

REVIEW ARTICLE

Contribution of Dorothy Hansine Andersen in Field of Pediatrics

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ABSTRACT

Dorothy Hansine Andersen was an American physician, pathologist, and paediatrician whose pioneering work transformed the landscape of paediatric medicine. She is best known for identifying and defining cystic fibrosis of the pancreas as a distinct clinical and pathological entity, a milestone that reshaped diagnostic and therapeutic approaches for children worldwide. Through meticulous autopsy analyses, she recognised patterns previously mistaken for coeliac disease and gathered forty-nine similar cases, culminating in her landmark description of cystic fibrosis in nineteen thirty-eight. Andersen further advanced the field by developing early diagnostic tests, including the sweat chloride test, and introducing nutritional and enzyme replacement therapies. Her contributions extended beyond cystic fibrosis to include the characterisation of Glycogen Storage Disease Type Four and significant work in congenital heart disease, where her anatomical collection guided early open-heart surgeries. Despite substantial gender discrimination and institutional barriers, Andersen rose to prominence as Chief of Pathology and a respected academic leader. Her career embodies scientific curiosity, resilience, and dedication, leaving an enduring legacy that continues to influence modern paediatric practice.

KEYWORDS

• Cystic fibrosis • Paediatric pathology • Andersen disease • Glycogen Storage Disease Type Four • Congenital heart defects • Medical history

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INTRODUCTION

Dorothy Hansine Andersen was a pioneering American physician and pathologist whose work reshaped the field of paediatrics. She made history by identifying cystic fibrosis of the pancreas as a separate disease, establishing its genetic basis, and developing early diagnostic and therapeutic strategies. Her contributions extended to metabolic and cardiac pathology, including Glycogen Storage Disease Type Four and congenital heart defects. Despite facing gender-based discrimination in medical training, she built a remarkable career defined by scientific precision, dedication to children's health, and a legacy that continues to influence modern paediatric practice.

Background:

Dorothy Hansine Andersen (1901–1963) was an American physician, pathologist, and paediatrician whose work fundamentally advanced the understanding of childhood diseases. Born in Asheville, North Carolina, she experienced personal hardship early in life. Following her father's death and her mother's deteriorating health, she moved to Vermont and attended St Johnsbury Academy. She later graduated from Mount Holyoke College, navigating her education amid the First World War, the Spanish influenza pandemic, and the loss of her mother, which left her financially independent.

She earned her Doctor of Medicine degree from Johns Hopkins University School of Medicine in the year nineteen twenty-six. Although she aspired to become a surgeon, she was denied a surgical residency solely because she was a woman. Consequently, she pursued anatomy at Strong Memorial Hospital, a shift that ultimately directed her towards pathology and paediatrics.

In 1935, Andersen joined Babies Hospital at Columbia-Presbyterian Medical Center (now Morgan Stanley Children's Hospital) as an assistant pathologist, where she conducted nearly three decades of groundbreaking research. She also completed her Doctorate of Medical Sciences at Columbia University, deepening her expertise in pathology.

SCIENTIFIC CONTRIBUTIONS

Discovery of Cystic Fibrosis

Andersen's most celebrated achievement was identifying and naming cystic fibrosis

(CF) as a distinct disease. During the autopsy of a three-year-old girl initially diagnosed with coeliac disease, she noted abnormalities inconsistent with that diagnosis, including thick pulmonary secretions and pancreatic cysts. She subsequently reviewed similar cases across hospitals and collected forty-nine cases, leading to her landmark description of cystic fibrosis in nineteen thirty-eight.

Her work extended beyond pathology. She developed early diagnostic methods, including pancreatic function analysis and the sweat chloride test, the latter remaining gold-standard diagnostic tool. She also established that CF is inherited as an autosomal recessive trait.

Andersen introduced some of the first treatment strategies: high-protein, low-fat diets, fat-soluble vitamins, and pancreatic enzyme replacement therapy.

Glycogen Storage Disease Type Four

Andersen described Glycogen Storage Disease Type Four, a condition later renamed Andersen disease in her honour. Her meticulous pathological observations helped define its characteristic hepatic findings and clinical progression.

Contributions to Paediatric Cardiology

Her interest in congenital heart defects led her to systematically collect malformed infant hearts. Surgeons performing the earliest open-heart procedures consulted her collection, which became a crucial educational and anatomical resource. Her detailed documentation contributed significantly to the early development of paediatric cardiology.

Challenges and Breakthroughs

Andersen's career was marked by persistent gender discrimination. Denied entry into surgical training solely on the basis of sex, she redirected her path into anatomy and later pathology, a field in which she continued to excel. She progressed to become Chief of Pathology at Columbia-Presbyterian Hospital and a full-time professor at Columbia University.

Her scientific contributions were sometimes overshadowed due to the Matilda Effect the systemic minimisation of women's scientific achievements. Nonetheless, she continued to publish influential work, mentor young

physicians, and challenge prevailing medical assumptions, especially the misdiagnosis of cystic fibrosis as coeliac disease or recurrent pneumonia.

Andersen received several honours, including Honorary Fellowship of the American Academy of Paediatrics and serving as Honorary Chair of the Cystic Fibrosis Research Foundation. In two thousand and two, she was posthumously inducted into the National Women's Hall of Fame.

Reflection:

Dorothy Hansine Andersen's life demonstrates the power of perseverance, curiosity, and scientific integrity. Despite professional and social barriers, she remained committed to evidence-based research and improving the lives of children. Her discovery of cystic fibrosis underscores the importance of questioning assumptions and seeking deeper understanding.

Andersen's achievements continue to inspire paediatric scientists to pursue innovation with compassion and resilience.

CONCLUSION

Dorothy Hansine Andersen's legacy endures as one of brilliance, determination, and compassion. Her identification of cystic fibrosis revolutionised paediatric medicine and continues to influence clinical practice worldwide. By persevering through discrimination and personal adversity, she became an exemplar of scientific dedication. Her life teaches future physicians that

curiosity, courage and commitment can reshape medical science.

Conflict of Interest: The authors declare that there are no conflicts of interest.

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