

Technology **I**ntervention for **D**iabetes **E**ngagement & **S**elf-care

The **TIDES** Study:

Comparative Effectiveness Randomized Clinical Trial in Primary Care

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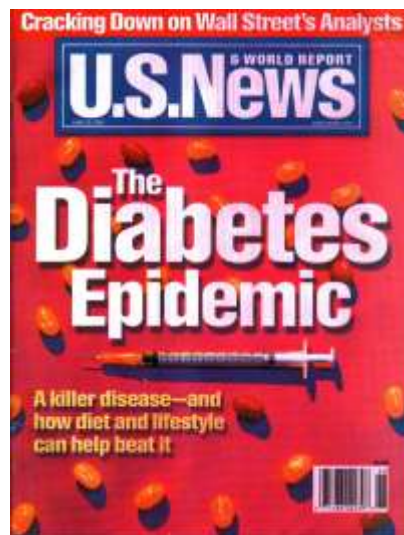
Howard Steinberg

CEO & Founder, dLife

Overview of Today's Session

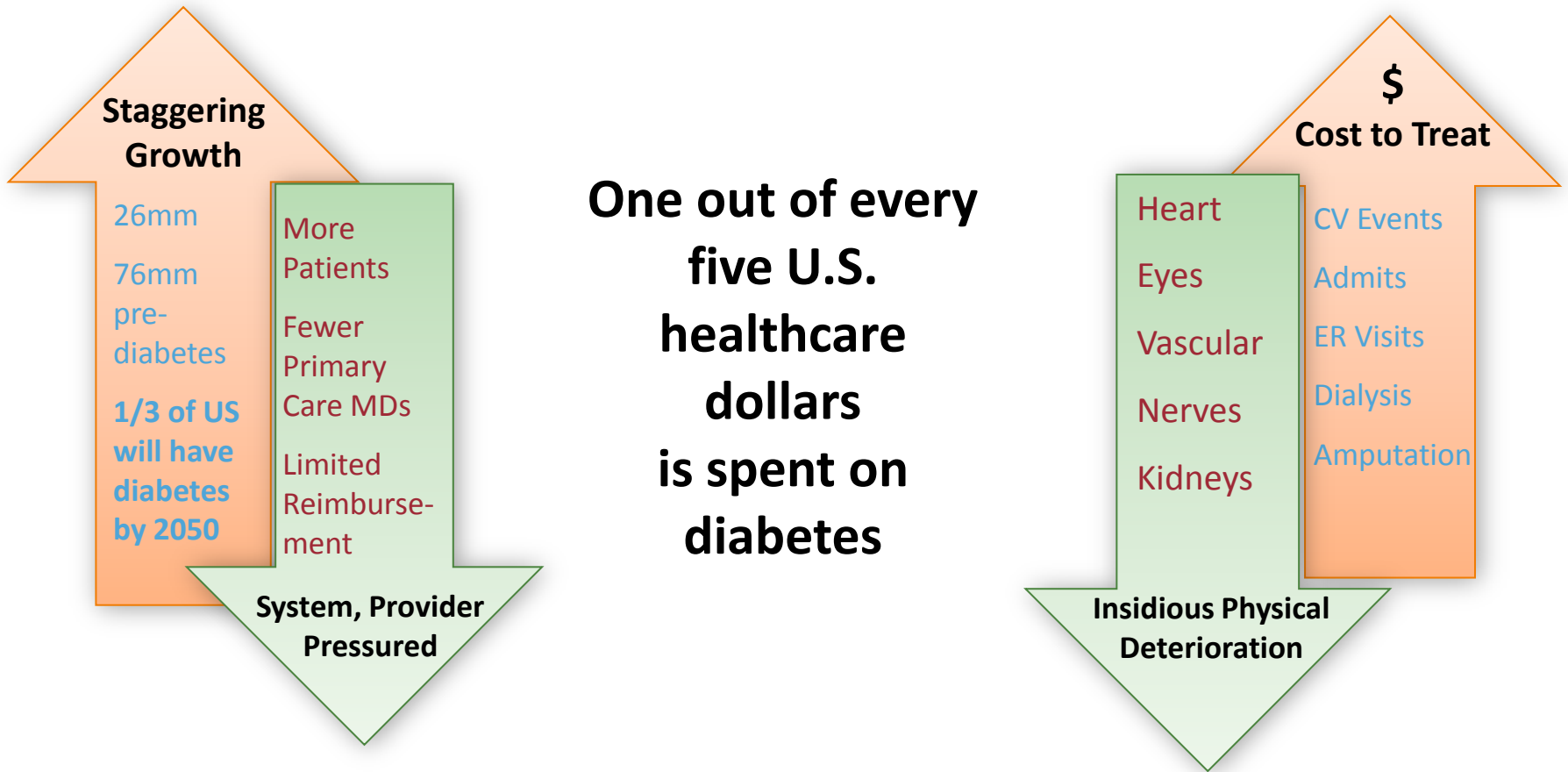
- **The Diabetes Challenge**
- **Current Intervention Options**
- **What is the TIDES Intervention?**
- **Results**
- **Discussion**

Diabetes in America



The disease of our time

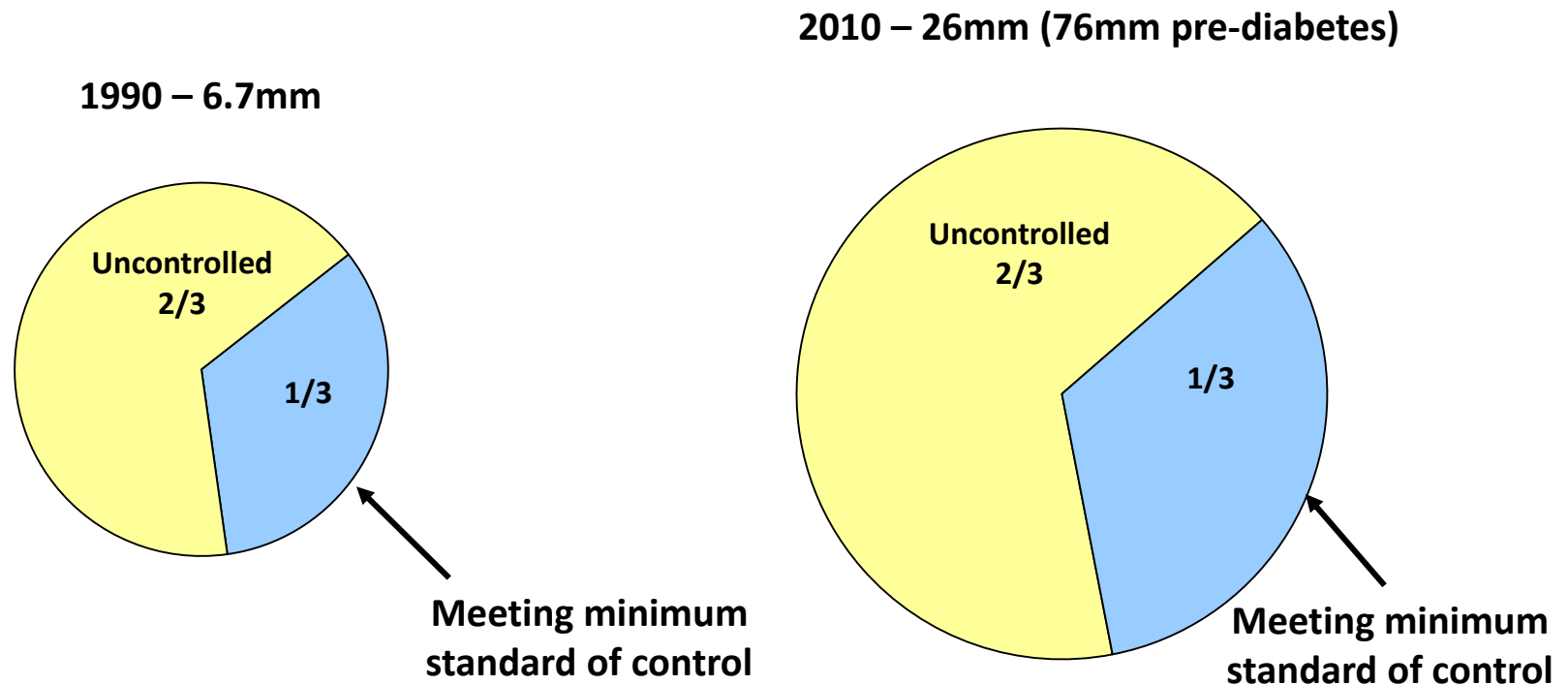
The Perfect Storm



The single largest opportunity in US Healthcare

Current System Fails to Manage Diabetes

No Care Improvement as Patient Growth Accelerates



Meeting minimum
standard of control

Meeting minimum
standard of control

* American Association of Clinical Endocrinologists (AACE): :only 33% of U.S. patients with diabetes achieved AACE's recommended A1C goal of $\leq 6.5\%$.

Why?

Diabetes is Hard:

Not simply an Endocrine Disease, but a Behavioral one

A person with diabetes is the manager of the body's dysfunction to normalize blood sugar



Requires Patient Opt-In to Self-care

**Source: CDC Task Force Study for Reducing Morbidity and Mortality from Diabetes Through Healthcare System Interventions and Diabetes Self Management Education*

CDC: ... “Reduction of diabetes morbidity and cost is directly related to patient knowledge and motivation...”*

System is Totally Misaligned with Diabetes Population Needs

Don't eat that!
Get more exercise!
Take your meds!



Clinical vs. Behavioral...
Episodic vs. Consistent...
Treats Acute vs. Chronic Disease



I don't know what
to do first!



**Source: CDC Task Force Study for Reducing Morbidity and Mortality from Diabetes Through Healthcare System Interventions and Diabetes Self Management Education*



Diabetes Challenge in Primary Care where 90% of Type2 Patients are Treated

- Incentivized to respond to volume=acute care needs
- Silent nature of disease with deferred (acute) complications
- Infrequent episodes of care
- Limited by training, resources and ability to support sustained behavior change and lifestyle improvements
- Medication dependent care legacy
- DSME/self-care intervention studies in literature, not in practice (e.g.: < 1% of available Medicare DSME reimbursement is utilized)

Inadequate Options for T2 Diabetes Population Health



Primary Care

Minimal ability to manage behavior and lifestyle

Diabetes Self Management Education

(DSME) – episodic “teaching” of ABCs, with little innovation and application of technology - constrained by a clinical and third party Payor mentality



Traditional Disease Management

addresses only highest risk segment - mainly episodic telephonic coaching/check-in interventions

Find it Yourself in the Public Domain

Assumes patient knows what they don't know, is motivated to hunt for answers in a maze of fragmented content of varying quality



Result: Diabetes Population is Disenfranchised and Self-Care Disabled

1 hour per annum with a physician...
8,759 hours of independent, highly
personal challenge of self management.





More Consumer-centric Approach Leveraging Technology

Apply **latest technologies and media channels** to integrate to the daily 24/7 habit stream of patients *and* caregivers

Entertain, Incent, Involve **as if you are selling something**

Deploy a full *engagement* suite: pragmatic lifestyle learning access including **psycho-emotional recognition**

Augment: Not replace providers

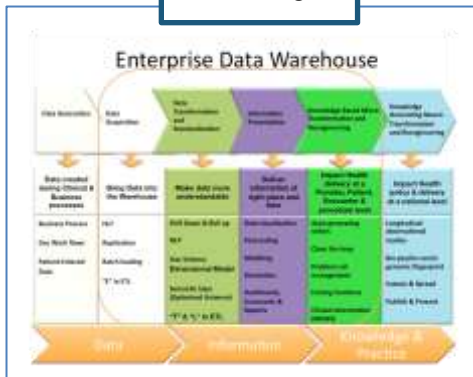


Partners to Compare Effectiveness

GEISINGER

High Quality Primary Care Delivery

“EHR’d”



dLife

Consumer-centric Multi-media technology

Evidence Based Lifestyle Interventions

Why Self-Care Engagement Intervention?

- Narrow the DSME/Self-Care Gap in PC: Urgency to engage and activate
- Online resources show promise to disseminate interventions¹

¹ Ramadas, A.(2011). *Web-based interventions systematic review of recent evidence*. Int J Med Inform, 2011. **80**(6): 389-405.

What is... *Technology Intervention for Diabetes Engagement & Self-Care?*

- Partners with Primary Care Providers (PCP) to improve routine diabetes care (without adding workload).
- Focuses on how to engage Persons with T2 Diabetes.
- Employs state of art media technology, educational, motivational, and engagement science
- 24/7 self-management resource and support.
- Complements face-to-face/classroom DSME.

What is Unique?

- ✓ Minimum intervention training/support (<2 minute in primary care)
- ✓ 24/7 - hour access and support
- ✓ Flexible – individual tailors intervention to own goals and preferences
- ✓ Variety of digital technology to drive sustained learning and engagement
 - email, video, audio, data mgt, social media, interactive tools
- ✓ Weekly lessons: “dosed” fresh content mixed with reminder/reviews/quizzes
- ✓ Built to interact and assess knowledge and reinforce skill mastery



Study Overview

Hypothesis

Compared to Diabetes System of Care (control), TIDES will significantly improve diabetes knowledge and self-care behavior.

Study Design: Randomized Control Trial

- 1: Control
- 2: TIDES

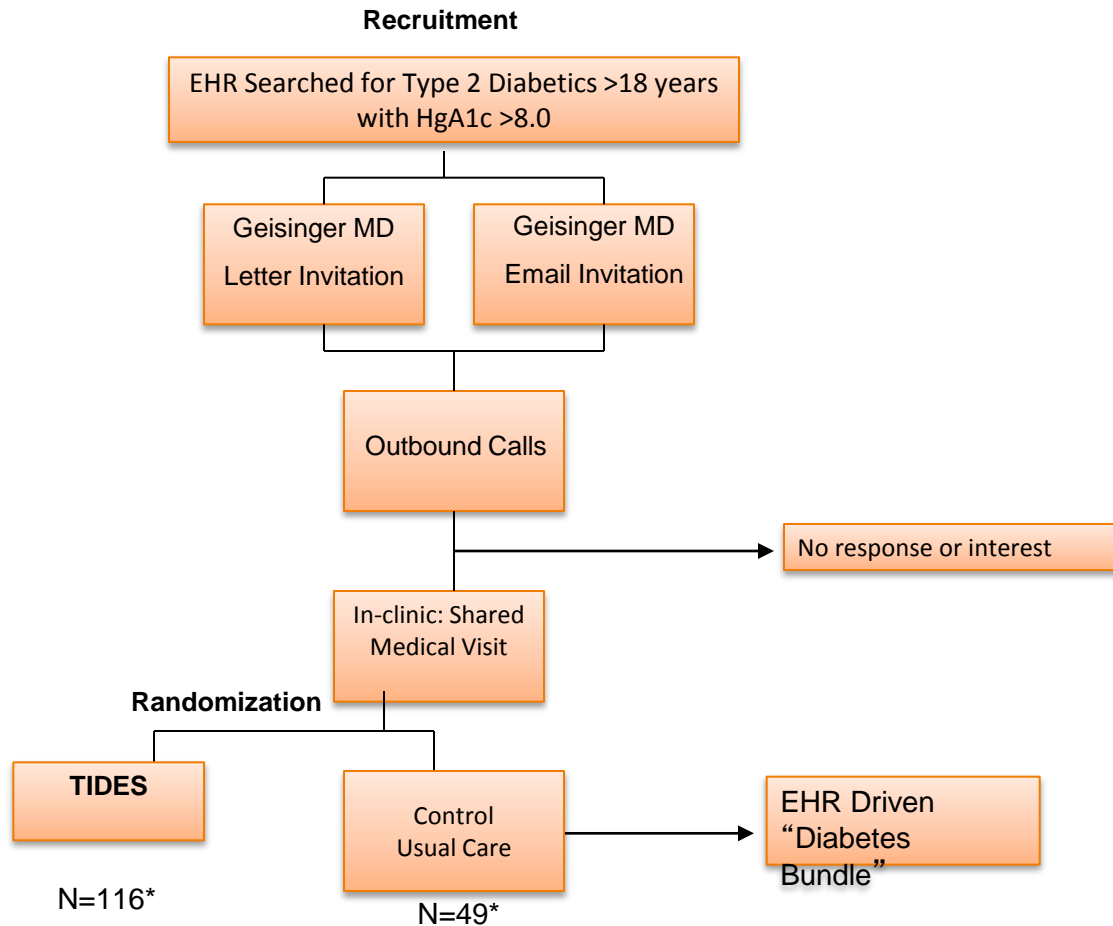
Duration

Ongoing messaging and learning for 6 months May–November 2010

Statistical Analyses: Intent to Treat (ITT)

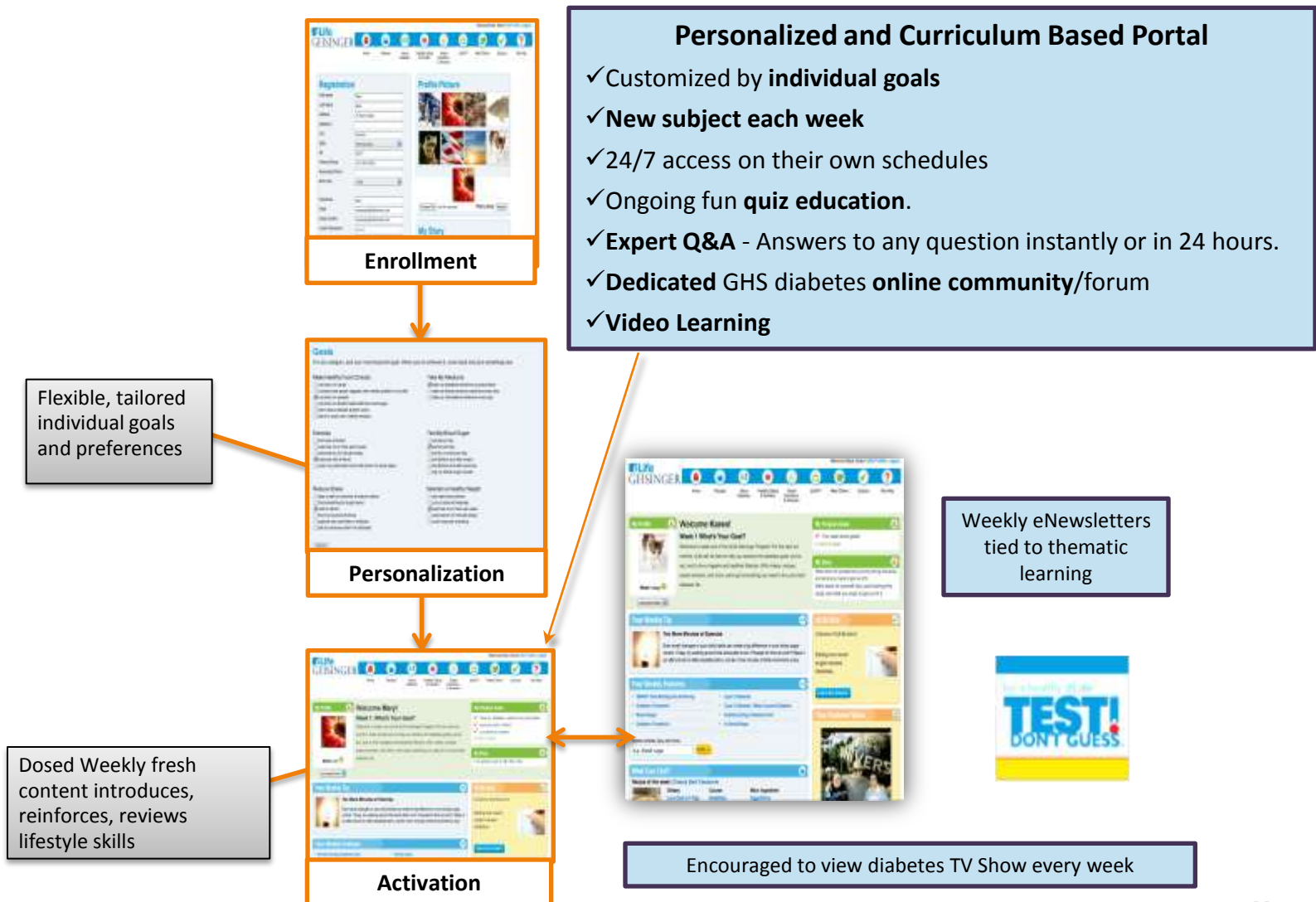
- Kruskal Wallis tests were done for all the change measurements (and all baseline measurement comparisons) between TIDES and controls.
- Summaries of baseline and change at 6 months measurements by intervention status (TIDES, Controls) were done using median with inter-quartile range.

Comparative Effectiveness - Control Randomized Clinical Trial



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Intervention Overview



TIDES Components

<p>Interactive Components</p> <ul style="list-style-type: none"> • Ten separate “learn as you go” quizzes • 6,000 Expert Q&A’s • 24 weekly click & go emails 	<p>Educational Content</p> <ul style="list-style-type: none"> • 60 slide shows • 24 tips of the week • 3,000 article diabetes learning library
<p>Food & Nutrition</p> <ul style="list-style-type: none"> • 2,500 recipes carb rated with full nutrition info • 25,000 food nutrition info food look-up • Over 100 articles 	<p>Video</p> <p>Over 500 original videos, including:</p> <ul style="list-style-type: none"> • Real People, Real Stories • Diabetes 101s • Cooking demos • Celebrities, athletes • Expert insights
<p>Motivational Messages</p> <ul style="list-style-type: none"> • Emails to patients <u>and</u> caregivers • Graphic banner ads • Integrated in weekly content 	<p>Community – Dedicated Forum for participants</p> <ul style="list-style-type: none"> • Professionally moderated forum with discussion prompts • Weekly email reminder of “hot topics”

TIDES

Public Domain

“Guided Concierge”

54 GB - Vetted, delivered “to your door” in “bite sized,” easily digestible sequenced, engaging doses



Search & Sift online – to find, relevant, accurate, timely and engaging help

1.6 GB = five books plus the five major magazines published in an entire year



Personalized Website as Hub



Home



Recipes



About
Diabetes



Healthy Eating
& Nutrition



Expert
Questions
& Answers



dLifeTV



Meet Others



Quizzes



Site Help

My Profile



Mood: happy 😊

accomplished

Welcome Mary!

Week 11 Testing Troubleshooting

At dLife, we always say "Test Don't Guess." Because testing your blood sugar is the single best way to get an accurate idea of how your diabetes is doing at a given point in time. But testing can have its trouble spots.

You have to have the right technique, and take good care of your equipment, to get accurate results. This week, check out tips on making sure your meter and your testing techniques are in tip-top condition for test results that are right the first time.

My Program Goals



- ✓ take my diabetes medicine as prescribed
 - ✓ cut down on sweets
 - ✓ vent to others
- + [click to open](#)

My Story



I am going to get it right this time...

Your Weekly Tip



Meter Motivation

Your meter can be particularly motivating when it shows real change. And change is easier than you may think. Today, try testing your blood sugar before and after exercise. You don't have to run a marathon; just a brisk walk will do the trick. See how that number falls post-exercise. And the next time your blood sugar is high, remember what a powerful tool a few quick laps around the block can be in bringing it down.

Your Weekly Features



- ▶ [Blood Glucose Readings](#)
- ▶ [Save On Strips!](#)
- ▶ [Ask an Expert FAQs - Your Diabetes Questions Answered](#)
- ▶ [Why Bother to Calibrate?](#)

Your Featured Video



Example Weekly Content Items

Life GEISINGER

Week 3: What Can I Eat?

What can I eat? It's probably the most frequently asked question of people with diabetes everywhere. The good news is that "the right diet" for people with diabetes is also the healthiest diet for just about everyone — low in refined carbohydrates, high in fiber and nutrients, and moderate in portion sizes. Visit the [LifeGeisinger.com](#) site for all the answers now.

In this Email:

- Real Stories
- What's Your dHQ?
- Your Questions Answered
- Oh, You Know?
- In the Kitchen
- More Tools for You

Real Stories

"Toughest Lister" winner Erik Chagan shares how he got back on track with his eating habits and diabetes control. [Get his secrets.](#)

Related:

- What is a Diabetes Diet?
- Video: Healthy Diet 101

One Thing for Today

Bread, especially white bread, is heavy on sugar-raising carbohydrates. Today, go open-face with your sandwiches and halve your bread intake. Feeling really adventurous? Try going bunless with that burger or sandwich, using a lettuce wrapper to hold together the filler's. Test your blood sugar after your breadless meals and you'll notice the difference.

What's Your dHQ?

When it comes to food and diabetes, it is all about the carbs. Don't know that much about carbs? Don't worry about a thing... we'll teach you along the way. [Take the quiz now!](#)

Newsletter

Life GEISINGER

Week 3: What Can I Eat?

Featured Video

Home page

Cooking demo

Featured Video

See other videos you might like

Home page

Expert Questions & Answers

When will a type 2 diabetic know they need to go on insulin?
Find out what the experts say

Find a question answered by diabe experts:
e.g., blood sugar testing

Insulin (24) Type 1 (84)
Pumping Issues (4) Blood Glucose Monitoring (30)



What Can I Eat?

Recipe of the week: Impossible Berry Pie

Dietary	Course
Low Carb (<+15g)	Breakfast
Low Calorie	Lunch/Snacks
Low Sodium	Main Dish/Entree
More...	More...

Expert Q & A

Life GEISINGER

The 12-Question Carb Quiz

All types of carbohydrates have the same effect on your blood sugar.

Quiz

Review Your Weekly Quiz



The 12-Question Carb Quiz

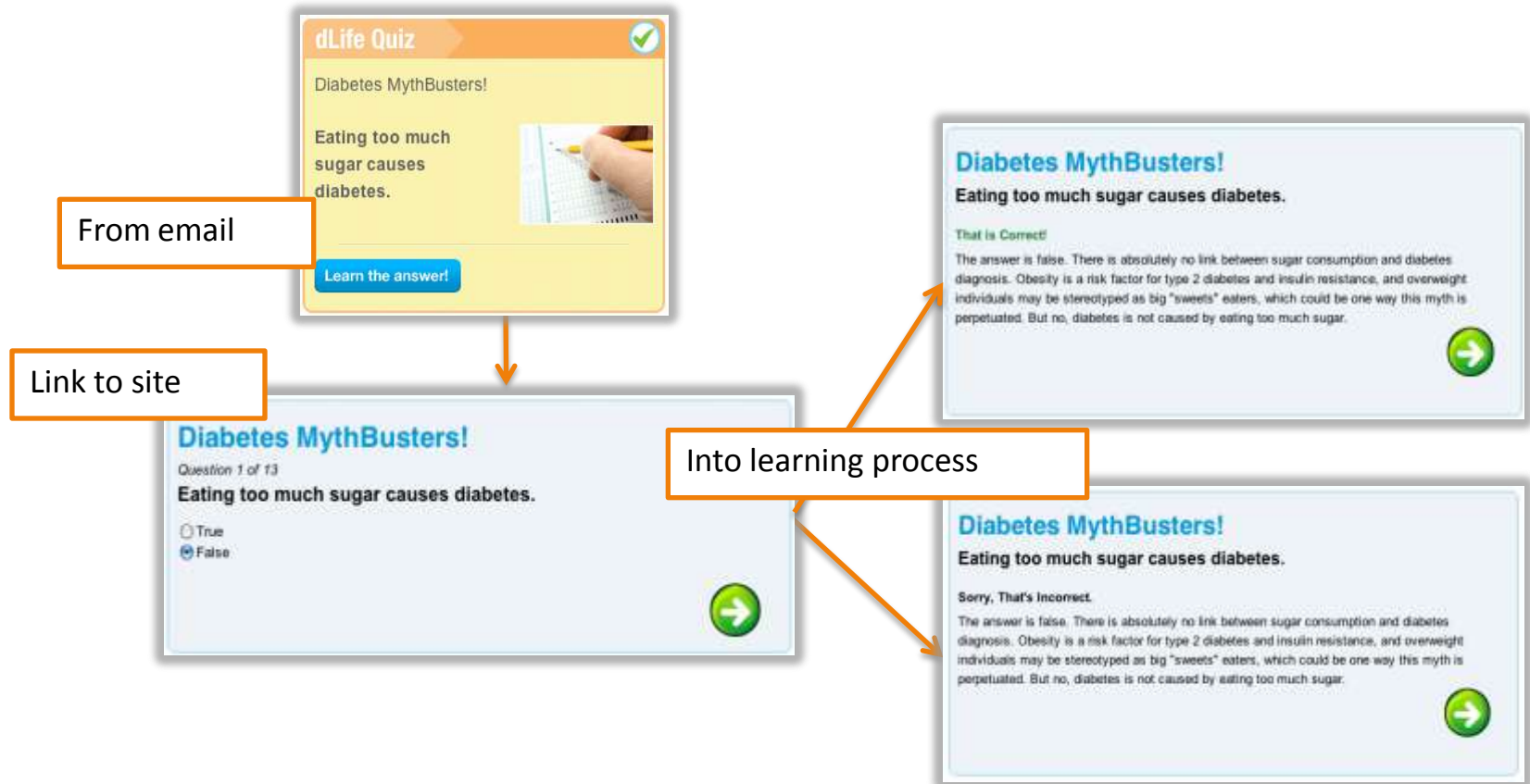
All types of carbohydrates have the same effect on your blood sugar.

Sorry, that's incorrect.


The answer is false. Certain types of carbohydrates, such as fiber and glycemic, have little to no effect on blood sugar. Sugar and starches, on the other hand, can cause blood glucose to skyrocket. Different carbohydrate-laden foods elicit different glycemic index responses, and these responses vary from person to person, too. For example, as a general rule, potatoes cause a rapid rise in blood sugar, while legumes such as soybeans or lentils cause a more gradual rise, because they are digested more slowly. Also, if you talk to a group of people who test their blood sugar, you will find that some individuals experience spikes after foods that cause only a moderate rise in others. SOURCE: The Glycemic Index. Home: <http://www.glycemicindex.com> (accessed 5/08).

Quiz Answer

Example Quiz Content



Dedicated Social Community



See what they're talking about!

Catch the latest conversations from your fellow "New Diabetes Day" program members in the dLife Geisinger [forum](#). Here are a few tidbits:

"Have you ever been in the kitchen and decided never to eat the wrong thing or too much of the wrong thing ever, ever, never again? I have. Then the inside refrigerator magnet (food) starts to pull and...then along came dLife Geisinger. I started to learn and change. One of the first things I discovered was to "Test Don't Guess"...I learned to use the (dLife Geisinger) refrigerator magnets on the door...Be well!"

"It has been a while since I posted. I could say I have been busy and I have. The real truth is I am a little disgusted with myself. I just can't, or maybe better said won't, stay on track...Not totally out of control, but not under the control I had attained earlier..."

Just drop it, see what's going on, and tell everyone how you're doing.

Visit the [dLife Geisinger forum now!](#)

Check into your [dLifeQ.com](#) site.

Be Well,
The dLife Team

Drive to community from email

Diabetes Support Forum

Welcome to the dLife Forums, where you can find support and share your own diabetes tips and experiences with others. To browse categories and topics, simply click on the links below.

We've made some changes here, but not to worry! The forum is still the same! The icon at the top of the page has been updated. To visit the new dLife Community space, click on the 'Community' button. To chat in the forum, click on the 'Forum' button!

Please read the [dLife Forum Guidelines](#) before posting in the forums. The opinions expressed in this forum are solely those of the poster and not of dLife. dLife does not endorse any product, service, or information site that may be mentioned by a forum user. Please read the [dLife User Agreement](#) for more information about participating in our forum. Please [contact us](#) to report any questionable posts.

Support Forum Activity

[Forum Index](#) » [Diabetes Community](#) » [dLife Geisinger - FOR](#)

dLife Geisinger - FOR STUDY PARTICIPANTS
Meet others in the dLife Geisinger study. Post your questions.

NEW TOPIC Search for: Go

Exclusive forum/community

Community posts

STRESS MANAGEMENT [Subscribe topic](#) [Bookmark topic](#) [View new](#)

POST REPLY BY: Search for: Go [8 posts] - Page 1 of 1

STRESS MANAGEMENT
by [agwv2008](#) Sat Aug 07, 2010 2:38 pm [Help](#) [Unwatch](#)

I was on another thread. I was the last to post on it several days ago. I started writing and stated: "It would appear now I am replying to myself!" Then I noticed my focus had narrowed in terms of a subject. I've been considering at best management for some time now about the "halfway" reading this last week. Writing this stuff is kinda cathartic, release some of the "stress", so it just writes. The options given in dLife for stress management include [yoga and meditation](#)...that's all well and good but as one of those "irregular" diabetics I avoid spoon feeding of "keeping inward". These really do seem to be a formal way of "neutralizing" unless obviously in order to release stress and I'm wondering about that. The definition of meditating (Greek) is to "chew over and over". It is the equivalent of a cow chewing it's cud or ruminating on a matter. So this as an [http://www.dailymed.com/med/med.htm](#)

Posts: 82
Joined: Thu May 26, 2010 8:30 pm

Successes and failures [Subscribe topic](#) [Bookmark topic](#) [View new](#)

POST REPLY BY: Search for: Go [52 posts] - Page 1 of 8 - Go to page: 1, 2, 3, ..., 8

Successes and failures
by [dresesen](#) Thu May 13, 2010 10:38 am [Help](#) [Unwatch](#)

It is like a week later and I have had some successes and one big failure. I have managed to check my sugar twice daily plus and have almost followed a healthy diet. I have tried a couple of the recipes I made the chicken wings, Tuesday and the cherry beef casserole yesterday. That is probably the source of the star of my failure. I lowered my evening insulin dose based on my meal and lower carbs, but not enough. I had a low fat after dinner and so always it started a feeding frenzy. A low makes me feel so busy that I always seem to over react to a low and I know better. Is this normal.

Posts: 71
Joined: Thu May 06, 2010 6:28 pm

Re: Successes and failures
by [dresesen](#) Thu May 13, 2010 8:13 pm [Help](#) [Unwatch](#)

My problem has always been eating at home. I can and do pack a lunch for the days I work. I work Fri-Sun 3 twelve hour shifts, and have 4 days to let my diet go to hell. My breakfast is always the same unexciting thing an English muffin w/ butter and coffee. Then on work days I eat the same thing at 2 breaks and lunch a sandwich (1 slice of bread and a slice of either turkey or ham a trail apple or orange along with some baby carrots to munch on) Then I come home and open the flood gates. Since the start of the study I have gotten back to my food and sugar logs I have set up in Excel spread sheets. I have even modified both to add spaces for carbs, and exercise. I have them both set up to keep a running daily total and averages for the month on sugars I even cleaned off the clothes rack and used it as it was designed for and got 30 minutes on the treadmill.

Posts: 191
Joined: Thu Oct 20, 2009 8:52 am
Location: Westport, CT

Posts: 71
Joined: Thu May 06, 2010 6:28 pm

Constant Drum Beat of Motivation & Inspiration

Practical Lifestyle Entertaining Social Empathetic Real



Results

- Baseline Demographics
- Digital Data: Did they ENGAGE?
- Primary Outcomes
 - Knowledge
 - Self-Care
- Secondary Outcomes

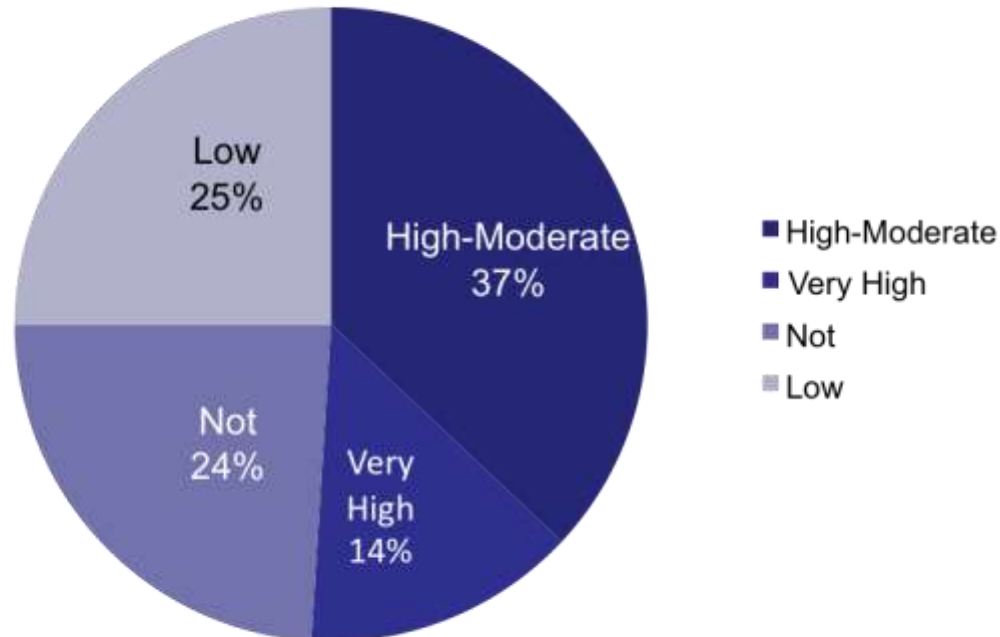
Demographics

	TIDES N=116	Controls N=49	P-Value	Entire Sample
Age Mean (SD)	53.2 (8.6)	54.6 (9.6)	0.327	53.6 (8.9)
Sex	47F, 70M	22F, 27M	0.573	69F, 97M
Race	97 White	96% White	0.632	161 White
Income >\$40K	54%	53%	0.938	

Engagement with Intervention (over 24 weeks)

76% engaged in the TIDES intervention

51% moderate to very high engagement



- Assessed site usage, email reception and quiz interaction
- Scored for overall engagement

Online Engagement

Metric	Site Pvs	# Meeting	% Total	Wtd Avg	Email Open	# Mtg Criteria	% Total	Wtd Avg	Quiz Pgs	# Mtg Criteria	% Total	Wtd Avg	Total	% Total
Engagement	0 to 4361													
Very High	> 1,200	12	10.30%	5	>75%	39	33.60%	10	>350	6	5.20%	2	17	14%
Mod-High	>400	44	37.90%	18	>25%	43	37.10%	11	>150	37	31.90%	13	42	36%
Low	>60	44	37.90%	18	>15%	11	9.50%	3	>60	25	21.60%	9	29	25%
Not Engaged	<60	16	13.80%	6	<15%	23	19.80%	6	<60	48	41.40%	17	28	24%
		116	100%			116	100%			116			116	100%
Weights		40%				25%				35%				

Knowledge & Self-Care

Total Knowledge Score (Diabetes Knowledge Questionnaire)*

TIDES group scored 2x higher vs. control on Diabetes Knowledge Questionnaire at six months/conclusion – $P = 0.028$

Self-Care – Blood Sugar Testing (SDSCA)**

TIDES group tested twice the rate of control – $P = 0.035$

Validated Instruments

*Diabetes Care May 2001

**Summary of Diabetes Self-Care Activities

Knowledge & Behavior Change

	TIDES N=116	Controls N=49	P-Value
Knowledge & Behavior Change (Partners in Health 8pt Scale)*	Improvement in 9 of 11 Variables	No Change	Avg 0.05

Variables Improved

- Ability to Observe, Measure and Record Symptoms
- Ability to Progress in Behavior Change Pattern
- Understand How to Take Action if Symptoms Change
- Take Action if Symptoms Change
- Ability to Share in Care Decisions
- Ability to Take Meds as Recommended
- Knowledge of Condition
- Knowledge of Treatment
- Ability to Arrange HCP Appt' s as Recommended

Engagement vs. Diabetes Management Knowledge

The more engaged, the more knowledge gained

Level of Engagement	TIDES N=116	DM Knowledge Change*
Very High	14%	2.10
Mod-High	36%	1.44
Low	25%	.23
Not Engaged	24%	.11

*Diabetes Knowledge Questionnaire (DKQ) $p = 0.009$

6 Month A1C

- ITT Analyses: no differences at statistical significance
- Subgroup Analyses: Among those with drop in 6 month A1C (to compare those who improved by group)

	TIDES 48/88	Controls 18/37	P-Value
Change A1C*	-0.8	-0.3	0.029
IQR	(-1.5, -0.3)	(-0.4, -0.2)	

Continued Study and Development

1. Explore paradata to match most effective components to population subsets
2. Integrate HIT/data collection and reporting for fully supported Self-Manager
3. Expand channels, tools and applications (e.g.: mobile)

Ultimate Integration Goal

