Diabetes & Obesity 2025

Four Future Scenarios For the Twin Health Epidemics

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By the
Institute for Alternative Futures

Funded by a Grant from
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Introduction

The U.S. is on track to have 50 million Americans with diabetes in 2025, up from what are now estimated to be 20.8 million. This looming crisis of human suffering and extraordinary national expense can be avoided if we act now in a caring, coordinated, and comprehensive way, addressing diabetes and obesity as a twin epidemic. This report sets out four scenarios of how our choices related to diabetes and obesity could play out between now and 2025. The scenarios are designed to show how serious this twin epidemic could become if we stay on our current path, to illustrate the range of options available for averting a crisis, and to demonstrate how learning to meet the challenge of diabetes and obesity could play a major role in the evolution of our entire system of health care. The scenarios suggest that diabetes deserves to be elevated from a 'stealth epidemic' to a top priority in the national health agenda.

It is possible that medical science could deliver a cure for diabetes by 2025, but we do not have to wait for that kind of uncertain breakthrough. We already have proven treatment interventions and prevention strategies that can save millions of lives, and there are many promising lines of effort to pursue. In constructing the four scenarios, the Institute for Alternative Futures identified 10 Diabetes Control Factors that can make a significant difference in ending the diabetes epidemic. Some are available for implementation now. Some will become possible with progress in technology and biomedicine or with improvements in health policy. Some require more fundamental changes in the health care system, including universal health care coverage. And some require still deeper changes in American culture, institutions and leadership. The 10 factors are:

1. Population focused prevention strategies which encourage healthy lifestyles that avoid obesity and lower the risk of Type 2 diabetes.

2. Regular screening for diabetes and introducing prevention strategies where pre-diabetes values are found in the blood.

3. Behavior modification methods, including personalized counseling in health-enhancing behaviors.

4. Chronic disease management with continuity of care by collaborative teams.

5. Empowered self-care through increased knowledge, monitoring, control of blood sugar, training and tools to navigate the health system.

6. Advances in technology such as the closed loop system that automatically monitors blood sugar and regulates insulin, non-invasive blood sugar tests and other biomonitoring devices, inhaled insulin or more effective pills and a widely implemented electronic health record.

7. Personalized medicine that analyzes the disease at the cellular level and identifies therapies for an individual's unique disease characteristics and response potentials.

8. Access to care, particularly for screening and appropriate management of chronic diseases for the uninsured.

9. Countering the obesogenic environment including the food we eat, the design of the communities in which we live, and the social norms that determine acceptable body weight.

10. Addressing the social determinants of health such as poverty, education, security, and social support that have a demonstrated link to health status.

The first scenario, *The Frog Didn't Jump,* shows the consequences of staying on our current path, where none of these Diabetes Control Factors are being seriously implemented. The other scenarios progressively incorporate more of these factors. The second scenario, *We Did the Best We Could,* describes progress that could result from market-based strategies and a boost in personal responsibility. The third scenario, *Caring Communities and Access to Health Care*, shows a nation taking a serious and systematic approach to improving health and preventing diabetes. The final scenario, *Evolving Systems with Enlightened Leaders,* portrays a still broader response to addressing the social determinants of health along with the "obesogenic environment."

Each scenario presentation consists of four parts. The first part is the *scenario story* itself, in which the state of diabetes and obesity in 2025 is portrayed in a vivid, personal way. Each story is followed by a *scenario table* which shows at-a-glance how much emphasis the scenario places on each of the 10 different Diabetes Control Factors. The scenario table is followed by a list of *health policy, public health and health system changes* that occur in the scenario between now and 2025. This is a useful guide for analyzing important choices about diabetes. Finally, a *diabetes burden table* contains

numerical forecasts of the extent and costs of diabetes in the scenario. These different pieces of the scenario presentation can be used all together or separately in various ways for different audiences and purposes.

The numerical forecasts of the diabetes burden in the scenarios are only meant to roughly illustrate the potential magnitude of achievable improvements. The forecast for the first scenario, which represents an extrapolation of business-as-usual, is based on published data from the U.S. Department of Health and Human Services and the American Diabetes Association. IAF also referenced a major report by Amanda Honeycutt of Research Triangle Institute and her colleagues from the Centers for Disease Control. The Honeycutt et al. study forecasts an increase of diagnosed diabetes from 12 million in 2000 to 39 million in 2050, with the prevalence rate for diabetes in the U.S. population rising from 4.35 percent in 2000 to 9.71 percent in 2050. These Honeycutt et al. forecasts assume three percent annual growth in diabetes from 2000 to 2010. Yet given that we have experienced five percent annual growth in diagnosed prevalence from 2000 to 2005, it is plausible to assume that this higher rate will hold until 2010. IAF also assumed that there would be a slightly higher yearly increase from 2010 to 2025 than the Honeycutt et al. study.

As a result, IAF forecasts that if we stay on the current course there will be 50 million people with diabetes by 2025. A disproportionate number will be people of color; Hispanic, African American and Pacific Islanders are at greatest risk of dying from this disease. The poor and underserved are hard-pressed to get adequate care and to make the lifestyle changes needed to manage their diabetes and avoid losing their vision, limbs and overall quality of life. The details of the scenario forecasts and the assumptions behind them are presented in the IAF report, *Diabetes Forecasts to 2025 and Beyond: the Looming Crisis Demands Change*. [1]

A massive and tragic epidemic of diabetes can be averted if we make wise choices today that lead to a coordinated, comprehensive, concerted, and continuous response. Wise choices in dealing with diabetes today can help shape a health care system better able to respond to all the challenges ahead. The scenarios in this report are designed to help people explore the consequences of the many different choices ahead. The report concludes with a series of questions designed to help decision makers think strategically about how to end the twin epidemics of diabetes and obesity.

[1] The IAF report, Diabetes Forecasts to 2025 and Beyond: The Looming Crisis Demands Change, by William Rowley, M.D., and Clement Bezold, Ph.D., is available at www.oxha.org/knowledge/publications/changing_diabetes.pdf

Overview of the Scenarios

Scenario #1: The Frog Didn't Jump

In this future, government, business, public health and healthcare delivery systems fail to make the changes needed to avert the twin epidemics of diabetes and obesity. The scenario characters show us the consequences of attitudes and decisions that are present today. Like the frog in a pot of water on the stove at room temperature that doesn't jump out of harm's way when the temperature is gradually raised to boiling, we let this stealth epidemic continue its disastrous course.

Scenario #2: We Did the Best We Could

Scenario #2 assumes the conventional expectation that healthcare systems will make individuals more responsible, add new technology and create delivery tiers for different levels of care. These market-focused changes only go so far into the complex range of factors creating the twin epidemics of diabetes and obesity, but they do deliver more effective treatments and disease management for those with access to health care.

Scenario #3: Caring Communities and Access to Health Care

In scenario #3, both the public and private sectors embrace prevention and more effective care, which results in a reduced burden of disease. People have universal access to a basic level of health care. Universal health care does limit some treatment options and constrains innovation.

Scenario #4: Evolving Systems with Enlightened Leaders

Scenario #4 takes on the "obesogenic environment" and confronts the social determinants of health. Change within the marketplace, culture, and science moves upward from individuals and families to communities, health care and economic systems. New leadership helps society navigate these changes.

The Diabetes 2025 Scenarios

Scenario #1: The Frog Didn't Jump – Extrapolation Scenario

It is 2025…

Arriving for his public health class, Jose Azul sits down in a new seat that is wider and more comfortable. Carla leans over, her frizzy orange hair annoyingly close to Jose's

face. With a knowing look she tells Jose, “My uncle got the contract to replace all the class furniture to comply with the 2020 Supreme Court ruling bringing obesity under the Americans with Disabilities Act.” Jose squirms, aware of the fifteen pounds he gained since starting college.

In 2025, over 80% of Americans will become overweight at some point in their lifetime, and 50% risk growing obese during their lifetime. Schools, restaurants, office buildings and airlines are making the necessary changes to comply with the new mandates for accommodating large people. Jose wants a career in public health because he wants to shape a better future, but he worries.

Jose is keenly interested in this class on the “crisis of diabetes.” The class pays close attention because more than a third of the class has pre-diabetes or diabetes. The rest either have a friend, close relative, or a neighbor who has diabetes. This is not unusual because the risk of getting diabetes in one’s lifetime in the U.S. is now one-in-three overall, and for some populations the risk is much higher.

Jose had to race to class after taking his aunt to the doctor. Like 50 million other Americans in 2025 she has type 2 diabetes. She’s on the waiting list for bariatric surgery through Medicare. The family cannot afford to send her to one of those popular private clinics for the procedure. She is now one of the 119,000 additional patients each year going into renal failure. Jose fears she will soon be added to the ranks of the 70,000 new cases of blindness and 239,000 lower extremity amputations. The prevalence of these complications has tripled since Jose was born in 2000. Jose’s aunt believes she can ward off the diabetes with charms. Jose winces at the memory of his aunt in her awful purple dress showing the nurse her amulet to protect against the “sugar”.

Professor Green is asking, “How did this epidemic of diabetes happen? How could this country allow diabetes cases to grow at 5% per year in the first decade of the century and then keep growing at over 3% each year? How could our government fail to stop more than a doubling of those with diabetes to 15% of the population?

Jose raises his hand, “I think it is irresponsible individuals like Fred. He’s this Anglo that’s hooked up with my sister Rosa. He just eats whatever he can get, never thinking about the future. I watch him grab Rosa’s torta--that’s cake--and he’s getting fatter every time I see him. He isn’t smart enough to make the right decisions; he needs strong direction and education.”

Professor Green counters, “It’s not just Fred, Jose. What about all the people who make money selling junk food? Aren’t they responsible?”

“Here’s a parable for the diabetes epidemic,” Professor Green paused for dramatic effect. “Consider the boiling frog. Had the frog been thrown into boiling water it would have jumped right out. It didn’t happen that way with diabetes. The temperature went up gradually, each year more of us adding pounds so society got a little more obese. By the time the water began to boil, it was too late. The frog didn’t jump!”

The professor continues: “Here’s how we got in this situation. In the years 2005-2010 the public was in denial about the severity of the twin epidemics of obesity and diabetes. We did nothing! Then from 2010 to 2020, a number of us in public health cried out and got the politicians to take some modest and mostly ineffective actions. For instance, the feds got alarmed about how many kids were getting type 2 diabetes. They mandated healthier school lunches, fruit in vending machines and compulsory physical education, but the kids still got super size portions from fast food joints after school.”

Jose feels his cell silently vibrating with a message from Carla forwarding an older article Professor Green wrote in 2015. “Same old rant!” Carla’s message reads. Jose knows she plans to use her masters in public health to get into the obesity management business and make a lot of money. She whizzed through their science class on the genetic, cellular and molecular pathways of diabetes. She flashes another message. “He blames business and politicians. Like they don’t pay his salary for teaching us? It’s the pharmaceutical companies spending the most on research.”

“We tried to educate the public on obesity and diabetes by making food labeling more detailed and explaining the food pyramid in more depth. But Americans still love large portions. There are a lot of rich and powerful interests in the system. Congress gives agricultural subsidies to the corn and sugar growers. Agribusiness gives money to the PACs that get the politicians elected. So the politicians can’t go after the core interests that are responsible for this obesogenic environment. “

“We called for more exercise, especially walking, but people wouldn’t get out of their cars despite the traffic. Obesity is now the accepted norm. Just look at all the ads featuring ‘full-figured fashions’. Meanwhile we had 622,000 deaths from diabetes last year. That’s almost 30% more than leading experts had forecast for 2025 “Jose smiled. He’d just read that forecast in the article Carla emailed.

Carla raises her hand: “How can you say no one has taken action, what about all the technological advances in treating diabetes?” The professor responds: “You’re right; there are new effective drugs to help control obesity and blood sugar if taken consistently. These drugs are very expensive. Therefore not everyone can afford them. So the health care industry gets richer while the people get sicker. This country needs universal healthcare, but the powerful interests, budget constraints, and public fears of having to foot the costs, with no political consensus mean that we don’t get it. Diabetes costs $351 billion this year. Despite all that money, many people can’t afford the drugs that have you so impressed!”

Professor Green lectures. “The health care business will do what gets reimbursed and there’s no money in prevention and chronic disease management. All we get is episodic acute care with a full court press using technology for serious complications. Advances in technology have not been developed or leveraged for prevention, or to empower self care and reduce disparities. We fail to screen for diabetes, and even do a miserable job on cholesterol and blood pressure except for the rich. So we have a vicious cycle. Patients with obesity and diabetes are discouraged from joining health plans, thus increasing the number of uninsured and underinsured.”

The professor continues, “Some of you live in neighborhoods where more than 25% suffer from diabetes, while other neighborhoods have less than a 5% incidence.” Blacks, Hispanics, Native Americans, and some Asians have very high incidences of diabetes and complications. Black and Hispanic women have a 50% risk of developing diabetes in their lifetime. Society has widely ignored this outrage. Only now, when the upper class sees their children developing obesity and later in life diabetes, do we see some government response.

Carla raises her hand again, “Isn’t it true, Professor Green, that those with diabetes are dying 10 to 20 years prematurely, and suffering a loss of 15 to 30 quality adjusted life years, which weakens our whole economy?” The professor nods his approval. Jose knows Carla will get her A in the course and her high paying job in obesity management.

Scenario 1 Table 1: Diabetes Control Factors

Factors to Control Diabetes	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Prevention	0			
Screening	0			
Behavior Modification	+/-			
Mgmt Chronic Diseases	0			
Empowered Self-Care	0			
Advances in Technology	+			
Personalized Medicine	0			
Access to Care	0			
Obesogenic Environment	0			
Social Determinants of Health	0			

Health Policy, Public Health and Health System Changes by 2025

Society is first complacent and then resigned to the twin epidemics of diabetes and obesity. Actions taken between 2020 and 2025 led to some progress, but it is too little too late for the many people with advanced diabetes.

Health Policy and Public Health

- America agrees to widen seats in public places and take other measures to accommodate the obese under the Americans with Disabilities Act.
- Only schools and individual patients are held accountable for controlling obesity.
- Some actions were eventually taken to promote healthy eating – education, better food labeling, healthier school lunches, fruit in school vending machines, and regulation of food advertising to children. However, the obesogenic environment is too strong for these modest measures to have much impact. Government agricultural subsidies and restaurant food portion sizes are not addressed.
- Other than compulsory physical education in school, little has been done to make the built environment and community more conducive for physical activity.
- Screening for obesity, pre-diabetes and diabetes is not emphasized nor are there programs to address any identified disease conditions.
- The social determinants of health are not addressed.

Health Care System

- The health care system remains a free market structure where providers focus on activities with adequate reimbursement.
- Insurance and managed care plan benefits do not include many incentives for effective diabetes management and discourages these higher expense patients from enrolling.

- Preventive services and screening are inadequately compensated and interventions for “pre-disease” are not reimbursed at all.
- Providers actually lose money on many services when providing effective management for complex chronic diseases like diabetes and its comorbidities. However, it is quite profitable to manage complications of late diabetes such as dialysis, amputations, and coronary bypasses. Patients have to get sick to get adequate treatment.
- Technological advances continue with eventual antiobesity drugs, noninvasive glucose monitoring, better oral drugs for diabetes and methods to administer insulin without injections. They are expensive and not accessible by the poor and uninsured. Technologies to change behavior or reduce health disparities are underdeveloped.
- Access to care continues to be unresolved.
- By 2025 the cost of diabetes is $351 billion and health care costs overall are 22% of GDP.

Scenario 1 Table 2: Diabetes Burden

Diabetes Burden in the U.S.	Current/ recent estimates	Scenario 1	Scenario 2	Scenario 3	Scenario 4
		In 2025			
Total US Population					
Prediabetes	41 million	65 million			
Total with diabetes	20.8 million	50 million			
Undiagnosed segment	6.2 million	15 million			
Complications					
New blindness per year	24,000	70,000			
New amputations per year	82,000	239,000			
New kidney failure per year	44,400	119,000			
Deaths contributed by diabetes	224,092	622,000			
Annual cost of diabetes	$132 billion	$351 billion			
Overweight & Obesity					
Children Overweight	17%	25%			
Adults Overweight	66%	75%			
Adults Obese	32%	38%			

Scenario #2: We Did the Best We Could

It is 2025…

"We'll make a killing." Ron Helbind flashed a smile and pointed at his company's orange logo overhead. "Our stock is already up 3 points, and these new diabetes treatments can drive it higher," he said with satisfaction. "Bring up our weekly health performance dashboard," he ordered. A wall screen glowed, showing the date: March 31, 2025. "Let's see the pounds per member graph first."

A dynamic display showed that the health plan beneficiaries' median weight had dropped a quarter pound over the week. Then it flickered through a series of comparisons to show how their system stacked up against society in general and key competitors. The executives saw that while 70% of American adults are overweight, only 55% of their beneficiaries are. The obesity numbers looked even better at 20% for their enrollees versus 35% for the general adult population.

"As you know," Helbind said, "the federal government is offering us incentives to join a pilot project to see if our approaches can help people who only have catastrophic coverage. It's an attractive offer, but I don't know if our costs can stack up against our likely competitors. Any ideas about what we can do?"

Frank Greenway, the Chief Medical Officer spoke first. "We have to take a holistic look at the needs of these people. We can get their numbers down if we give everyone access to the basics—particularly education and basic treatment."

Sissy Bluestone, his Chief Operating Officer, leapt in. "We can do the education cheaply enough online, but patient care is expensive and will dilute earnings. We can only afford to offer generic medicine and group visits to clinics for lower-tier patients. Let me look at the contract and put a fine point pencil to it for the government, Ron."

She switches to other number-crunching recommendations. "Our experts recommend we eliminate the co-pay levels on bariatric surgery for the top 10% of our most obese patients. Then we follow the protocols for checking portion size, promoting exercise and giving generic metabolic enhancing drugs to the top 25% of weight gainers."

Helbind nodded his approval. "OK and I want to press ahead with the new closed-loop insulin pumps. We've negotiated a bulk purchase and set the co-pays to make a profit,

and our patients get better control without the hassle of managing their own blood glucose."

Greenway weighed in. "We need to keep improving our care coordination." Bluestone countered. "The last time you said that it cost us millions to update and integrate our intelligent agents with the electronic medical records." Greenway nodded. "Yes, and it worked because now we get the meds right so they're personalized to the patient. We now control blood sugar, cholesterol and the metabolic drugs that help burn calories. What we cannot coordinate yet is all the ways in which beneficiaries navigate the obesogenic environment. It would be great if we could program our intelligent agents to counteract food ads and all the messages saying it's ok to eat too much and to be fat. We are really only reducing growth rates in this diabetes epidemic. We're not stopping the problem, even though we're doing better than most plans."

Helbind scowled, "Let's focus on what we can do and how we succeed as a health plan. We are a business. Let's leave the 'obesogenic environment' to the government."

Greenway wasn't easily deterred, "Computer! Show the latest diabetes figures for the U.S. The wall screen shows a high definition line graph that begins in the year 2000. From 2000 to 2010 the slope is steep – a flashing figure of 5% showing the yearly growth rate. After 2010 the slope grows less steep – down to 3.65% in 2015 and falling under 3% per year after 2020. "Look at that," Greenway's voice rose, "this is as good as we can do and still almost 100,000 patients will go into renal failure this year in 2025! There will be 50,000 new cases of blindness and 200,000 lower extremity amputations this year. We have to do more to stop this."

Helbind spoke gently. "We will do more, Frank. The government knows that the private sector has the best chance at solving this crisis. For twenty years they've been trying to get individuals to take more responsibility. They've finally figured out they have to give us the incentives to help. In fact, that's why I arranged an e-Conference between you and the Surgeon General's office. You will help devise a program that makes our approaches available to the under-insured. The budget will be pretty constrained, and our margin will be very thin, but we have to do it. I've sent all the information to your I-assistant. Now, Sissy, while Frank gets ready for his conference, I'd like to talk with you about our high tier customers"

The COO's eyes lit up. "They continue to give us the highest margins. Their use of metabolic enhancing drugs is up, and they are driving more demand for biomonitors, scans and personalized preemption plans. It's amazing how quickly they convert the

latest research findings into requests for risk reduction for various health threats." Helbind nodded in agreement. "We have to keep our own research teams working on new avenues to superhealth. I've been really pleased with the results I'm personally getting from our program. I can work longer without losing my edge."

Later that day the CMO Frank Greenway is working with his I-assistant to put together a program for obesity and diabetes within the constraints he'd been given. He hears the gentle warning that Dr. Mandez from the Surgeon General's office is preparing to connect. "Put his bio up." Greenway commanded. A quick series of video clips, voiceovers, news items and academic records flash in front of Greenway. The wall screen announces Dr. Mandez entering the e-Conference.

"Hello Dr. Greenway. It's nice to meet you," Dr. Mandez's smile appears relaxed and genuine. "You too, Dr. Mandez," Greenway smiles, "I see we both went to Yale for medical school. I was just a few years behind you."

"Yes," Mandez replies, "but after your residency you caught the healthcare reform wave, while I went into public health. I remember how we thought consumer-driven care, electronic medical records and integrated delivery systems would change everything. Yet as the epidemics of obesity and diabetes show, from a public health perspective the changes were less significant than we hoped. So now we are charged to combine what has worked in the private sector with our public health programs. Since they reorganized the old Medicare and Medicaid programs into MediAll, and put us in charge of the payment system we can put an economic footing underneath the collaboration."

"Good," said Greenway, "with business working for public health we can combine the strengths of both. I think we should set a goal for this project to reverse the growth in both obesity and diabetes by 2035. I've been looking holistically at the problem and have outlined some ideas for you."

Scenario 2 Table 1: Diabetes Control Factors

Factors to Control Diabetes	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Prevention	0	+		
Screening	0	+		
Behavior Modification	+/-	+		
Mgmt Chronic Diseases	0	+		
Empowered Self-Care	0	++		
Advances in Technology	+	++		
Personalized Medicine	0	+		
Access to Care	0	0		
Obesogenic Environment	0	+		
Social Determinants of Health	0	+/-		

Health Policy, Public Health and Health System Changes by 2025

Science and business are the primary avenues of response to the twin epidemics of diabetes and obesity. Private sector healthcare creates successes, but only where the market offers sufficient rewards.

Health Policy and Public Health

- Medicare and Medicaid are combined into MediAll which increases coverage to a larger segment of the population. Many are still uninsured.
- Gradual policy changes address healthier food and physical education in school. Better warning labels and increased information on healthy eating shift trends in processed foods to healthier ingredients and portion sizes. The fast food and restaurant industries have added more choices, eliminated harmful ingredients such as transfats and reduced portion sizes on a voluntary basis, but the driving force was a fear of future law suits.
- Social determinants of health are only marginally addressed towards the end of the period.
- The majority of Americans blame individuals at risk rather than other components of society. Health policy does not extend to supersizing, the lack of affordable quality food in poor communities or the role of advertising.

Health Care System

- The free market health care industry slowly adjusts to the twin epidemics by changing financial incentives for more effective prevention and treatment. The rapidly increasing cost of managing the complications of obesity and diabetes make it more profitable for managed care organizations to either encourage prevention or to intervene with early screening and aggressive early management. Well run

managed care organizations are finding ways to be highly profitable by reducing obesity and effectively managing early diabetes for their enrollees.

- To control costs health benefits have transitioned into a tiered system with a basic tier of comprehensive services mandated for all health plans and MediAll. People can “buy up” to higher tiers out of pocket. The newest expensive therapies and more personalized care are only available in the higher tiers.
- The private sector effectively uses financial incentives to promote prevention and chronic disease management for those who are well insured. Government health providers have not been as successful at using financial incentives for effective disease management.
- Consumer-driven health care early in the period helped more people become very knowledgeable about health and managing their diseases and offered clear financial incentives for wise health purchases.
- Advances in information and biomonitoring technology have become quite effective in empowering a significant portion of people to manage their health.
- Technological advances are aggressively applied within the health care system. New therapies are at first expensive, but managed care organizations still find ways to incorporate them into the basic tier to profit by avoiding complications.
- Weight control through drugs targeting hunger and metabolic pathways (metabolic enhancing drugs) are widely used by those who can afford them. Health plans include these drugs in the basic tier. Obese patients who fail the targeted drug approach usually receive bariatric surgery if their health plan tier covers it.
- Noninvasive glucose monitoring and home tests for hemoglobin A1c and cholesterol are tied into digital health coach programs and routinely employed to encourage compliant self-care. Many people with diabetes who are not controlled through oral medication receive insulin producing stem cell transplants or closed loop implanted insulin pumps if they belong to health plans.
- Diabetes care costs society $395 billion per year and 24% of GDP goes into healthcare. As a result outcomes have dramatically improved over the past 10 years.

Scenario 2 Table 2: Diabetes Burden

Disease Burden in the US in 2025	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Prediabetes	65 million	50 million		
Total with diabetes	50 million	45 million		
Undiagnosed segment	15 million	10 million		
Complications				
New blindness per year	70,000	55,000		
New amputations per year	239,000	180,000		
New kidney failure per year	119,000	95,000		
Deaths contributed by diabetes	622,000	550,000		
Annual cost of diabetes	$351 bn	$395 bn		
Overweight & Obesity				
Children Overweight	25%	23%		
Adults Overweight	75%	70%		
Adults Obese	38%	35%		

Scenario #3: Caring Communities and Reformed Systems

It is 2025…

Jim Vertmiller has a strong opinion about why America made health care a universal right that he doesn't mind sharing with his fellow prospective jurors. "It wasn't because Medicare was going to bankrupt the country before 2020. It was all the amputations, failed kidneys and blindness from diabetes that everyone knew could have been prevented," he asserted. "Look! In 2015 we had over 35 million cases of diabetes, giving us more than 437,000 deaths, almost 45,000 blind people, 80,000 renal failures and almost 160,000 amputations. That's why we got national healthcare reform."

While some of the other prospective jurors were impressed by Vertmiller's recitation of the statistics, Lisa Smith thought he was putting himself above the others. "It was 78,236 renal failures in 2015," she corrected after a glance at her infopod, "and the National Center for Health Statistics reports there will still be 65,000 cases of renal failure from diabetes in 2025 even with national health care."

Vertmiller turns to his young challenger. "There would have been a lot more if we hadn't reformed the system so everybody could get access. We used to have a lot of uninsured, and more of them had diabetes than people who had insurance." He glanced at his own infopod. "Today we still have about 40 million people with diabetes, but we don't have millions more who have the disease but are undiagnosed like we used to. That's because everybody gets to see a doctor now and the electronic protocols ensure

their blood sugar gets checked. That's how we know we still have about 45 million more people with pre-diabetes."

Not to be outdone, Lisa looks at her infopod and says, "Yes and the government still projects 450,000 deaths, 35,000 cases of blindness from diabetes and 110,000 amputations. So my question is why do we still have such a problem with diabetes if national health care is so good?"

An older African American woman named Doris Blumer answers. "I've had diabetes for fifteen years now. So I know what it was like before national healthcare and what it's like now. There's no question that it's better now. I see an endocrinologist every year, I have an electronic medical record that does not get lost between visits and my care is coordinated. My electronic health coach is helping me keep my weight down. That didn't happen before."

Vertmiller nods his head enthusiastically. "That's right, and we now address inequity far better." Lisa is still skeptical. "So are you really satisfied with national health care?" "No girl, I didn't say that!" Doris shakes her head. "I am wait-listed for those new drugs that could help me lose this weight, and I'd like to get those latest drugs that work to control my blood sugar, blood pressure and cholesterol all at once. Instead they keep putting me on generics, and I'm taking so many of them that the only time I'm not taking a pill is when I'm sleeping. I'd complain to my doctor, but she spends so little time with me I can't get the first word out before she's gone. No. I'm not saying national health care is good. I'm just saying it's better than it was."

The discussion is interrupted by the bailiff who enters the room. "The judge is meeting with the lawyers now," he announced. "Jury selection should start before lunch. Meanwhile, you've got time to get coffee and doughnuts while you wait. There's soda in the vending machine if you don't drink coffee."

Lisa mutters to Doris, "Don't you wish they'd serve healthier snacks? People with diabetes have to be careful about their diets, I know." She looked back at her infopod. "According to the latest figures 45% of Americans are still overweight and 20% are obese." Doris gives Lisa an annoyed look. "Enough with the statistics, girl. I can eat snacks as long as I watch my blood sugar and take my pills."

Vertmiller sides with Lisa. "You are right. The government needs to do more to help us eat healthier. They've published plenty of warnings, taken away farm subsidies for sugar and made sure we learn about nutrition, but they need to do more."

“At least they’ve made physical fitness a priority in schools now. We’ve got to make exercise a bigger part of our lives in the community,” Lisa replies. Doris moves away from the vending machine to join back in the conversation. “We’ve got walking groups for our neighborhood. The city has put in a nice new path that takes us through two parks and it’s well lit and patrolled so we feel secure.”

Lisa smiles at Doris. “My company enrolled in one of the government’s prevention incentive programs. Has yours?” Doris shakes her head, and Lisa explains. “We have a set of baseline measures including weight, blood pressure, glucose tolerance and cholesterol. Every month we get rewards if we keep fit. Our company gives time off, health club memberships and sports equipment. I got my bike for meeting my health goals last year.” Doris frowns. “The supermarket I work at doesn’t give us much of anything for benefits.”

Jim spoke up. “That’s just wrong! Healthcare reform was supposed to make sure we all got good quality of care.” Lisa counters, “Yes, but while the basic level of effective health care does include personalized medicine, you can’t get many of the latest breakthroughs. It’s like we have to stay a step behind even when tests show the new medicine would work better. The government is afraid it will be too expensive if everybody demands them, so you have to buy them yourself.” Jim looked thoughtful for a moment. “Maybe that’s the price we have to pay for everybody to get healthcare; and it’s better than the poor and much of the middle class not having health care,” he said.

Lisa shakes her head. “I don’t agree. If there is enough information about me from all the biomonitors in my electronic health record, there should be a way to give me the right care. I don’t have diabetes or pre-diabetes. I do agree I don’t need the same care she does.” She points to Doris. “She should get more prevention. In the long run that will save money. It’s not really fair that some people get sick and some people don’t, and even more unfair if sick people don’t get the treatment they need. I think our healthcare system has worked hard on fairness since the reforms passed.”

At that point the bailiff comes back to announce, “You are now summoned for jury selection. Follow me. The judge will explain the proceedings.” They follow him into the court room.

“This case is a lawsuit.” The judge announces. “The plaintiff contends that the regional health administration has refused to reimburse for a critical new medical device, though

it's been proven to work. Because of the nature of the device we will be excluding some of you as jurors. Do any of you have diabetes?"

Scenario 3 Table 1: Diabetes Control Factors

Factors to Control Diabetes	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Prevention	0	+	++	
Screening	0	+	+++	
Behavior Modification	+/-	+	++	
Mgmt Chronic Diseases	0	+	++	
Empowered Self-Care	0	++	+	
Advances in Technology	+	++	++	
Personalized Medicine	0	+	+	
Access to Care	0	0	+++	
Obesogenic Environment	0	+	++	
Social Determinants of Health	0	+/-	++	

Health Policy, Public Health and Health System Changes by 2025

Society looks at the multiple factors causing the dramatic increase in diabetes and adopts concerted efforts to address the obesogenic environment and provide universal access to health services for all Americans. People do not get everything they may want, but they do get what they need to improve the incidence of diabetes and obesity within the population.

Health Policy and Public Health

- In 2005 policy makers started to identify and address ways to lessen the impact of the obesogenic environment to control obesity. Schools became role models for healthy eating, physical activity and health education so young people learn good habits and pressure their parents for healthy living at home. Subsidies, incentives and regulations are changed to control advertising of unhealthy foods, promote healthy ingredients in foods and change America's view of the normal portion size.
- Communities promote healthy "built environments" that offer safe ways to walk to work and school, provide opportunities for exercise and encourage children to play outside for hours a day.
- Policy changes are made to offer education, job and housing opportunities for the poor and minorities and enhance the social determinants of health.
- Prevention is reinforced with education campaigns and work place incentives for healthy behaviors.

- The political push for healthcare reform came in 2010 because of rapidly rising numbers of serious diabetic complications. Comprehensive universal health coverage for all Americans is enacted.

Health Care System

- Universal health coverage and government prevention incentive programs dramatically shift the health care industry toward prevention, early screening and effective management of chronic diseases. These efforts are adequately funded in 2025.
- Addressing health problems early with effective behavior modification techniques makes a huge difference in reducing obesity and diabetes. This helps cut the prevalence of major complications by half their projected levels in 2025.
- With all segments of society and the economy promoting health, empowered self-care and personal responsibility for health are now the norm.
- Technological advances are impressive – plentiful biomonitoring devices, new classes of effective drugs against obesity and diabetes and its comorbidities, and electronic personal health records. Advances in biotechnology lead to greatly expanded knowledge about health and disease at the genetic, cellular and molecular levels so that prevention and therapy could be targeted to the individual.
- Many of these sophisticated therapies are quite expensive and there is constant friction in determining who should have access to expensive, but appropriate drugs while keeping universal health care financially viable. The result is that the less affluent often wait several years for the cost of new therapies to drop.
- In 2025 the societal cost of diabetes is $305 billion – about $5 billion less than projected. More importantly, the number of people with diabetes is 20% less than anticipated 20 years earlier.

Scenario 3 Table 2: Diabetes Burden

Disease Burden in the US in 2025	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Prediabetes	65 million	50 million	45 million	
Total with diabetes	50 million	45 million	40 million	
Undiagnosed segment	15 million	10 million	1 million	
Complications				
New blindness per year	70,000	55,000	35,000	
New amputations per year	239,000	180,000	110,000	
New kidney failure per year	119,000	95,000	60,000	
Deaths contributed by diabetes	622,000	550,000	450,000	
Annual cost of diabetes	$351B	$395B	$305B	
Overweight & Obesity				
Children Overweight	25%	23%	15%	
Adults Overweight	75%	70%	45%	
Adults Obese	38%	35%	20%	

Scenario #4: Evolving Systems with Enlightened Leaders

It is 2025…

Andy Amarillo tells the President of the United States, "Yes, I can help you make that happen." Andy smiles as he signs off. The President had called Andy a "System Wizard," a term increasingly used to describe the growing number of people trained to a "black belt" level in systems thinking and change management, as well as in a specialty like health care. He walks through the lobby of the communal living center for seniors. Andy feels at ease here. He collects three of the elders he'd recruited last night.

Esmeralda, the oldest of the three, is blind as a result of diabetes, and her friend Charles is helping guide her. "Why couldn't we get a van to take us to the church?" she complains. "Walking is good for us, Tia," Andy says. "It helps the blood circulate and burn the sugars, darling." Esmeralda responds. "I got pills that burn the sugars. They work like magic." Andy nods. "Yes, you need to keep taking the pills, but walking every day makes them work better. When we get to the church, I'm going to have you meet with some teenagers from the neighborhood."

"Are they gangstas?" Walter asks as he limps alongside the others, his black cane supporting his weight while Esmeralda's white cane moves side to side in front of her. Walter lost toes to diabetes back in the days before the new treatments made amputations rare. "Most of them are, Walter," Andy smiles. "The police department recommended them. We're using this program to broker a peace process and get kids back into school, as well as to fight diabetes in the community. You three have a big role to play." Andy could see they liked hearing that. He'd seen the signs of depression in all three faces the night before and knew that this program would help give them meaning as they helped orient the teens to improve community health.

When they reach the church, they find the teens are sitting in two distinct groups and Andy could sense the hostility as the Red Bloods leader demands, "What you bring these punks here for with us?" Andy politely replies, "To make money and earn respect in the community, same as you. How do you like my jacket?" he asks. He performs a slow pirouette so they can see the dramatic skull emblem emblazoned on his gold silk jacket. "Nice," the gang leader answers with greedy eyes, "where you get those?" Andy reaches down into a box. "Here, these are yours." He had red silk for the bloods and green for M-13. "You can wear these when you are out in the community spreading the word."

Andy explains how they will earn money from the public health office by going to health class and introducing new foods to their families and friends. He introduces the elders who will tell their stories. Their job is to provide security for the elders and escort them to the schools and neighborhood health centers. He describes the "Green Gym Program" and how they will earn credits by enrolling people into the outdoors exercise classes. By the end of three hours he has another community health program up and running.

Andy heads to City Hall for a meeting with the Chief of Police, public health officials, school principles, clergy and business leaders. They agree to join in a recognized national health promotion program they have customized to fit their community needs.

Later that week Andy joins a conference of fellow health-focused system wizards gathered at an upscale resort. On the first day he hears the Secretary of Health and Human Services, the Surgeon General, NIH Director and FDA Commissioner along with the Director of the Office of Management and Budget, the Secretary of Labor and members of the Joint Economic Council, as well as key Members of Congress. Leaders from healthcare delivery and academicians from every major discipline also enrich the program. The Secretary opens the conference.

"Let's look at the national picture first," the Secretary begins. "This map shows where our 35 million people with confirmed pre-diabetes live, as well as the 25 million who have significant risk factors. The data is displayed on beautifully colored, interactive maps that let participants probe the data with individual questions and hypotheses. The Secretary continues, "As you can see we still have 28 million cases of diabetes. So despite our progress there is work to do. We still have 30% of Americans who are overweight, including 10% of the population that is obese. We will continue to make certain every level of government is coordinated, that public and private resources are in synergy and that every field contributes."

The conference technology guides people with similar questions and hypotheses to others in the hall whose partial answers, alternative views and complementary knowledge provoke new learning. Andy is drawn to a series of illuminating dialogues on facilitating change in behavior for individuals, families and communities. The methods for helping people change at different developmental levels are well established for those open to change, and even for those in an arrested state. Psychologists, neurobiologists, social scientists and change agents have yet to figure out how to help people closed to change, but the dialogues bring forward some intriguing new ideas to try out. The conference celebrates powerful changes in the environment, such as universal health care and chronic disease management, stronger family and community

cultures, health promoting advertising and product choices, and physical environments that encourage physical activity.

The conference exhibition hall offers a wide variety of monitoring devices, disease preemption packages and prevention programs addressing diabetes and weight gain. He sees exhibits that explain how personalized medicines are targeted effectively to host of chronic conditions. Andy is most intrigued by the stunningly realistic simulations showing how a person can age into health or disease based upon dietary choices. He imagines his teen health clinics playing with these images, some coming hauntingly close to an end of life like the blind Esmeralda, whose diabetes had her tapping sidewalks with her white cane.

Andy is impressed by the leadership in his one-on-ones with the cabinet members and other policy leaders. Senator Greenwald reminisced about helping pass legislation ten years ago that make high-calorie foods and larger portions too expensive to be a major part of the American diet. He loves to tell how he threatened to expose the sugar lobbyists as addiction peddlers through their own secret studies if they didn't stop opposing eliminating agricultural subsidies.

The conference is buzzing the next day with rumors that the President will announce a dramatic policy change in her speech. "I'll bet she's announcing that our health gains have given us the GDP growth that the Labor Department is releasing today," one of the economists speculates with Andy, who just smiles knowingly. When the President called, she had asked him to support a large increase in the change agent program to bring more system wizards to communities. Even he did not anticipate the scale of her vision.

"We are defeating diabetes and obesity in America," President Turk began. "Yet it is not enough! We will begin today to help rid the world of diabetes. You System Wizards have become remarkable change agents for our nation's health care system. Now I also want you to work with me and the World Health Organization as global change agents. I speak now to each and every one of you." The President's eyes bored into Andy's from the screen as she spoke. "Your instructions and country destination are being downloaded right now into your AI. I expect to get your first report next week." As the president's image fades Andy had to laugh as he caught the ever so slight hint of a wink.

Scenario 4 Table 1: Diabetes Control Factors

Factors to Control Diabetes	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Prevention	0	+	++	+++
Screening	0	+	+++	+++
Behavior Modification	+/-	+	++	+++
Mgmt Chronic Diseases	0	+	++	+++
Empowered Self-Care	0	++	+	+++
Advances in Technology	+	++	++	+++
Personalized Medicine	0	+	+	++
Access to Care	0	0	+++	+++
Obesogenic Environment	0	+	++	+++
Social Determinants of Health	0	+/-	++	+++

Health Policy, Public Health and Health System Changes by 2025

In this scenario the country has mobilized under strong leadership to achieve the audacious goals of designing these twin epidemics out of society. All of society shares responsibility for achieving health. This scenario describes a systems approach that incorporates the ten factors to control diabetes. The focused attention on the ten components provides a solution for addressing obesity and diabetes with a gradual reduction of diabetes to near half its projected burden for 2025. Systems wizards interact with different segments of society to achieve behavior change. Strong visionary leadership pursues the desired outcome. These leaders knew how to leverage change in governments, businesses and institutions. This scenario represents a fundamental mind change throughout America.

Health Policy, Public Health and the Health Care System in Synergy

1. The **Obesogenic Environment** is systematically addressed. People find it easy to eat healthy food in the right portions at home and in restaurants. High calorie, unhealthy meals are looked on the way tobacco use was seen in 2006 – as risky, unnecessary and unhealthy. The built environment is designed to make physical activity a natural part of daily life for everyone. Walking and other physical activity on the job and at home are encouraged. Most kids are using their intelligent agents as health coaches before they become teenagers.
2. **Social Determinants of Health** play an essential role in preventing diabetes and disparities. This requires research to understand the true underlying etiologies, design potential solutions, execute controlled demonstration projects, and then implement proven changes. Every citizen is accepted as a valued member of his or her community.

3. **Prevention** is understood at the cellular level and based on what works for the individual. Society encourages and rewards prevention at the community level.
4. **Screening** using simple biomonitoring devices identifies problems early for preemptive medical interventions.
5. **Behavior Modification** is a well developed process of education, coaching, monitoring and incentives tailored to the world view and beliefs of the individual. This produces a high rate of success.
6. **Chronic Disease Management** is done by teams of collaborating professionals using electronic health records to provide long-term continuity of care, education and coaching. All risks are aggressively managed using evidence-based medicine, but early intervention means therapeutic approaches can be just enough to nudge disease back to normalcy while maintaining a high quality of physical, emotional and spiritual life.
7. Individuals engage in **Empowered Self-Care** to maintain health and comply with advice for managing diseases. They have the tools, such as information agents, assistive devices and coaching, to do this.
8. **Advances in Technology** include biomonitoring, intelligent electronic assistive devices and a wide range of targeted therapies. These devices are leveraged to eliminate disparities while creating health.
9. **Personalized Medicine** leads to selecting therapeutics for the unique characteristics of an individual's health problems. Pharmacogenomic assessment of the individual's drug metabolism prevents adverse reactions to therapies.
10. **Access to care** is universal and comprehensive. Society can afford it because effective prevention and early intervention keeps the disease burden low.

Scenario 4 Table 2: Diabetes Burden

Disease Burden in the U.S. in 2025	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Prediabetes	65 million	50 million	45 million	35 million
Total with diabetes	50 million	45 million	40 million	28 million
Undiagnosed segment	15 million	10 million	1 million	0.3 million
Complications				
New blindness per year	70,000	55,000	35,000	10,000
New amputations per year	239,000	180,000	110,000	35,000
New kidney failure per year	119,000	95,000	60,000	25,000
Deaths contributed by diabetes	622,000	550,000	450,000	275,000
Annual cost of diabetes	$351 bn	$395 bn	$345 bn	$220 bn
Overweight & Obesity				
Children Overweight	25%	23%	15%	8%
Adults Overweight	75%	70%	45%	30%
Adults Obese	38%	35%	20%	10%

Conclusion

At present we are on track to realize the first and worst of the four scenarios. To change the future and increase the likelihood of a scenario we aspire to create there are important actions to take in the near term. The ten Diabetes Control Factors illustrated in the scenarios provide the strategic components for policies and programs that can defeat diabetes. But even with effective policies it will take time to make headway because even the most optimistic scenario shows that the disease will be with us in 2025.

The fourth scenario illustrates a comprehensive approach to implementing all ten strategic components. We see leadership at a national as well as local level as crucial to success. The efforts against diabetes in this preferred future are integrated—science with social science, business and government, public health with churches, schools and law enforcement. The systems for prevention are culturally sensitive, providing answers appropriate to different developmental levels, ages and community norms. Technology plays an important role in defeating diabetes. So does visionary leadership, systems engineering and creation of healthy cultures. Whether or not such a scenario is fully achievable, it sets out aspirations and strategies that policy makers, healthcare leaders and community activists can use as a guide for getting started today.

IAF poses the following questions to policy makers to help them get started on an effective agenda against diabetes and obesity.

NN Scenarios Public Policy Questions

1. Are there viable policy wins that could move us toward a systems change focused on all 10 factors that can address the twin epidemics of obesity and diabetes?

2. What congressional committees have jurisdiction over policies to address each of the 10 factors identified for intervening in the twin epidemics?

3. What federal agencies should play a lead role and which should be involved in implementing policies focused on each of the 10 factors?

4. Beyond the Federal Government, what policies for health should regulatory agencies, states, local governments, schools, employers, communities, and advertisers execute to address obesity and diabetes?

5. What current Federal policies are preventing progress on the 10 factors?

6. Can a market-driven approach to health care work or do we need universal access to provide effective prevention and good diabetes management?

7. Can we alter payment incentives so prevention, screening, and coordinated management of chronic diseases are rewarded in the marketplace, and therefore are readily accessible?

8. Can we fundamentally alter payments systems so that providers and consumers have the incentive for prevention, care coordination and healthy outcomes?

9. Can our policies create the right incentives for innovation without worsening disparities or creating unrealistic expectations for service?

10. How do we assure innovations that are expensive in the near term but that save money in the long term get into the market and to those most in need?

11. When should we look for cultural and behavior change rather than an expensive technology (such as bariatric surgery and metabolic drugs) to address obesity?

12. What are the responsibilities of the food industry (producers, processors, restaurants, marketers and advertisers) and what are the responsibilities of the individual in addressing obesity?

13. What political interests need to be energized in order to overcome the resistance to the best changes described in these scenarios?

The one clear conclusion for anyone who looks clearly at the future of diabetes and obesity is that more must be done than we are doing today. The public health of America is at stake.