Mary Tyler Moore (1936–2017): Diabetes Educator and Advocate

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> Having a dream is what keeps you alive. Overcoming the challenges makes life worth living.
>
> —Mary Tyler Moore

"Who can turn the world on with her smile?" So began the theme song for the popular *The Mary Tyler Moore Show*, which aired on the CBS television network from 1970 to 1977. With the passing of Mary Tyler Moore, the show's star, on 25 January 2017, the diabetes community lost an individual who for decades not only brought smiles to her audiences, but also changed the world for people living with diabetes, researchers seeking its cure, and health care providers for those with the disease.

A LIFE IN THE SPOTLIGHT

Born in Brooklyn, NY, in 1936, young Mary moved with her family to Los Angeles, CA, when she was 8 years old (1,2). There, she developed a love of show business, and her early efforts as a dancer opened doors into the world of television. Many tributes published since her passing have highlighted Ms. Moore's creativity and success as a performer; her remarkable talent encompassed dancing, acting, and singing. From 1961 to 1966, she played Laura Petrie, the wife, mother, and homemaker on *The Dick Van Dyke Show* (3). In the 1970s, on *The Mary Tyler Moore Show*, she was Mary Richards, the modern, forward-thinking, fearless yet vulnerable producer at a local Minneapolis, MN, television news station who spoke her mind but also fostered teamwork and a sense of camaraderie among her quirky coworkers (4). For her dramatic role as Beth Jarrett in the acclaimed 1980 film *Ordinary People*, in which she convincingly conveyed a parent's heartbreaking challenge of surviving a child (5), she was nominated for an Academy Award for Best Actress in a Leading Role. Whether performing on television, in a film, or on a theater stage, Ms. Moore loved her craft and felt called to use her talents, time, and fame to help others.

Mary Tyler Moore delivering testimony at a U.S. Senate hearing for JDRF's Children's Congress, 2003.

AN UNEXPECTED DIAGNOSIS

Ms. Moore's commitment to bringing about positive change for others was manifest in her openness about dealing with life's challenges, including her diagnosis with diabetes.

At the age of 33 years, during her time on *The Mary Tyler Moore Show*, she was diagnosed with type 1 diabetes (6). Later, she described being initially incredulous, having never expected that something like this could happen to her. It took her only a short time, however, to fully appreciate the seriousness of her diagnosis, and her response was to become vigilant about managing the disease. Her public statements about type 1 diabetes humanized the condition and gave voice to the thoughts and experiences of many others living with the disease. Her acknowledgment of her diagnosis became their acknowledgment. Her acceptance that living with type 1 diabetes would be an all day, every day undertaking with no vacations helped them to accept their own condition. Her courage in the face of constant fear of long-term complications lent courage to others facing the same fear.

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A CHAMPION OF EDUCATION

Ms. Moore's openness about her life with diabetes, as well as her struggles to control her blood glucose, did not just make her a role model for people with the disease; she was also tireless in encouraging everyone to learn more about the disorder. She championed the understanding that individuals with type 1 diabetes do not look any different from others and that they hold a unique position from which to educate friends, neighbors, schoolmates, coworkers, and colleagues that type 1 diabetes is not "just" a disorder in which one cannot eat sweets and for which the major challenge involves overcoming a fear of injections. To be very clear, Ms. Moore knew that people would say, "Mary Tyler Moore has diabetes." Nonetheless, she accepted the risk that her transparency about living with type 1 diabetes might negatively affect her career and chose to act on the bold notion that her fame could help raise awareness for the greater benefit of everyone with the disease.

In the early 1980s, she became involved with an organization founded by parents of children with type 1 diabetes (known then as the Juvenile Diabetes Foundation and now simply as JDRF). By 1984, she had become its International Chairman (7). Ms. Moore knew that being active in this position would mean interacting with young people, and she relished the opportunity. She was not only one of them, but also someone whose life proved that a person with type 1 diabetes could achieve anything. Although this message may seem obvious today, one must recall that, at the time of her diagnosis, that was not the case. Back then, people diagnosed with type 1 diabetes were widely considered to be bound for unacceptable morbidity, early mortality, and a lifestyle that in many ways was prescribed to be devoid of life. Simply put, Ms. Moore helped to change that view.

A TIRELESS ADVOCATE

Ms. Moore's impact on people with type 1 diabetes did not end there—far from it. Beginning in 1995, she led a group of government relations volunteers, individuals with diabetes, and their family members to petition the U.S. Congress for increased funding for the National Institutes of Health (NIH) and, in particular, for special funding for type 1 diabetes research. In 1999, JDRF launched its first Children's Congress, with Ms. Moore delighting in being the most senior "child delegate" participating. She would later explain that the idea for the Children's Congress came from another child delegate, Tommy Solo, who, at the age of 9 years, asked, "Why should adults go to Congress to ask for funding? Kids with diabetes should go and tell them what it's like, because we know better than anyone. Maybe then they'll hurry up and help us find a cure." Ms. Moore encouraged participants in the Children's Congress to ask members of Congress to, as the campaign's slogan said, "Promise to Remember Me" when appropriating funds for type 1 diabetes research.

In response to these and other persistent charm offensives and advocacy initiatives, from fiscal year 1998 through 2017, Congress appropriated a cumulative total of $2.46 billion in special funding for type 1 diabetes research, with an additional equal amount to support

Ms. Moore at a press conference in the U.S. Capitol Building in Washington, DC, to help launch the inaugural Fall 2006 issue of the magazine NIH Medline Plus*, of which she was featured on the cover.*

diabetes and education programs for Native Americans, who are disproportionately affected by type 2 diabetes. The so-called Special Diabetes Program (SDP) funding to the NIH augments regularly appropriated funds that the U.S. Department of Health and Human Services receives for diabetes research. The SDP has fostered unique collaborations among the NIH, the Centers for Disease Control and Prevention, and the broader research community to accelerate the pace of progress in type 1 diabetes research. Thanks largely to Ms. Moore's leadership, the diabetes research community has benefited greatly from the opportunities made possible by the SDP, as illustrated in a few examples below.

A LEGACY OF RESEARCH

Example 1: Genetic Discovery

In 2003, only three genes were known to be associated with type 1 diabetes. Through research supported by SDP funds and other sources, more than 50 genes or gene regions have now been identified as being associated with type 1 diabetes (8). The pathways controlled by these genes are being studied for how they contribute to the development of type 1 diabetes, how environmental factors may interact with them to affect disease development, and how they may be related to other autoimmune disorders in addition to type 1 diabetes.

Example 2: Epidemiology, Disease Prediction, and Pathogenesis

Today, data from both TEDDY (The Environmental Determinants of Diabetes in the Young study) (9) and Type 1 Diabetes TrialNet Pathway to Prevention Study (10) have led to improved disease risk classifications, leading in turn to a recommendation for a new type 1 diabetes staging classification (11) for at-risk individuals that provides a framework for research into and development of preventive therapies. Clinical trials are ongoing in which immune therapies are being tested for their ability to help people with newly diagnosed diabetes (12). Researchers also now have access to resources that enable detailed studies of the human pancreas and immune system in those with or at risk for the disease (13).

Example 3: β-Cell Replacement

In 2005, the NIH Immune Tolerance Network completed the first multicenter clinical trial demonstrating that transplantation of pancreatic islets from a deceased donor can restore glycemic control in individuals with type 1 diabetes (14). The Clinical Islet Transplantation Consortium has conducted clinical trials with associated mechanistic studies to test new strategies for improving islet transplantation and to facilitate the transition of islet transplantation into clinical practice (15). Today, new methods for large-scale laboratory production of β-cells, including from stem cells, are being discovered, and researchers are investigating strategies to protect these cells from autoimmune attack once they are implanted into a person with type 1 diabetes. Other approaches for regenerating β-cells are being studied, and innovative technologies for testing therapies are being developed.

Ms. Moore testifies at a U.S. Senate hearing for JDRF's Children's Congress 2005. The panel to her left includes Douglas Wick (producer, Red Wagon Entertainment, Culver City, CA), Gary Hall, Jr. (Olympic gold medal swimmer, Miami, FL), and Allen M. Spiegel, MD (director of the NIH's National Institute of Diabetes and Digestive and Kidney Diseases), each of whom also testified about the need for increased type 1 diabetes research funding. Photo credit: Larry Lettera, Camera One.

Example 4: Complications Prevention and Treatment

The SDP also enabled the establishment of large-scale collaborative research groups that seek to better understand and prevent the complications of diabetes. The Epidemiology of Diabetes Interventions and Complications (EDIC) study is an ongoing follow-up to the landmark Diabetes Control and Complications Trial (DCCT) (16) that has shown that intensive blood glucose control can reduce the risk of cardiovascular complications of type 1 diabetes. The Diabetic Retinopathy Clinical Research Network (17) demonstrated that anti–vascular endothelial growth factor (VEGF) therapy is a more effective treatment for diabetic macular edema than laser treatment alone. This result dramatically changed clinical practice, and anti-VEGF therapy has quickly become a standard treatment for individuals with vision loss from diabetic macular edema. Additional trials demonstrated that three different anti-VEGF therapies are equally effective in people with mild vision loss (18), a result that will certainly inform personalized treatment.

The progress enabled by this long-term investment in diabetes research underscores the power of partnership among government, foundations, scientists, and people with diabetes—an alliance that counted Ms. Moore among its most effective leaders. The cumulative effect of all of these research efforts has been that long-term survival of individuals with type 1 diabetes has dramatically improved, and a foundation of knowledge has been generated that offers more opportunities for research advancement and greater promise for the future.

A GRATEFUL COMMUNITY

Remembrances of Ms. Moore since her recent passing have and will continue to include accolades for her work as a performer and an icon for social progress; she is well worthy of such tributes. However, her impact on research progress in diabetes should be given equal praise. Indeed, because of Ms. Moore, individuals with type 1 diabetes are able to live better lives with ever-increasing hope—a priceless gift. In her own unique way, Ms. Moore summarized her view of dealing with diabetes, often saying, "You can't be brave if you've only had wonderful things happen to you."

So, thank you, Mary Tyler Moore, for your bravery, your leadership, and your ability to make us smile. We will be smiling as we move forward to fulfill your passion to find a cure for diabetes and its complications and realize your vision of a world without type 1 diabetes.

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