with varieties of injuries and illnesses came through the doors, but one group stood out.

“I might see 30 people and often two-thirds of them were there because of falls,” Goldberg recalled. The most frequently and badly injured were from Rhode Island’s large older adult population, she added.

“The worst were the ones that couldn’t get up off the floor and spent the whole night there on their own,” Goldberg said. “They came in delirious, dehydrated and critically ill.”

The experience helped to spark in Goldberg a commitment to improving care for older adults. She went on to complete a fellowship at Brown’s Center for Gerontology &

Healthcare Research, and ultimately focused her research – which continues today as Associate Professor of Emergency Medicine at the University of Colorado School of Medicine – on fall prevention.

The human and financial toll of falls is considerable, not only for the injured, but also for their caregivers and the healthcare system, Goldberg emphasized.

“Falls are hands-down the number-one reason for injury-related visits to the ED among older adults,” she said. “We often have to admit them to the hospital because they have a head bleed or a hip fracture. And falls are one of the leading reasons why people have to leave their own homes [for nursing homes].”

### RESEARCHING FALLS

Goldberg’s current research, funded by a five-year Paul B. Beeson Emerging Leaders in Career Development Award from the National Institute on Aging (NIA),



tests an interdisciplinary intervention called GAPcare to prevent future falls while using wearable devices to determine fall risk and outcomes. That award sprung from an initial clinical trial during her fellowship at Brown that tested the GAPcare concept.

The six-month study enrolled patients who came into the ED after a fall, Goldberg explained. Half of them received standard care, while the other received an intervention that included patients meeting with a physical therapist (PT) and a pharmacist. The goal: identify and collaboratively address the reasons for the fall.

For example, PTs might notice a weak or deconditioned patient struggling to steady their gait, maintain their balance or use their walker correctly. With just a few observations and questions, PTs could suggest practical solutions – exercises, equipment adjustments, or small changes at home, for example – to protect against another fall, Goldberg said.

Meanwhile, pharmacists reviewed the number and type of medications patients were taking, with an eye toward flagging potentially harmful drug interactions, as well as drugs that slow cognition or cause dizziness. Pharmacists identified the medications that posed the greatest fall risks for people 65 and older using the Beers Criteria, compiled and maintained by the American Geriatrics Society, Goldberg said.

**THE GAPCARE INTERVENTION ALSO RECOGNIZED THAT FALL RISKS MOUNT AS PEOPLE ARE PRESCRIBED MORE AND MORE MEDICATIONS, GOLDBERG SAID.**



“There are too many people in this country on too many medications,” Goldberg said. “It’s not only the amount of medications that you’re on that is problematic, it’s the type of medication.”

The GAPcare team helped patients consider whether they really needed to be on a medication, and if they were taking the right dose as prescribed, she explained.

With that relatively short medication review in the emergency setting, pharmacists could then recommend medication changes to the patients’ primary care providers for a final decision, Goldberg said.

The trial, which showed that GAPcare was successful in reducing the number of subsequent fall-related and overall ED visits, helped Goldberg secure her Career Development Award funding, which is now in its final year.

### **INCORPORATING NEW TECHNOLOGY**

For this phase of her research, Goldberg drew on both her

memories of the past and her ideas for the future. At about the time that she submitted her grant application in 2019, Goldberg considered that the Apple Watch had developed a new fall-detection feature the previous year. The idea: if a person took a hard tumble, the watch would sense it and allow the person to request emergency services. If the person were unconscious, the watch would call for help itself.

Goldberg recalled her days on the trauma shifts in Rhode Island, treating badly injured fall patients who had lain for hours on floors, unable to reach the help that an Apple Watch could have provided. But she saw new possibilities for preventing falls.

First, a watch and phone app could provide a reliable record of falls – a valuable alternative to the standard method, which required patients, most of them 80 years and older, to maintain a calendar log of their mishaps.

“They have other stuff going on. They don’t want to fill out

calendars,” Goldberg said. “So that was one of our problems in the first trial. We couldn’t get an accurate measure of falls.”

Second, Goldberg saw that in addition to collecting user data passively – think heart rate, blood pressure and step count – a phone app could also involve users in “active tasks,” such as taking tests to measure cognition and reaction time and analyze their walking gait.

“There were all these new digital measures coming out that I thought were relevant to falls, and I incorporated them into the grant,” Goldberg said.

Patients in the current study still meet with a PT and pharmacist after an ED visit for a fall, and all receive digital tests of cognition and function. Goldberg’s research staff makes home visits to help them learn the technology and use the cognition tests and other potential measures of fall risk.

The bottom line for the research, of course, is to reduce the number of falls and injuries in older people and increase providers’ understanding of why they happen, their effects on the brain and body, and how to prevent them, Goldberg said. But she also sees new technology as vital to helping bridge care gaps for an aging population.

**“PART OF THE REASON I GOT INTO WEARABLES AND TELEHEALTH IS BECAUSE WE CAN ACTUALLY DO QUITE A BIT FOR PEOPLE IN THEIR HOMES – ESPECIALLY OLDER FOLKS THAT HAVE MOBILITY AND TRANSPORTATION CHALLENGES,” SHE SAID.**



### MENTORING WITH PURPOSE

Goldberg advocates not only for patients but also for the young physicians and – particularly those of underrepresented in science and medicine – who are vital to strengthening and diversifying the profession that has fulfilled her.

“That’s another piece of my identity,” she said. “We know that in medicine that we all benefit if our workforce is diverse. We need to be champions for them because their path is often harder.”

Goldberg noted that she began her mentoring work in the Providence Public Schools system in 2020 and has been a guiding light for more than one student since joining the CU faculty in 2022.

For example, she met Johnny Gomez Picazo, a senior at University of Colorado Denver, while he was working as a scribe in the ED at UCHealth University of Colorado Hospital. After Picazo

– who is first in his family to attend college – described to Goldberg his goal of getting to medical school, she offered him a position with her research team.

“[Liz] made med school feel attainable,” said Picazo. He helps to recruit patients for Goldberg’s current GAPcare study, assists in writing papers, and analyzes qualitative research. He recently led a presentation explaining a digital pill designed to help patients with dementia comply with their medication plans.

“She has been a very important figure in helping me to build [my skills],” Picazo said. That includes not only the clinical but also the human side of patient care, he added.

“Working as a scribe with Liz, it just seemed like she cares for her patients,” Picazo said. “Something that I would take from her that I would use if I become a doctor is her patient interaction.” ■