DRIVING OUT DIABETES
A LARRY H. MILLER FAMILY WELLNESS INITIATIVE

HERE FOR UTAHNS, HERE FOR THE FUTURE

Annual Report

2019–20
The Larry H. and Gail Miller Family Foundation and the University of Utah set extremely high goals for the Driving Out Diabetes Initiative when we imagined and built it.

This was done intentionally. Diabetes is such a challenging issue facing our community, we knew it would take a multifaceted approach to begin to stem the tide. Yet we also knew that the payoff—the opportunity to help people live longer, healthier lives—was worth all the work.

During the program’s three-plus years, our combined efforts have shown outstanding results. As we detail in this annual report, our prevention and outreach programs are helping people prevent the onset of diabetes, our clinical care programs are allowing those with diabetes or prediabetes to more-effectively manage their conditions, and our research programs are demonstrating promising signs as we advance an all-out war against diabetes.

We are incredibly grateful that you chose to partner with the University of Utah to launch the Driving Out Diabetes Initiative. Together, we have improved the health and well-being of thousands of Utahns, gains which continued even as we quickly modified our patient-focused services to ensure safety during the COVID-19 pandemic in Year 3.

We hope you share our joy at what we have achieved together, and that you share our enthusiasm about the future of this life-changing program. On behalf of the University of Utah, we thank you for your investment in our university, our program, and the many people whose lives are impacted by diabetes.
# Impact at a Glance

## Prevention and Outreach

**We set out to**

- Identify people who have higher chances of developing diabetes and target this population for primary diabetes prevention strategies
- Educate Utahns of all ages about diabetes and the benefits of healthy lifestyle choices, taking this message to where people learn, work, pray, and play

## Clinical Care

- Deliver new models of clinical care to those who already have diabetes

## Research, Discovery, and Innovation

- Invest in innovative research to discover scientific breakthroughs that will lead to improved treatments, and eventually to cures

## In Year 3

The *Driving Out Diabetes Initiative* brought the Wellness Bus into communities where residents are at high risk for diabetes, and increased enrollment in long-term health coaching programs.

- Screened more than 3,700 people at the Wellness Bus
- Provided hundreds of underserved individuals across Salt Lake County with strategies to improve their health and well-being
- Coached 928 people in clinic-based programs who have shown improvements in weight and blood sugar levels
- Enrolled 263 people in the National Diabetes Prevention Program

## Since launching we have

**Prevention and Outreach**

- Taught 1,331 students in socioeconomically disadvantaged high schools how to lead healthier lives
- Reached 56,181 middle school students across Utah, Idaho, and Arizona through the Crush Diabetes program
- Served 1,377 people at homeless or transitional housing facilities, teaching them healthy strategies on a limited budget
- Educated 281 people in our Intensive Diabetes Education and Support (IDEAS) Program, which has led to meaningful improvements in their blood sugar levels and has improved their outlooks on their disease. These health gains were sustained 12 months after program completion
- Identified and screened 281 people with diabetes who had not undergone recommended yearly eye screening; more than half required follow up care by ophthalmology for abnormal findings, resulting in potentially saved vision

**Clinical Care**

- Educated 281 people in our Intensive Diabetes Education and Support (IDEAS) Program, which has led to meaningful improvements in their blood sugar levels and has improved their outlooks on their disease. These health gains were sustained 12 months after program completion
- Supported 32 independent projects (24 seed grants and 8 trainees), which have led to 10 publications and $4.8 million in external grant funding to date
- Three trainees have earned faculty-level positions at the University of Utah, a fourth has earned a position at Intermountain Healthcare, and two have been awarded prestigious fellowships

**Research, Discovery, and Innovation**

- The *Driving Out Diabetes Initiative* expanded and refined clinical programs aimed at helping people with diabetes manage the disease and prevent its complications
- The *Driving Out Diabetes Initiative* supported six projects to seed new innovations and support graduate and postdoctoral trainees

## Year Two Impact at a Glance

**UNIVERSITY OF UTAH HEALTH | 3**
Our Reach

MAP OF PROGRAMS

Our community partnerships continue to expand, impacting lives across Utah. An example of our growth is a new partnership with the Intermountain Community Care Foundation and the Utah Food Bank, which is addressing basic medical and nutrition needs for formerly homeless residents of the Road Home’s Palmer Court Apartments. This partnership, like all those with our community partners, provides low- or no-cost resources to those who need them most. We are deeply grateful to:

- Tongan West Stake Salt Lake City
- Central Park Community Center
- Cornerstone Evangelical Free Church
- Utah Pacific Islander Health Coalition
- Green Team Farm

Other partners include:
- Malihem
- Workforce Services
- Utah Food Bank
- Rescue West Valley City
- Project Homeless Connect
- Regence
- Cigna
- Sunnyside Farmers’ Market
- Learne
- Smith’s
- Utah Olympic Legacy Foundation
- Utah Partners for Health
- Communities United
- Sorenson Unity Center
- The Community Foundation of Utah

PROGRAM LOCATIONS
- Health Coaching
- Pre-Diabetes Screening
- Clinical Programs
- The Wellness Bus
- Crush Diabetes Childhood Program
- Team Thrive Childhood Program
- Food, Movement, and You Childhood Program

64,436
TOTAL LIVES TOUCHED

56,181
CRUSH DIABETES

3,794
THE WELLNESS BUS

1,377
FOOD, MOVEMENT, AND YOU

1,331
TEAM THRIVE

1,191
HEALTH COACHING PROGRAMS

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Responding to a Crisis

COVID-19 represents a particularly dangerous threat to people with diabetes.

Yet while those with diabetes are at higher risk of severe clinical outcomes of COVID-19 (The Lancet Diabetes and Endocrinology, May 2020), the reality is that even young people who are in seemingly perfect health have suffered severe harm to their health, including loss of life, after contracting COVID-19.

The coronavirus is a once-in-a-century global pandemic, and it will take all of our best resources to overcome it. As COVID-19 came to the United States, and then to Utah, University of Utah Health quickly shifted much of its clinical and community outreach to this mysterious disease.

We were aided in these efforts by the Larry H. and Gail Miller Family Foundation. With the blessing of the foundation, we transformed the Wellness Bus into a mobile COVID-19 testing unit in early April. By mid-September, the bus had been the site of more than 7,300 tests throughout the Salt Lake Valley, free of charge.

Changing the focus of the bus increased access to COVID-19 testing, particularly in Salt Lake’s hardest-hit areas, and helped Utah prevent the long wait times for testing that plagued so many other states. It also garnered significant media attention. The Wellness Bus is not just the most-visible symbol of the Driving Out Diabetes Initiative; it is one of the most-visible symbols of health and wellness in our state.

We look forward to returning the Wellness Bus to its original mission, hopefully in 2021.

Prevention and Outreach

We pledged to identify people who have higher chances of developing diabetes and targeted this population for primary diabetes prevention strategies.

Diabetes is on the rise in our state, nation, and around the world. Close to 13 percent of American adults have diabetes.

In Utah, we estimate that more than 200,000 people have diabetes and that another 600,000 have prediabetes. Sadly, of those with prediabetes, 90 percent don’t know they have it, limiting their ability to take steps to protect their health.

To bend the curve on the growth of diabetes, the Driving Out Diabetes team has rolled out several key efforts across the state of Utah to screen, educate, and coach those who are at high risk for developing diabetes. By reaching people where they learn, work, pray, and play, we are delivering vital prevention services to those who need it most.
The Wellness Bus

The Wellness Bus aims to create healthier communities for Utahns who lack access to quality health care by providing preventive services—the best way to head off diabetes and related metabolic diseases before they start.

The Wellness Bus offers chronic disease screenings, nutrition and physical activity education, health and wellness counseling, and referrals to low-cost medical care and social services. Our vision is simple: equal access to diabetes prevention for a diabetes-free future.

The Wellness Bus is a specially designed RV that takes part in many outreach events across the Salt Lake Valley and travels to four sites in the Salt Lake Valley each week:

- **Mondays:** Midvale (Cornerstone Evangelical Free Church) 9 am–1 pm
- **Tuesdays:** Glendale (Sorenson Unity Center) 3–7 pm
- **Wednesdays:** Kearns (Kearns High School) 3–7 pm
- **Thursdays:** South Salt Lake (Central Park Community Center) 3–7 pm

**COVID-19 adaptation:** With the support of the Larry H. and Gail Miller Family Foundation, the Wellness Bus paused diabetes prevention activities and was redeployed as a mobile COVID-19 testing site on April 3. Wellness Bus COVID testing has primarily taken place in Salt Lake’s hard-hit western side, but the bus has traveled as far as Orem and Ogden.

We have partnered with community-based organizations, Intermountain Healthcare, Salt Lake County, and the Utah Department of Health to increase the accessibility of COVID-19 testing. Testing has taken place at residential treatment centers, homeless resource centers, city parks, churches, and local businesses. To date, we have tested more than 7,000 individuals, with a positive test rate of 15 percent. The positivity rate has reached 42 percent on some days.

**Resource referrals**

- Alternative clinics: 32%
- Dental: 16%
- Food: 12%
- Housing, optical, 3% each
- Clothing, 6%
- Financial help, 6%
- 3% each

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**THE WELLNESS BUS HAS**

- **reached an ethnically diverse population.**
- **served clients facing a variety of health issues.**
  - 83 percent of first-time visitors were either overweight or obese.
  - 57 percent had high blood pressure.
  - More than half (53 percent) of high-risk clients had blood sugar values in the prediabetes and diabetes range.

**provided screening, education, and referrals to those who had been lacking care.**

- Of the 3,794 individuals served by the Wellness Bus, 58 percent said they did not have a primary care provider.

- **reached people who did not know their health status.**
  - 80 percent of clients with prediabetes reported not having been diagnosed with it previously.
  - 89 percent with diabetes reported this was new information to them.
  - Most clients reported not being previously diagnosed with high cholesterol (73 percent) or high blood pressure (78 percent).

- **connected clients to much needed low- or no-cost services.**
  - The Wellness Bus works with Connect 2 Health, a U of U student organization that connects people in need to low- or no-cost community resources.
  - Connect 2 Health has made 2,195 resource referrals to Wellness Bus clients (see resources chart on page 8).

- **improved health outcomes through health coaching.**
  - More than 1 in 4 Wellness Bus clients (26 percent) return for ongoing health coaching.
  - Of those who have retested, many clients have shown improvements in body weight and blood pressure, as well as an increase in HDL (good cholesterol).
Health Coaching

For people at risk for developing diabetes, health coaching is an important strategy that improves overall health and prevents diabetes before it starts.

The Driving Out Diabetes Initiative offers two health coaching programs aimed at preventing diabetes and related complications: a clinic-based health coaching program and the Diabetes Prevention Program. These programs share a common goal: helping people lead healthier lives through nutrition education and increased physical activity. They differ in their approaches, reflecting the fact that there are multiple strategies to address behavior change.

Embedded in primary care clinics, the clinic-based health coaching program is a personalized health coaching program that focuses on nutrition and long-term support for lifestyle changes. By adding a trained diettian health coach to the primary care team, the team can adequately address the important issue of lifestyle change for those who are obese or at risk for chronic diseases such as diabetes.

The clinic-based health coaching program has reached 928 people, 88 percent of whom are overweight or obese. 44 percent had prediabetes and 20 percent had diabetes.

KEY ACCOMPLISHMENTS

- Participants reported an increase in healthy behaviors after health coaching, including more physical activity, reduced servings of sugar-sweetened beverages, and increased fruit and vegetable intake.
- Moreover, individuals reported increased self-efficacy for making and maintaining dietary changes and exercise after health coaching.
- Participants showed significantly improved outcomes after 6 months of continued health coaching, including decrease in weight and reduction in Hemoglobin A1C (HbA1c, a measure of blood sugar).
- Those with prediabetes and diabetes showed significant weight and HbA1c decreases.

Notes From Proud Parents

I’m really pleased with my 13-year-old’s progress. I’m noticing some changes in her activity level. Two bike rides this week and a walk last night. I feel this is helping keep her more accountable and it’s not coming from a “nagging mom.” Thanks for your help to instill healthier long-term lifestyle changes for her and our family.

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I’m so proud of my daughter. The first day of school I saw she had a belt. I commented on it. She said, “Yes, I’ve been wearing it for a week or two now in order to keep my pants up!” Also, I had bought a treat, offered a bite to her, and where before we would have shared, she not only declined, she even had a face of yuck. Changing those tastebuds! Today, she was running a bit behind and grabbed a healthy lunch, but not breakfast. I took the learning opportunity and asked her how she felt. She said, “I was so hungry by third period, and it was a harder day.”

“I’m so glad you have that awareness and can see that having something in your belly helps.”

I so admire her dedication. She is now seeing and feeling the benefits from health coaching!

The Diabetes Prevention Program is a 12-month evidence-based curriculum shown to reduce the risk of diabetes by 58 percent. Through the Driving Out Diabetes Initiative, we offer both an on-site group-based program and an online option for those who prefer to engage from the privacy of their own homes.

KEY ACCOMPLISHMENTS

- The Diabetes Prevention Program reached 263 participants, 95 percent of whom were obese or overweight.
- Participants in both the on-site and online programs showed decreases in weight and increases in physical activity, both 6 months and 12 months after starting the program.

Overall, our Diabetes Prevention Program had significantly better outcomes than the national averages for similar programs. 67 percent of our on-site participants achieved a weight loss of 5 percent or more of their starting weight, a rate that was nearly double the national average. This demonstration of success led to continuing recognition of our program by the Centers for Disease Control and Prevention.

COVID-19 adaptations: The clinic-based health coaching program moved to a telehealth virtual platform and the on-site Diabetes Prevention Program moved to a virtual platform as well. These changes allowed both programs to continue serving participants.
Childhood Prevention

The Driving Out Diabetes Initiative accomplished its goal of educating Utahns of all ages about diabetes and the benefits of healthy lifestyle choices.

The team developed and implemented three different programs geared toward adolescents and underserved, low-income families and involved hands on activities, food demonstrations, and group discussions. The curriculum for the school based programs have been packaged to be delivered by teachers in person or in an online format, thus greatly expanding the future reach of the program.

COVID-19 adaptations: All three of these programs continued to provide valuable resources during the pandemic. Modifications included deploying digital versions of existing curriculum aimed at students and trainers, connecting teachers in different states to refine lessons and delivery methods as social distancing continues in a second school year, and launching a weekly produce delivery program.

### Team Thrive

**About**

Team Thrive is a six-lesson diabetes prevention curriculum in Utah high schools targeted at adolescents, a group with increased risk for developing diabetes. It is designed to differ from traditional health classes, with a focus on changing habits rather than memorizing risk factors. Team Thrive aims to have participants display an increase in healthy behaviors such as dietary decisions and physical activity, and demonstrate greater knowledge of nutrition, physical activity, and diabetes.

**Key Accomplishments**

- The Team Thrive curriculum was implemented in 3 high schools reaching 768 students. Results were compared to 3 schools who were given the standard nutrition curriculum. Between the 6 high schools, 738 students completed surveys at 4 weeks and 6 weeks after the curriculum’s conclusions.
- Students participating in Team Thrive engaged in more muscle-strengthening exercises, consumed more vegetables, and showed reductions in blood pressure compared to those in schools that did not receive the Team Thrive curriculum.
- Team Thrive developers created a curriculum package that is freely available, can be delivered by teachers directly, and includes student workbooks, teacher’s manuals, and additional materials.

### Crush Diabetes

**About**

Crush Diabetes is a program designed to encourage healthy habits in middle-school students and their families. The program’s short curriculum incorporates a moving and educational 40-minute documentary titled “Sugar Babies.” This film explains the basic physiology of diabetes and features young people who face type 1 and type 2 diabetes.

**Key Accomplishments**

- In Year 3, the Crush Diabetes curriculum was delivered to 100 schools across Arizona, Utah, and Idaho to reach 31,626 students. Over the three years, Crush Diabetes reached over 56,181 students.
- In November 2019, the CRUSH Diabetes team hosted a health fair and community film screening of Sugar Babies at West Jordan Middle School. University of Utah Health partners, including the Utes’ beloved mascot Swoop, joined in the event, along with community agencies such as Utah Naloxone and The American Heart Association. The event served 150 families.

### Food, Movement, and You

**About**

Food, Movement, and You works with families in transitional care and homeless shelters. During a four-week program, team members present curriculum that includes topics that are often challenging for lower-income families, such as eating on a restricted budget, limiting sugary beverages, and preparing healthy recipes from inexpensive or donated foods. Children participate in physical activities while adults take classes. Families gather together for a final food demonstration and tasting session.

**Key Accomplishments**

- In Year 3, we served 377 people at two sites (Midvale Road Home and the House of Hope), putting the three-year total at 1,377 people. We provided classes at homeless resource centers and worked to increase access to nutritious foods for members of our community experiencing homelessness. This work has continued during the pandemic.
- The success of Food, Movement, and You has led to state incorporating the role of diet as measures of individuals’ health and wellness, including food and nutrition classes as key impact areas in the state’s new Homeless Resource Center Model.
We promised to deliver new models of clinical care to those who already have diabetes to help people better manage their diabetes and prevent health complications.

For people throughout Utah, diabetes is an insidious threat. Complications from diabetes are rising, and the disease is a leading cause of death in our state. If not appropriately managed, diabetes can lead to blindness, limb amputations, and kidney failure. It is also a top cause of heart disease and stroke.

Thanks to the Driving Out Diabetes Initiative, we have two new innovative programs to support people already living with diabetes. One helps people with diabetes better manage their disease, while the other screens patients for the earliest signs of devastating eye complications.

During the initiative’s three years, these clinical programs have evolved to become more operationally sustainable, and they adapted to meet the needs of patients, including the addition of shorter programs and programs available in Spanish.

YEAR THREE: JULY 2019 TO JULY 2020

Clinical Care

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Screening, Education, Support

For those who have already developed diabetes, we have created programs that educate in order to minimize future health threats.


The IDEAS Program is a personalized diabetes management program for both the newly diagnosed and those who have lived with diabetes for years. Clients meet in groups with 8-14 peers and care partners (i.e. family members), and take part in interactive education programs that include nurse practitioners, diabetes educators, pharmacists, social workers, and physicians. Formerly a full-day program known as the One Day Diabetes Education and Care Program, this past year IDEAS added half-day and Spanish-language options.

This team addresses clients’ physical and mental needs, by providing them with referrals, education, and care through personalized and group education, screenings for eye complications, dietary and exercise coaching, optimizing diabetes technology, and developing an individualized plan for healthy living.

COVID-19 adaptations: IDEAS transitioned to telehealth delivery. Prior to restarting, staff was trained on the new technology. Because people with diabetes who contract COVID-19 are at elevated risk for severe complications, changes included: 1) adding COVID-19 specific content (transmission, risk for those with diabetes), 2) mailing diet and exercise resources, and 3) reviewing snacks in real time at the participants’ homes. By offering tablets to people who needed them and moving the program online, we were able to reach out to more rural participants.

OUTCOMES

- Participants in the full-day achieved improvements in clinical, behavioral and psychosocial outcomes that were sustained through 3, 6, and 12 months:
  - Increased diabetes self-care behaviors
  - Lower burnout rates
  - hba1c lowered by 0.6% at 3 months and 0.5% at both 6 and 12 months

A Vision-Saving Intervention

Last year, a 30-year-old man visited the Utah Diabetes & Endocrinology Center (UDEC) for a regularly scheduled visit. He was there to monitor his diabetes, which had been diagnosed at age 12. He had not had an eye exam in more than one year, and report no vision changes. Retinal photos taken at that visit revealed the presence of severe retinopathy, along with swelling of the retina – findings that demanded urgent evaluation. In working with the Moran Eye Center, the Diabetes Retinal Complications Program was able to arrange for ophthalmology clinic evaluation within a week, and the patient started on therapy to help preserve his vision. After nearly a year of therapy, the most recent ophthalmology notes indicate reduced retinal swelling and stable vision. Rapid identification of retinopathy and subsequent coordination with ophthalmology services very likely helped this patient preserve his sight.

For those who have already developed diabetes, we have created programs that educate in order to minimize future health threats.

- Participants (N=213) in the full-day program were most likely to have type 2 diabetes (80%), be female (59%), non-Hispanic White (85%), or obese (62%). They had an average A1c of 8.3%.
- 68 individuals participated in the half-day program, 69% in-person and 31% via telehealth.
- Participants were mostly likely to have Type 2 diabetes (94%), be female (65%), non-Hispanic White (76%), and obese (68%). On average, those with type 1 diabetes were 44 years old and those with type 2 diabetes were 62 years old.

The Diabetes Retinal Complications Screening Program extends the important benefits of early detection to Utahns with diabetes by providing rapid, noninvasive retinal screening to identify complications early—in time to mitigate long-term effects or reverse them. Retinal screenings take just a few minutes and are embedded into standard diabetes care appointments at the Utah Diabetes and Endocrinology Center. This streamlines care, sparing patients the need of scheduling a separate appointment in a different clinic. Using digital technology, an ophthalmologist at the Moran Eye Center reviews the retinal images for abnormalities.

OUTCOMES

- We have screened 281 people with diabetes for retinal complications. We found abnormalities in more than half of participants, and referred these individuals to an ophthalmologist for additional follow-up and treatment.
- Of the patients with abnormal findings, 68 percent were diagnosed with diabetic retinopathy.

COVID-19 adaptations: The Moran Eye Center staff trained the Diabetes Retinal Complications Program team on how to safely perform eye exams, using measures such as a protective shield to separate patients from photographers.
We aimed to catalyze innovative research to make scientific breakthroughs that will lead to improved treatments—and eventually cures—for people with diabetes in Utah and beyond.

Today, diabetes is a crisis. In the future, we want it to be a mere memory. We are advancing toward this goal by carefully evaluating the Driving Out Diabetes outreach and clinical programs, and by investing in innovative research projects. Through the Driving Out Diabetes Initiative, we have invested in 24 research seed projects at the University of Utah in the areas of diabetes prevention and management, uncovering the causes of diabetes and prediabetes, and drug discovery. We aimed to catalyze scientific breakthroughs that will lead to better prevention, treatments—and eventually cures—for people with diabetes.

But these breakthroughs don’t happen overnight; they require creativity, patience, and significant resources. Seed funding is essential for our scientists and thought-leaders to test their new ideas and gather preliminary data, making it possible for them to be competitive for large grants from federal sources.

This is a proven approach. In diabetes and metabolic health alone, the University of Utah has invested $1.7 million in seed grants over the last five years, which has turned into nearly $20 million in extramural research awards to continue research explorations in these areas.

Letters from Grateful Participants

Karen Tilelli-Greenwood and Kate Parker struggled with their weights for years. They finally broke through with the help of the Driving Out Diabetes Initiative programs, losing weight and lowering their A1c levels.

“I’ve dieted many times in my life, but this is the first time I was part of a group. Hearing other people’s challenges became a mirror of sorts to my own. I used to think of a diet or lifestyle change was all or nothing—very strict or no limits at all. I’ve learned that it is a process—not a perfect process by any means, but an opportunity, meal by meal, to choose more wisely—and if life intervenes, it is not a failure because another opportunity is just around the corner. I feel fortunate that I don’t have time restraints since I’m retired. I feel for those who are working full time, raising children, caring for elders, because that was me just a few years ago. I never realized how supportive a group can be.

Karen

I had my Zoom meeting yesterday with my primary care physician. She was delighted with my progress and proud of how I am doing in my diabetes program. She wanted to hear all about it, what I liked and why it was working for me and so on. It was really cute. I am excited for how my hba1c has changed since starting the class. One more pound and I will be at my goal for the class. Fingers crossed!

Kate
In Year 3 of Driving Out Diabetes, we awarded 6 seed grants for $296,890.

Family involvement & sharing information among families with multiple members with type 1 diabetes, by Cynthia Berg, PhD (Psychology), Michelle Litchman, PhD, FNP-BC, FAANP (College of Nursing)
- An investigation to understand how to communicate information among families to earlier identify type 1 diabetes in the diagnosis process.

Inhibiting EFHD1 to prevent mitochondrial calcium overload in diabetic cardiomyopathy, by Dipayan Chaudhuri, MD, PhD (Cardiology)
- A study to test if mice without the mitochondrial protein EFHD1 are slower to develop diabetes and cardiovascular complications.

Approaches to activate shelf-stable insulin for diabetes management, by Raphael Franzini, PhD (Medicinal Chemistry)
- A project to develop a chemically modified insulin that has a longer shelf life and that will spontaneously activate in vivo upon contact with a chemical reagent.

Incidence and persistence of cancer-therapy induced hyperglycemia among cancer patients in the first year after diagnosis, by Sheetal Hardikar, PhD, MBBS (Population Health Sciences), postdoctoral fellowship for Richard Viskochil, PhD
- A postdoctoral fellowship to determine the effect of different cancer treatments and patient characteristics on developing hyperglycemia in cancer patients within the first year following diagnosis, and the underlying pathophysiological changes of hyperglycemia over time.

A dominant-negative mutation in human adiponectin, by William Holland, PhD (Nutrition and Integrative Physiology)
- This study seeks to understand how a rare human mutation that leads to loss of an adipocyte-secreted molecule, adiponectin, may lead to end-stage renal failure in some patients with diabetes.

Simultaneous assessment of tissue oxygenation and muscle metabolism using dMb-1H and 31P MR Spectroscopy for diabetic foot ulcer, by Eun-Kee Jeong, PhD (Radiology)
- A project to develop an innovative technology that can simultaneously estimate tissue oxygenation and metabolism in calf muscle in patients with foot ulcers through nuclear magnetic resonance spectroscopy.
Research Snapshot #1

Lack of Information Impedes Access to Food Pantries and Programs in Utah

A University of Utah Health study finds that poor communication could be hampering efforts to connect people and families in need with food stamps, food banks, food pantries, and other food resources in at least 22 Utah communities. These findings offered a more in-depth picture of food needs in Utah than had been previously available. Based on these findings, the researchers plan to expand their work to identify at risk communities in more than 15 other states.

The first-of-its-kind study, which appears in the American Journal of Preventive Medicine, pinpoints previously undetected areas in the state where a lack of information about food banks, food pantries, and Supplemental Nutrition Assistance Program (SNAP)—commonly known as food stamps—is derailing efforts to alleviate food insecurity in Utah. Food insecurity is defined as the limited or uncertain availability of acquiring safe and nutritional food.

In the past, accessibility or availability of food resources, such as grocery stores, and the ability of individuals or households to buy that food, were two key measures of food insecurity. However, these traditional indicators may not fully reflect the scope of the problem. Using data analysis and a geographic information system (GIS) method, the researchers identified four clusters of communities: food secure, food insecure, information deserts, and information uncertain.

The study’s senior author was Andrea Wallace, Ph.D., R.N., chair of health systems and community-based care in the College of Nursing. Wallace was supported by a seed grant from the Driving Out Diabetes Initiative.

Research Snapshot #2

Study Points to Unappreciated Role for Lipids in Muscle Function

Research led by scientists at University of Utah Health reveals that exercise reshapes an important component of our cells, called mitochondria, which are tiny factories responsible for manufacturing energy for the body. Published in Science Advances, results from the study point to a previously unappreciated role for mitochondrial membrane lipids (which include fats and cholesterol) on energy production and muscular function and provide new insights into therapies to combat diabetes and obesity.

The study’s senior author was Katsu Funai, Ph.D., associate professor in physical therapy and athletic training at U of U Health. Patrick Ferrara, a graduate student mentored by Dr. Funai, was awarded a Driving Out Diabetes graduate student fellowship.

Scientists have long known that exercise influences how well mitochondria work but the mechanisms had remained elusive. Funai decided to look more closely at a potential role for lipids after another study led by his team hinted that they might be involved in modulating efficiency of energy (ATP) production.

Carrying out measurements focusing exclusively on mitochondria revealed impacts that had never been seen before. This is the first study to evaluate lipid composition in just the organelle rather than in the whole cell, revealing large localized shifts that were otherwise masked. The scientists also utilized a diagnostic platform for measuring oxygen consumption and energy production in mitochondria specifically.

The results suggest that mitochondria adapt to how much energy the cell is using. If we don’t exercise, our mitochondria learn to become less efficient. Less efficient mitochondria can trigger cell events that are bad, in this case muscle wasting. Their findings raise the possibility that changes in lipid composition could be one reason why muscles atrophy when we don’t exercise. They could also possibly explain why we rapidly lose our function to breathe when patients are on life support.

Throughout the Driving Out Diabetes Initiative, we have invested in 24 research grant projects, 8 of which were driven by our most exceptional trainees. These seed grants supported principal investigators across 14 departments and 5 colleges, have led to 10 publications to date (with 10 more already in preparation), 9 funded grants for $4.8 million, and 14 more grant proposals being prepared.

The Driving Out Diabetes Initiative was instrumental in launching careers of our best and brightest trainees. Of the 8 trainees, 2 have been awarded prestigious fellowships and 4 have moved on to new positions. Three began roles as assistant professors at the University of Utah, and one started at Intermountain Healthcare. The other two trainees are currently in training.
Throughout the month of November, the Driving Out Diabetes Initiative led a campaign to spotlight diabetes and prediabetes, and to increase awareness of the ways people can prevent both.

Through Wellness Bus screenings, social media, events, and other advertising, University of Utah Health reached more than 210,000 people across the Salt Lake Valley, Utah, and the country. Our engagement included:

- Wellness Bus screenings: 280 screenings
- Social media: 5,737 impressions
- Utah Jazz game media: 109,836 impressions
- Utah Utes stadium media: 94,186 impressions
- Health Fair attendance: 270 people
- Total Reach for November 2020: 210,398 (est.)

In addition to these outreach efforts, the Driving Out Diabetes Initiative reached people through an op-ed in the Salt Lake Tribune, public-service announcements by Gail Miller and U of U President Ruth Watkins during sporting events, LED signage at Jazz games, and a KUTV media spot with Michelle Litchman.
The Future

We have made great progress toward our goals, yet there is still work to be done. We seek to catalyze a paradigm shift in the way health care systems combat diabetes and related disorders by developing new strategies for disease prevention, personalized care, and therapeutic intervention.

Utah is poised to become a national model for diabetes prevention and care. We all have a stake in the health of those in our community—be it related to COVID-19 or diabetes. Let’s achieve equal access to prevention and care to move us toward a future that is diabetes free.

**Key Tactics**

**Community Engagement and Policy**
- Launch new, culturally-appropriate programs that reach families throughout Utah by partnering with faith-based organizations
- Expand mobile screening and education programs that facilitate access to care in underserved populations and rural communities
- Increase access to education and healthy food for vulnerable community members at homeless shelters and resource centers
- Influence state and local policy, and offer leadership and support to our network of community partners as they combat food insecurity
- Train partners to go into schools, particularly in underserved communities, in order to teach students how to lead healthier lifestyles that prevent chronic illness

**Prevention, Management, and Clinical Care**
- Pilot innovative new strategies for integrating multi-disciplinary health care teams to prevent and manage diabetes and related disorders that will serve as a model for other health care systems across the country
- Utilize and expand satellite facilities and telehealth to ensure services are readily accessible for those who cannot easily travel to Salt Lake City
- Expand screenings for diabetes and many of its complications, as well as preventive screenings for overweight and obese patients, across the region
- Expand access to evidence-based weight management programs for all ages and risk levels

**Discovery, Innovation, and Evaluation**
- Recruit and retain the best diabetes researchers in the country, and ensure they are provided with leading-edge equipment and opportunities to form unique interdisciplinary connections
- Pioneer scientific advances aimed at preventing, treating, and ultimately curing diabetes and related disorders
- Create personalized strategies for combating diabetes and improving metabolic health by leveraging Utah’s rich and distinctive resources such as the Utah Population Database, extensive linked medical records through U of U Health and Intermountain Healthcare, and unparalleled resources for assessing family genetics and metabolic profiling
- Test and deploy new therapies that build upon discoveries from our strong cadre of basic scientists studying diabetes and metabolic health

**Education**
- Expand training for clinicians across the five U of U Health colleges – medicine, health, nursing, pharmacy, and dentistry – with new opportunities in diabetes and weight management, such as enhanced emphasis in culinary medicine
- Train the next generation of health professionals (doctors, nurses, health coaches, dietitians, pharmacists, etc.) about the value of using coordinated team-based approaches to tackle all phases of diabetes research, prevention, and management
- Provide students with real-world opportunities to work with clients through our robust and growing set of clinical and community partnerships
- Leverage community partnerships to prepare trainees to care for people from a range of cultural and socioeconomic backgrounds

**Impact**

**Community Engagement and Policy**
These innovative programs will coordinate the actions of a network of community partners to empower Utahns across the state to live healthier lives.

**Prevention, Management, and Clinical Care**
These programs will transform Utah into a site for destination care, provide unparalleled access to diabetes prevention and management services, and empower Utahns to avoid and combat diabetes and its complications.

**Discovery, Innovation, and Evaluation**
These programs will provide scientific evidence supporting the best approaches to tackle diabetes and inform clinical care and community programming beyond our state borders.

**Education**
These educational programs will decrease the burden of diabetes and other chronic disease by training skilled and culturally-sensitive clinicians.
For those facing risk due to diabetes and prediabetes, the question has always been, “How?”

How did I acquire this disease? How does it threaten my health and well-being? How do I live with it? How do I thrive with it?

The Driving Out Diabetes Initiative made great strides toward providing answers. For more than three years, our clinicians, researchers, staff, and volunteers have committed themselves to impacting the lives of people throughout Utah. Children have been set on paths to healthier futures. Adults have learned and enacted strategies to safeguard their health. Families have been spared the pain that diabetes causes when it affects a loved one.

All of these lives that have been transformed owe a deep debt of thanks to the Larry H. and Gail Miller Family Foundation. University of Utah Health shares their gratitude. Thank you for allowing us to change lives together.

In Year 3, we built on the successes and lessons of our first two years, and when the COVID-19 pandemic struck, we modified our services to ensure that patients continued to safely receive services. With your blessing, we also transformed our most-visible symbol, the Wellness Bus, into a mobile testing unit, temporarily making it a resource for all Utahns during a time of pandemic.

Based on the data we have collected, the Driving Out Diabetes Initiative has been an unqualified success. Our life-changing work continues in Year 4. We are incredibly grateful for your partnership as together we battle against diabetes in Utah.

Final Thoughts

The Partnership Grows

Inspired by the actions of the Larry H. and Gail Miller Family Foundation, philanthropically inclined individuals, businesses, and foundations gave a total of $870,377 in Year 3 to help boost and sustain the Driving Out Diabetes Initiative.

- Allen Foundation
- Ardene Bullard “Of Love” Tennis Tournament
- C. Scott and Dorothy Watkins Foundation
- Castle Foundation
- Cigna Foundation
- The Community Foundation of Utah (CFU) and the Association for Utah Community Health (AUCH)
- England Family Foundation
- HealthWell Foundation
- Herbert I. and Elsa B. Michael Foundation
- Intermountain Healthcare Community Foundation
- Jacobsen Construction
- Jan Bayle
- Lawrence T. and Janet T. Dee Foundation
- Margolis Foundation
- Regence Blue Cross Blue Shield of Utah
- Sorenson Legacy Foundation

It is important to the University of Utah that the Driving Out Diabetes Initiative continues to change lives across our state. In addition to the $1.6 million the university has contributed in Years 1-3, the university is supplementing this funding to keep all of the Driving Out Diabetes Initiative programs in Year 4. We are actively seeking additional partners to help support Driving Out Diabetes and ensure it continues in Years 5 and beyond.
The University of Utah provided more than $546,000 in support for the Driving Out Diabetes Initiative in Year 3. Over the last three years, the University has contributed more than $1.6 million to the initiative.

### Institutional Support from U of U

<table>
<thead>
<tr>
<th>U of U Support of the Driving Out Diabetes Initiative</th>
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<tr>
<td>Administrative Leadership</td>
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<td>Mobile Health Program</td>
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### Year 3 Expenditures

#### Expenditures per Program

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<td>Mobile Health Program</td>
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Changing Lives Across Utah

There are many people with diabetes who don’t take insulin, especially in communities of color. Other people take medicine, but they don’t obtain it from doctors or pharmacies. After studying why people with diabetes and other chronic illnesses are forced to donate, trade, or borrow medical supplies, Michelle Litchman, Ph.D., FNP-DB, FAANP, helped thousands of Utahns return to safer suppliers.

Litchman, an assistant professor at the U of U College of Nursing and a family nurse practitioner at the Utah Diabetes and Endocrinology Center, played a key role in the passage of 2020 Utah law that made it easier and less expensive for Utahns with diabetes to obtain insulin. Litchman testified during the lawmaking process, and she created a one-page infographic that was used by Rep. Norm Thurston (R-Provo) as he marshalled support for the bill.

Thurston reached out to Litchman in the summer of 2019, shortly after she completed a study that concluded people with diabetes were foregoing basic needs and taking part in underground trading of insulin and other diabetes medications and supplies in order to stay healthy (Why People Buy, Trade, Donate Medications on the Black Market). The most-common reason given was lack of affordability and accessibility. Insulin, for example, surged from $21 a vial in 1999 to upwards of $350 a vial by 2019.

During the past year, Litchman has been featured on CNN and NPR. She also received a $385,982 grant from the National Institutes of Health’s National Institute of Nursing Research. This grant went to support her work with the IDEAS program (Adapting and Assessing the Feasibility of a Diabetes Self-Management Education and Support Telehealth Intervention for Rural Populations to Reduce Disparities in Diabetes Care).

Amplifying the Impact

Additional Media

- NBA.com, Jazz Fit: Diabetes Awareness, https://www.nba.com/jazz/jazz-fit-diabetes-awareness (additionally mentioned in The Assist, the Jazz e-newsletter and Winning Spirit)

Videos

- President Watkins and Mark Harlan public service announcement, https://www.youtube.com/watch?v=PDwWtICsQs
- Gail Miller public service announcement, https://www.youtube.com/watch?v=7f9MMo3joj_G0
- Wellness Bus Ribbon Cutting, https://www.youtube.com/watch?v=bub1gbFvvlc&t=3s
- Telemundo, At the U: The Wellness Bus, November 11, 2019, https://www.youtube.com/watch?v=dahd3QZqQJA
- ABC4 Utah, The Wellness Bus to Take COVID-19 Testing to Underserved Communities, April 13, 2020, https://www.youtube.com/watch?v=7wpCYUVnOpw

Research-Related Press

- People with High Ceramide Levels up to Four Times More Likely to Have Heart Attacks, Stroke, https://uofuhealth.utah.edu/newsroom/news/2019/12/ceramides-summers.php