

# Gravens by Design: A Tribute to Stanley Norman Graven, MD: A Comprehensive Legacy

## Early Life and Education, in Memoriam

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Stanley Norman Graven, MD, was born in the United States on May 20, 1932. His early academic journey began at Wartburg College in Waverly, Iowa, where he earned his Bachelor of Science degree in 1955. His pursuit of medical knowledge continued at the University of Iowa College of Medicine, where he graduated with his M.D. in 1956. His formative years in medicine were marked by an internship at Madigan Army Hospital, Tacoma, Washington, from 1956 to 1957. Dr. Graven furthered his training with pediatric residencies at The Children’s Hospital in Cincinnati, Ohio, and the State University of Iowa in Iowa City, where he received extensive training in pediatric care.

### **Military Service and Early Research Contributions**

Dr. Graven’s service in the U.S. Air Force from 1960 to 1964 gave him significant opportunities to advance pediatric care. As Chief of Pediatric Services at USAF Hospital-Fairchild AFB, Washington, he established a new pediatric ward that became a model for future pediatric care facilities. His research during this period included pioneering studies on the relationship between cholesterol, lysolecithin, and bilirubin in breast-fed versus bottle-fed infants, contributing to a better understanding of neonatal nutrition and metabolism.

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At Wilford Hall USAF Hospital in San Antonio, Texas, he led the

newborn service and made groundbreaking advancements, including creating the first special care nursery for newborns in the military. Dr. Graven’s work here involved the innovative use of ventilators and intravenous therapy in preterm infants with Respiratory Distress Syndrome (RDS). His research on fibrinolysin therapy for RDS and the genetic basis for RDS in preterm infants was instrumental in improving treatment outcomes. Additionally, he studied the effects of television viewing on children’s fatigue and somatic symptoms, providing insights into the impact of environmental factors on child health.

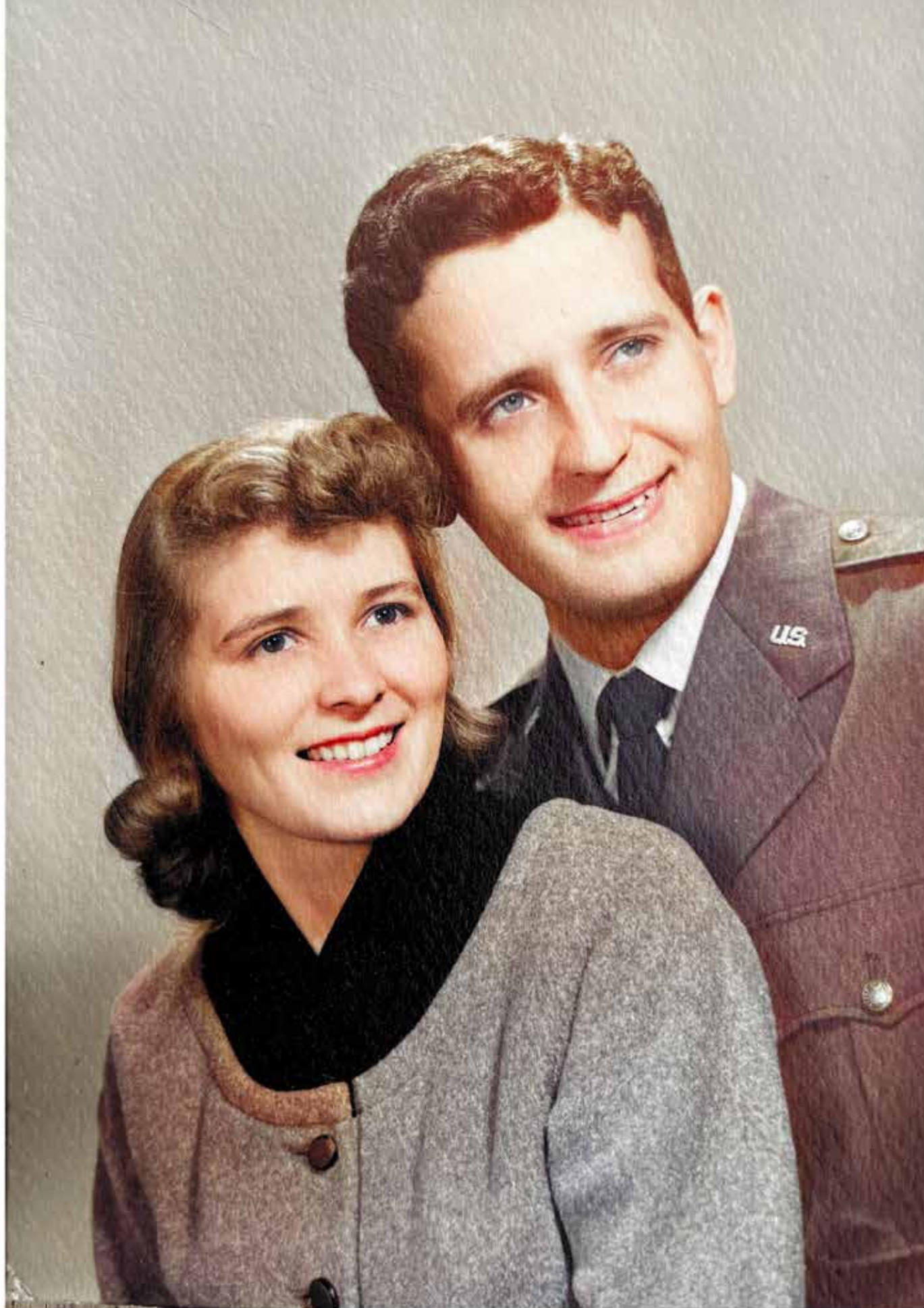
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### **Academic and Research Career**

In 1964, Dr. Graven began his academic career at the University of Wisconsin-Madison as a Research Associate in the Department of Pediatrics and the Institute for Enzyme Research. Under the mentorship of Professor Lardy, he focused on the biochemistry of mitochondrial function, which contributed significantly to the field of enzymology and mitochondrial research. His work during this period included crucial findings on the role of mitochondria in cellular metabolism.

Dr. Graven’s academic ascent continued as he became an Assistant Professor in 1966 and later an Associate Professor and Professor. During his tenure, he was a driving force behind the establishment of Wisconsin’s first neonatal intensive care unit (NICU) and the Wisconsin Perinatal Program. This regionalized perinatal care system was pioneering, offering data on its impact on fetal and infant mortality and setting a precedent for similar programs across the U.S. His research on lecithin and sphingomyelin levels in amniotic fluid provided critical insights into prenatal development and neonatal health markers.

As Chairman of the Committee for Sub-specialty Certification in Neonatology, American Board of Pediatrics, and later Chair of the Sub-Board of Neonatal-Perinatal Medicine, Dr. Graven played a critical role in defining the standards and scope of neonatal care and certification. His efforts to establish the first neonatal nurse



*Mavis and Stan*



clinician program in the United States and publish groundbreaking research on lecithin/sphingomyelin ratios in amniotic fluid were seminal in advancing neonatal care practices.

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#### **Leadership and Contributions to Public Health**

Dr. Graven's transition to Medical Director for Maternal-Child Health at the South Dakota Department of Health in 1976 marked a new phase in his career. His leadership led to the creation of a statewide perinatal program, a comprehensive prenatal and parenting education system, and the establishment of the National Perinatal Association. He also established a neonatal nurse clinician program and developed the Children's Comprehensive Health Care System, which aimed to improve pediatric care infrastructure across South Dakota.

At the University of South Dakota, where he served as a Professor in the Departments of Pediatrics and Obstetrics/Gynecology, Dr. Graven spearheaded the creation of a new NICU with full-time neonatologists and neonatal nurse clinicians. He also initiated a



series of pediatric subspecialty clinics, including those for cardiology, neurology, gastroenterology, and child development. His role as Program Director and Senior Program Consultant for the Rural Infant Care Program and the Egyptian Newborn Care Program highlighted his commitment to improving neonatal care globally. The latter program was instrumental in reducing neonatal mortality related to tetanus in Egypt by legalizing and training traditional midwives.

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#### **Impact at the University of Missouri and University of South Florida**

In 1980, Dr. Graven joined the University of Missouri-Columbia as a Professor in the Department of Pediatrics. His contributions included creating an Infant Development Unit designed to control environmental factors affecting infant development, such as light and sound. His role as a consultant to Missouri's maternal and child health programs and the organization of a multidisciplinary study group on early infant and child development were pivotal in advancing care practices.

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Dr. Graven's tenure at the University of South Florida, starting in 1984, was marked by significant achievements. As a Professor and later Chair of the Department of Community and Family

Health, he built the department from two faculty members to a robust team of eleven academic and thirty-two total staff members. He developed and expanded academic programs, including MPH, MsPH, and PhD programs, and led the creation of the Healthy Beginnings Program. This program aimed to improve public health practices and optimize Medicaid spending for maternal and child health. The Gravens Conference was established to inform and educate about the importance of environmental factors on infant development. Dr. Graven also served as a principal investigator for over fifty grants and contracts, securing over \$4.5 million in funding.

As director of The Lawton and Rhea Chiles Center for Healthy Mothers and Babies from 2000 to 2003, he oversaw initiatives to improve maternal and child health outcomes. As Interim Dean of

the College of Public Health from 2003 to 2004, he managed the college's academic and research functions, further cementing his leadership in public health.

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### **Comprehensive Impact of Dr. Graven's Research in Perinatal and Neonatal Health**

Dr. Graven's research covered a wide range of perinatal and neonatal health topics. Graven's early studies made significant strides in understanding the nutritional management of celiac disease in children. In 1958, Graven and Tomsovic investigated the effectiveness of a gluten-free diet in treating celiac disease, providing crucial insights into dietary interventions for managing this condition. This early work laid the foundation for Graven's future research endeavors.

In the early 1960s, Graven's research expanded to address the challenges of ABO blood group incompatibility and its impact on neonatal health. The 1960 study examined the implications of blood group incompatibility, offering valuable information on its management. In 1964, Graven and Mann focused on the pathophysiology and treatment strategies for hemolytic disease in newborns. This period also saw collaboration with Gomez to explore the use of fibrinolysin as a treatment for respiratory distress syndrome, further advancing the field.

Graven's investigation into neonatal hyperbilirubinemia in 1965, particularly his study on the role of phospholipids, provided new insights into the biochemical mechanisms underlying this condition. His concurrent research on blood lactate levels in respiratory distress syndrome highlighted the importance of metabolic factors in neonatal respiratory conditions.

In the late 1960s, Graven delved into the effects of mitochondrial function and antibiotic use on oxidative phosphorylation. This research was pivotal in understanding the biochemical impacts of antibiotics on neonatal health and mitochondrial function. His exploration of maternal factors and their association with respiratory distress syndrome risk contributed significantly to the field, revealing critical links between prenatal conditions and neonatal outcomes.

In the 1970s, Graven's focus shifted towards developing and implementing perinatal health care programs. His 1973 study emphasized the benefits of regionalized OB/GYN care systems, advocating for a structured approach to improving perinatal outcomes. Subsequent research in 1974-1975 examined amniotic fluid analysis for assessing fetal maturity, which played a key role in advancing diagnostic methods for evaluating fetal development.

The 1974-1976 period was marked by Graven's work on the lecithin/sphingomyelin ratio, a crucial indicator of fetal pulmonary maturity. This research provided valuable benchmarks for assessing the readiness of the fetal lungs for birth, influencing clinical practices related to neonatal respiratory care.

During the late 1970s and early 1980s, Graven concentrated on enhancing neonatal intensive care practices and developing state-wide perinatal outreach programs. His efforts in 1978-1980 to evaluate and improve perinatal care systems highlighted the importance of coordinated care strategies in reducing neonatal morbidity and mortality. In 1991, Graven's research on prenatal nutrition and educational services underscored the impact of maternal health interventions on birth outcomes, contributing to a broader understanding of how prenatal factors influence neonatal health.

In the 2000s, Graven's research shifted towards sensory development in neonates, emphasizing the critical role of early sensory experiences on cognitive and physical development. His studies during this period provided insights into how environmental factors and sensory stimulation affect neonatal development, shaping approaches to early childhood care.

Graven's comprehensive contributions also include developing educational materials on perinatal care and organizing nursery services. His 1983 work provided foundational knowledge for neonatal-perinatal medicine, offering guidance for best practices in neonatal care and program organization.

Overall, Graven's extensive research has significantly advanced the field of neonatal and perinatal health. His work spans decades and includes crucial findings on neonatal care practices, perinatal health care systems, biochemical mechanisms, and developmental outcomes, reflecting a commitment to improving neonatal health through rigorous research and practical applications.

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### Recognition and Awards

Dr. Graven's contributions to pediatric medicine and public health have been recognized with numerous awards. He received the Bordon Undergraduate Medical Research Award in 1956 and was honored as a John and Mary Markle Scholar in 1968. The Stanley N. Graven Award, established by the National Perinatal Association, and the Virginia Apgar Award from the American Academy of Pediatrics are among the many accolades that reflect his significant impact on the field. In 2005, he was awarded the Distinguished Service Award from the University of Missouri-Columbia, and in 2006, the Stanley & Mavis Graven Award was named in his honor.

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### Professional Affiliations and Activities

Dr. Graven's professional affiliations include membership in Sigma XI, the American Academy of Pediatrics, the Society for Pediatric Research, and the American Public Health Association. His leadership roles have encompassed chairing and participating in various committees and task forces on perinatal care, including serving as President of the Wisconsin Association for Perinatal Health Care and consulting for international health programs.

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### Community and Church Involvement

Beyond his professional achievements, Dr. Graven has been actively involved in community and church activities. His service on the Board of Missions for the American Lutheran Church, the Board of Regents for Wartburg College, and various other church-related organizations highlights his commitment to community service and faith-based initiatives.

### Courses and Teaching

At the University of South Florida, Dr. Graven taught a wide range



of courses in the College of Public Health, including Introduction to Maternal Child Health, Program Development and Change Process, and Child Development and Public Health. His dedication to education and mentoring has shaped the careers of many future pediatric and public health professionals.

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***“His dedication to pediatric medicine and maternal-child health has been evident throughout his career, marked by significant advancements in neonatal care and public health initiatives. Today, Dr. Graven continues to be a respected figure in his field, influencing the next generation of healthcare professionals and contributing to the ongoing evolution of pediatric care.”***

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#### **Personal Life and Legacy**

Dr. Graven was married to Mavis Graven for over 70 years. They had four children together. His dedication to pediatric medicine and maternal-child health has been evident throughout his career, marked by significant advancements in neonatal care and public health initiatives. Today, Dr. Graven continues to be a respected figure in his field, influencing the next generation of healthcare professionals and contributing to the ongoing evolution of pediatric care.

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Dr. Stanley Norman Graven’s career is a testament to his enduring commitment to advancing pediatric medicine and public health. His pioneering work in neonatal care, leadership in public health programs, and dedication to education have profoundly impacted the field. His legacy continues through the institutions he helped build, the policies he influenced, and the lives he has improved through his work.

Stanley Norman Graven, MD passed away on July 8, 2024, in Dallas, Oregon. He was 92.

**Disclosure:** The authors have no conflicts of interests to disclose.

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