PROFILE

Katharine H.K. Hsu, MD

By Timothy B. Kirwin

Courtesy Baylor College of Medicine Archives

BIOGRAPHICAL FACTS

BORN
February 12, 1914, Foochow, China

MEDICAL SCHOOL
Peking Union Medical College, MD degree conferred by State University of New York, 1939

RESIDENCY
Peking Union Medical College, Internal Medicine, 1939-1941

Chief Resident in Pediatrics at Shanghai Children's Hospital, 1941-1942

Assistant Professor of Pediatrics and Chief Pediatrician at Chung Cheng Medical College, 1942-1947

In May 1994, Baylor College of Medicine President William T. Butler bestowed to Katharine Hsu, MD, the Service Recognition Award for her forty years of dedicated employment.[1] Distinguished research, teaching, patient care, and scholarship describe Dr. Hsu's long career at the Houston medical school. She initiated groundbreaking medical research that revolutionized the protocols used by the medical community to identify and treat tuberculosis (TB) in children. She made advances in asthma therapy and established standard lung function measurements in children, standards that remain in place today. The impact of Dr. Hsu's medical initiatives has indeed reached international significance.

Katharine Hsu arrived in the United States from her home country of China in October 1948 to complete a yearlong pediatric fellowship at the Cincinnati Children's Hospital in Ohio.[2] Dr. Hsu hoped to learn the latest United States treatment procedures, but discovered that the Cincinnati Children's Hospital admitted few TB patients.[3] She arranged a transfer to the Henry Phipps Institute for Tuberculosis Research at the University of Pennsylvania.[4] The outbreak of the Korean War and the suspension of diplomatic relations between the United States and China prevented Dr. Hsu from returning home after she completed her American Society of Pediatric Research fellowship.[5] In 1951, she secured a position in the United States at the Pennsylvania State Hospital, Mont Alto, where she continued her medical focus of caring for childhood tuberculosis.[6]

In 1953, Dr. Russell J. Blattner, Professor and Chairman of Pediatrics at the then Baylor University College of Medicine (BUCM), contacted Dr. Hsu about joining the faculty of the medical school. Dr. Blattner informed his colleague of Houston's need to implement a tuberculosis control program and identified her as an ideal candidate for such an undertaking.[7] This was quite a prestigious position for a female doctor at the time.

Tuberculosis control was personal, as well as professional, for Hsu. She previously had dealt with the loss of her younger brother and sister and then many of her own patients. Addressing the reason for her attention to tuberculosis, Dr. Hsu stated, "I had a drive to conquer it [tuberculosis] and find a solution that would save others from this suffering."[8] In the early 1950s, Houston certainly qualified as a place where many suffered from tuberculosis, ranking high among U.S. cities in tuberculosis cases.[9] According to a December 4, 1953, *The Houston Post* article, the disease considerably impacted public health. The article cited the potential number of tuberculosis cases throughout the city and discussed the lack of resources committed to its management:

> For the past two years, there has not even been a pretense of a children's tuberculosis diagnostic and treatment clinic in Houston, although the most conservative estimates are that at least 6,000 and probably 10 times that many have been infected or dangerously exposed to the disease by the known 2,300 tuberculars who are walking around uncontrolled in Houston.[10]

Houston's population stood a considerable risk of contracting tuberculosis if the disease continued untreated. Dr. Hsu accepted the position in Houston and maintained a dual role as BUCM pediatric faculty member and as director of the City of Houston's Children's Tuberculosis Clinic. In these capacities, she became instrumental in formulating a medical agenda for combating tuberculosis' widespread contagion in Houston. The challenge of tuberculosis abatement posed a demanding challenge for the pediatrician.

First, Dr. Hsu needed a facility where

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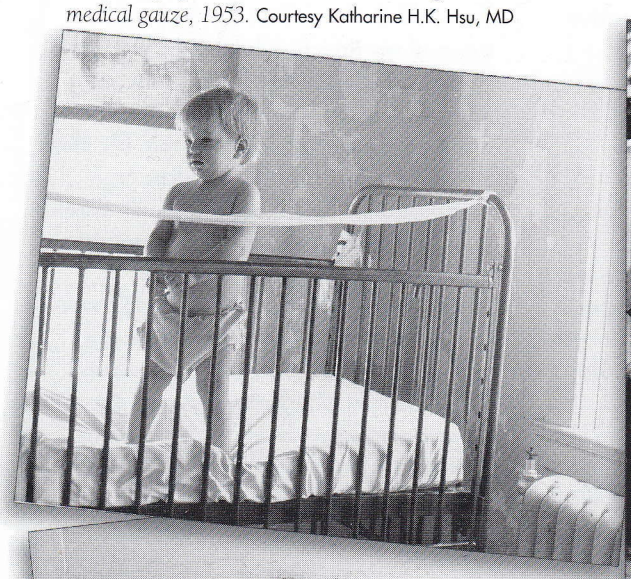
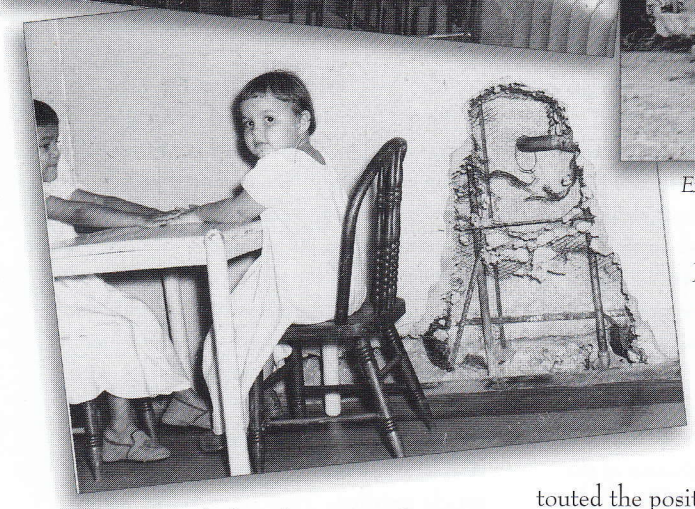
The photograph below shows a crib held together with medical gauze, 1953. Courtesy Katharine H.K. Hsu, MD





The photograph above demonstrates the physical hazards of the building's interior, 1953. Courtesy Katharine H.K. Hsu, MD

Exterior view of the front entrance of the Autrey Building, 1953. Courtesy Katharine H.K. Hsu, MD

she could examine and treat patients, but finding a suitable location presented an obstacle. Houston had only one TB hospital, a further indication of the city's inadequate allocation of resources to the disease. Unfortunately, the TB hospital located on Shepherd at West Dallas cared for adult patients only and the pediatrician required a place to see children.[11]

Initially, she used a small building on the grounds of the TB hospital for evaluating and treating children. *Angel of Mercy*, Dr. Hsu's book with writer Valerie Waller, described the accommodations: "On the grounds of the hospital was a dilapidated building called the Autrey House. Katharine was given permission to use one room on the first floor of that house for a children's TB clinic...with no more than borrowed tables and chairs for furniture, and the assistance of one nurse, Mrs. Ethel Smith." Dr. Hsu opened Houston's first children's tuberculosis clinic in July 1953.[12] At the official opening ceremony in December, Mayor Roy Hofheinz touted the positive impact of such a facility stating that "the children's clinic is the beginning of a new effort in tuberculosis prevention."[13]

Even though the opening of the Children's Tuberculosis Clinic offered a meaningful step in disease control, its placement in the Autrey Building immediately proved insufficient to meet the expanding needs of her patients. The dilapidated building, with its crumbling walls and broken floors, made sanitary conditions arduous if not impossible to sustain. Furthermore, basic furnishings such as cribs, examination tables, beds, and other equipment were absent or in disrepair.

Dr. Hsu recognized that ameliorating the deplorable environment of the clinic would require substantial financial assistance. The Children's Tuberculosis Clinic received such support from devoted Houston philanthropist, R.E. "Bob" Smith. Dr. Hsu's fellow pediatrician at BUCM, Dr. Dora Chao, arranged a visit at the home of Smith and his wife, Vivian. During the visit, Katharine discussed the clinic and presented photographs of the problems that required attention. Smith then visited the clinic to survey the situation firsthand. After seeing the vast needs of the clinic, Smith agreed to fund all of the renovations. The refurbished facility enabled Dr. Hsu and her staff to increase patient loads and to maintain sanitary medical conditions.[14] Dr. Hsu recalled the impact of Smith's generosity saying, "he wrote one check to cover everything—furniture, cribs, beds, equipment. Without his support, Houston might not have had a TB program for a long time to come."[15]

Despite its initial physical problems,

Katharine Hsu views the portrait of R.E. "Bob" Smith, which hangs in the Vivian and R.E. "Bob" Smith Medical Research Building at Baylor College of Medicine, 2001. Courtesy Baylor College of Medicine Archives

Dr. Hsu explains child centered investigation procedures to a patient's family. Courtesy Baylor College of Medicine Archives

the Children's Tuberculosis Clinic provided the environment for Dr. Hsu to initiate her most noteworthy medical research. While operating the clinic, Dr. Hsu introduced two theories that altered the ways the medical community confronted tuberculosis control and prevention. In 1953, she began prescribing the recently discovered drug Isoniazid as a preventive measure to stop TB germs from becoming a destructive disease. Isoniazid, approved for use in the United States in 1952, was the first drug that destroyed tuberculosis bacilli.[16] Previous treatment protocols dictated bed rest in combination with suppressive drugs, which produced varying and uncertain outcomes depending on the patient's response. After many years, some patients would improve, but others, especially children, often died from the disease. Dr. Hsu advocated administering the medication based on positive skin tests prior to active signs of TB appearing. Reflecting on her decision to use Isoniazid she said, "I felt that Isoniazid, if administered as soon as TB germs were detected in the body, might prevent the disease from developing."[17] Underlying the use of Isoniazid stemmed from her philosophy that "you don't wait until a house is half burned down before you try to put out a fire."[18]

Dr. Hsu's hypothesis that Isoniazid might prevent a full-blown condition of tuberculosis was considered radical in the 1950s. Many in the medical community scoffed at her notion of using the drug before the manifestation of symptoms, before patients became ill.[19]

In just over two years after beginning what became known as "INH Preventive Therapy," Dr. Hsu noticed striking results.[20] An April 18, 1956, *Houston Chronicle* article reported on a speech Dr. Hsu made to the membership of the American Academy of Pediatrics. Addressing the crowd of 1,000 pediatricians, Dr. Hsu chronicled the effects of her two-year pilot program. She detailed how prescribing the drug to children who showed positive skin tests, but had not yet developed any outward symptoms of the disease, prevented the disease from maturing. Dr. Hsu told the audience, "From our results we feel this drug is effective in preventing the child with primary tuberculosis from getting sick with the serious complications."[21]

To substantiate her initial findings, Dr. Hsu undertook an unprecedented course. She studied the effects of Isoniazid drug treatment for thirty consecutive years, following a generation of children to adulthood. It took Dr. Hsu three decades to validate her hypothesis that Isoniazid functioned as a preventive medication and ascertain that the TB germ did not reactivate later in life.[22]

In 1984, Dr. Hsu published her final study relating the remarkable outcome of Isoniazid treatment in *The Journal of the American Medical Association*. The study involving nearly 2,500 patients from 1953-1983 confirmed that initiating Isoniazid at the earliest detection of tuberculosis infection halted the progression of the disease and further prevented any future reactivation. Specifically regarding pulmonary tuberculosis, Dr. Hsu stated, "Isoniazid containing drug regimen" had the effect that it "not only cured pulmonary tuberculosis but also prevented dissemination."[23] Moreover, "in the Houston study, there was not a single case of reactivation. The striking absence of adolescent reactivation strongly suggests the possibility of a permanent cure for pulmonary tuberculosis."[24] These results proved extremely significant. Dr. Hsu showed that drug intervention could cure tuberculosis and keep the disease from returning.

The second theory that Dr. Hsu advanced concerned the identification of TB hosts. Before the 1950s, the identification of tuberculosis revolved around the adult, but Dr. Hsu changed the methods and instituted a comprehensive means to identify the source of the child's tuberculosis infection. Essentially, tracing how a child contacted tuberculosis would lead to an infected adult who provided the original infection. In the late 1950s, the *Fort Worth Star-Telegram* detailed the innovation of child contact investigation in an article entitled, "New Approach Used to Find Tuberculosis." Dr. Hsu explained the advantages offered by child-centered

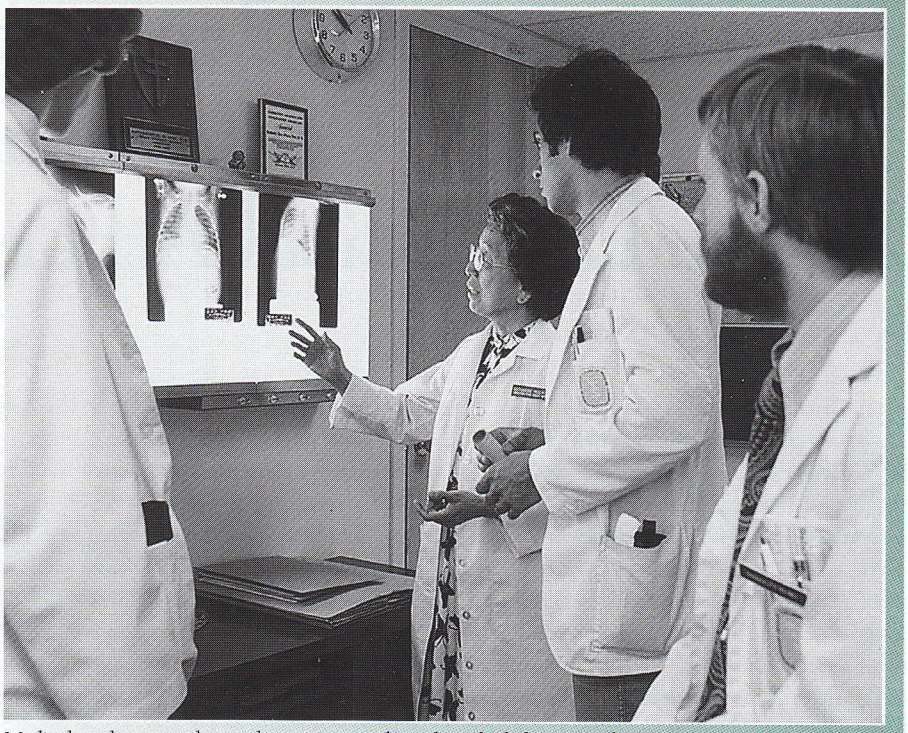
Dr. Hsu tests a child's lung function using a sophisticated device called a Spirometer. Courtesy Baylor College of Medicine Archives

investigation: "We have found in the last three and a half years that if we trace tuberculosis from the infected child to his home, we will find many cases among adults and siblings in the family and among the child's playmates," a situation that Dr. Hsu described as "TB nests."[25] Testing family members, neighbors, and close friends of a known TB case led to the discovery of many additional infections. Dr. Hsu also stated "this method of finding tuberculosis is about one hundred times more effective than mass x-ray survey, because attention is focused on the families which are known to have tuberculosis and those which are being exposed to tuberculosis knowingly or unknowingly."[26]

Dr. Hsu authored a pamphlet entitled "Tuberculosis in Children and Finding Tuberculosis Through Examination of Contacts" in 1958. The booklet was distributed nationally with approximately 70,000 copies circulated and outlined for health care professionals the procedures involved in conducting child contact investigation.[27] The combination of drug intervention and child-centered contact investigation steadily reduced the spread of tuberculosis.

From 1964-1968, Dr. Hsu broke new ground once again by becoming the first Director of Tuberculosis Control for the City of Houston. In this capacity she expanded her research base to include the entire city as well as Harris County.[28] Dr. Hsu and staff mapped each reported case of tuberculosis and created a TB registry. As she had done at the Children's Tuberculosis Hospital, Dr. Hsu implemented preventive therapy in combination with child contact investigation throughout Houston.[29] These tools allowed for a more accurate and comprehensive count of the number of tuberculosis cases in Houston while also pinpointing the locations of tuberculosis clusters. This approach allowed for proven treatment procedures to be enacted on a grander scale while simultaneously allocating resources to the areas most affected.

By the 1970s, when tuberculosis no longer represented a considerable public health threat, Dr. Hsu transitioned her medical research and achieved significant strides in the field of asthma and respiratory disorders. At the time, these disorders accounted for large numbers of school absences. While operating the Children's Asthma Clinic at Jefferson Davis Hospital, Dr. Hsu sought to determine the "normal" lung function of children. "One of the difficulties in diagnosing and treating the asthmatic child has been the absence of documented normal lung function standards for races other than white," Dr. Hsu stated in a Baylor College of Medicine newsletter.[30] "I have noticed that the normal black or Mexican American child has a lung capacity distinctly different from the normal white child...we've been treating these groups based on standards that simply don't apply to them and, consequently, the treatment has sometimes been less than perfect."[31]



Medical students are shown chest x-rays and taught to look for signs of tuberculosis. Courtesy Baylor College of Medicine Archives

To correct the protocols, Dr. Hsu approached the Houston Independent School District about testing a large number of normal children. Testing approximately 2,500 first through twelfth grade children in six public schools yielded results that formulated new standard lung function measurements for the three predominant races, Caucasian, African-American, and Hispanic.[32] Her finding showed that all three races had different lung function measurements. Therefore, in making a diagnosis of asthma and in evaluating treatment results, a race-specific standard must be used.[33] The importance of this discovery remains significant today as medical students, residents, and pediatricians reference the data compiled on lung functions, which are published in textbooks and physician handbooks.[34]

In May 1994, Dr. Hsu received another prestigious honor—the Distinguished Achievement Award from the American Thoracic Society. This international society, composed of over ten thousand members, recognized Dr. Hsu for her four decades of medical contributions.[35] This award stands as one of the most significant achievements of her career and highlights the international importance of her work.

Throughout her lengthy career, Dr. Hsu devoted efforts to improving the lives of children by advancing the therapies used to treat tuberculosis and asthma. Her investigations developed new protocols in the identification and treatment of tuberculosis and led to the establishment of normative values of child lung functions. The ramifications of her medical discoveries cannot be overstated. Even today, as the numbers of tuberculosis cases again rise, health care professionals can look to the advances made by Dr. Hsu and be confident in the arsenal available to fight the re-emerging disease. ■