

Why an evidence-based food strategy escapes us:

What we can do to make a difference anyways

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58th Annual Margaret L. King Lecture:

SEMDA and Henry Ford Hospital

Special thanks to Winona Bynum

Executive Director, Detroit Food Policy Council

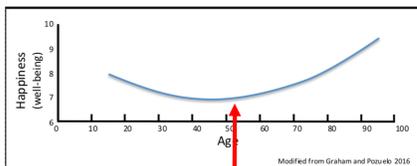
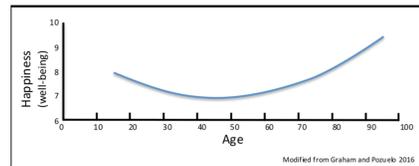
President-Elect/President, Southeast Michigan Dietetic Association

Alumnus of our Wayne State University Dietetics program

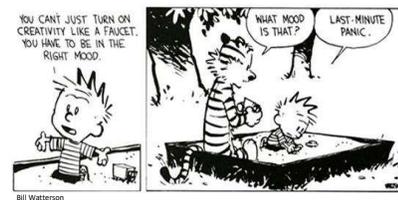
Losing Your Way as a Scientist: How Not to Suck

September 24, 2016
SR Shaw

“There is a vague, but loud and persistent, feeling that what you are doing right now is not what you are meant to do with your career”



Finding meaning in my research



Why an evidence-based food strategy escapes us

Or

Why are we even searching for the “perfect diet”?

Fall 2018



OPTIMIZING THE DIET

By L. Bryan Ray

In every stage from competitive cycling to an experiment of sorts to discover who can most efficiently turn dietary energy sources into muscle and power output on the bike, there literally, were all interested in diet because abundant evidence shows that diet has major effects on human health and resistance to tropical disease associated with eating, such as obesity, cardiovascular disease, and diabetes. Ask for on what counts: Is a healthy diet is more prevalent and more consistent than ever.

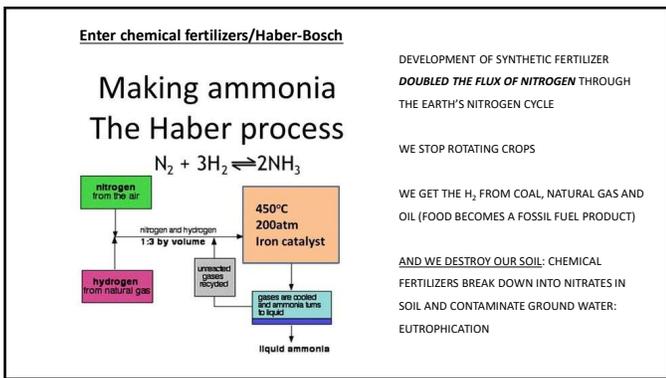
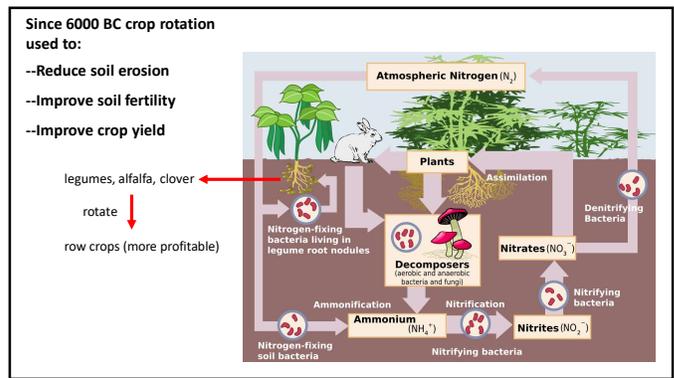
Science

Optimizing the diet
L. Bryan Ray

Science 342 (6416): 762-763
DOI: 10.1126/science.1259415

HOW WE GOT HERE:

A STORY OF UNINTENDED (?) CONSEQUENCES



A STORY OF UNINTENDED CONSEQUENCES

The Haber-Bosch process revolutionized agriculture

Helped feed and sustain growing population of Boomers

Today, half the global population dependent on ammonia-based fertilizers generated by Haber-Bosch process

~17% of that ammonia gets used

THE REST ESCAPES AS RUNOFF, LARGELY CONVERTED TO NITRATES—HIGH WATER SOLUBILITY OF NITRATES LEADS TO SIGNIFICANT NUTRIENT POLLUTION IN OUR WATER.

SO...

Industrialized agriculture produces **A LOT**

BUT also generates massive quantities of fertilizer runoff and animal waste, which pollute the air and water

AND it produces “industrialized food”

AND this is a BIG problem.

INDUSTRIALIZATION OF FOOD:**CHEAP FOOD**

Fast growing hybrids/loss of diversity/monocultures

Haber-Bosch

Unintended consequences of Nixon’s ag policies

ADDICTIVE FOOD

Foods are manufactured to make you want more

Food companies are in business to make money

The food industry is complicit in the obesity epidemic (more later)

HOW WE GOT HERE:**A STORY OF UNINTENDED (?) CONSEQUENCES**

Eric Holt-Gimenez: Can We Feed the World without Destroying it?

(He would likely argue that the consequences of industrialization were not unintended. Another conversation for another day...)

For today:

- “Rather than eating a healthy diet made up of diverse, whole, and fresh foods, poor people are sold special, nutrient-enriched, processed food purchased from the food industry”
- “Not only is the environment the destination for the food system’s effluvium; also our bodies are recipients for its toxic levels of salts, sugars, fats, additives, and chemicals. Like the oceans, the aquifers, and the atmosphere, we have become yet another toxic sink for the food system’s crap”

“The chronic diseases that now kill most of us can be traced directly to the industrialization of our food”

Michael Pollan, In Defense of Food

“The Age of Nutritionism” according to Michael Pollan

- 1) what matters most is not the food but the “nutrient”
- 2) because nutrients are invisible and incomprehensible to everyone but scientists, we need expert help in deciding what to eat
- 3) the purpose of eating is to promote a narrow concept of physical health

So we try to eat “scientifically”—by the nutrient and the number and under the guidance of experts

(This leads to REDUCTIONISM in nutrition science that is at odds with actual eating)

Everybody want to know what is the PERFECT DIET

The key to glorifying a questionable diet? Be a tech bro and call it 'biohacking.'



Jack Dorsey, chief executive of Twitter and Square, speaks with members of the media following an Empowering Entrepreneurs event at Ryerson University in Toronto. (Cole Burston/Bloomberg)

By **Monica Hesse**
Columnist
April 11

The gist: one meal a day; total fasting on weekends. "During the day, I feel so much more focused..."

Monica Hesse: "One wants to grab him by the hoodie strings and bellow, 'that's not mental clarity, my good man—that's starvation.'"

Nutritionism

Orthorexia

Disordered Eating

Biohacking




OPTIMIZING THE DIET

By **L. Bryan Ray**

In every diet, man, competitive cyclists perform an experiment of sorts to discover who can most efficiently turn dietary energy sources into muscle and power output on the bike. More broadly, we're all interested in diet because abundant evidence shows that diet has major effects on human health and medicine to recognize disease associated with eating, such as obesity, cardiovascular disease, and diabetes. Ask for on what counts: Is a healthy diet more prevalent and more important than ever.

Science

Optimizing the diet
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SPECIAL SECTION DIET AND HEALTH

REVIEW

A time to fast

Andrea Di Francesco, Clara Di Germanio, Michel Bernier, Rafael de Cabo*

REVIEW

Swifter, higher, stronger: What's on the menu?

Louise M. Burke^{1,2*} and John A. Hawley³

REVIEW

The gut microbiota at the intersection of diet and human health

Christopher L. Gentile and Tiffany L. Weir*

IN MY OPINION, ONE OF THE MAJOR CONSEQUENCES OF ALL THIS ON NUTRITION SCIENCE AND HEALTH IS THAT WE HAVE COME TO:

LOSE OUR CONNECTION TO ACTUAL FOOD
--HOW TO GROW IT
--HOW/WHERE TO BUY IT
--HOW TO COOK IT

FOCUS ON NUTRIENTS INSTEAD OF FOOD

BELIEVE THERE IS SOME PREDETERMINED PERFECT WAY TO EAT TO
--LOSE WEIGHT
--EXTEND LIFESPAN/HEALTHSPAN
--IMPROVE ATHLETIC PERFORMANCE
...ETC

FOOD:	1,068,461
OBESITY:	295,884
NUTRITION:	436,659
DIABETES:	647,883
WEIGHT LOSS:	130,574
SUGAR:	470,392
FAT:	245,911
LOW CARBOHYDRATE:	164,675

So after millions of studies...we should have the answers

But we DO NOT

CONFUSION IS AS BAD OR WORSE THAN EVER

- 1) Media and **Food Industry** (and scientists) exploit and cherry pick equivocal data for headlines and money
- 2) Even the best-designed and implemented studies generate controversy. Recent case in point:



Evidence based medicine | The BMJ

Effects of a low carbohydrate diet on energy expenditure during weight loss maintenance: randomized trial

Cara B Ebbeling, Henry A Feldman, Gloria L Klein, Julia M W Wong, Lisa Bielak, Sarah K Steltz, Patricia K Luoto, Robert R Wolfe, William W Wong, David S Ludwig

the bmj | BMJ 2018;363:k4583 | doi: 10.1136/bmj.k4583

TRIAL REGISTRATION ClinicalTrials.gov NCT02068885

\$12 MILLION STUDY: ~As good as it can get in terms of study design

Effects of a low carbohydrate diet on energy expenditure during weight loss maintenance: randomized trial

Cara B Ebbeling, Henry A Feldman, Gloria L Klein, Julia M W Wong, Lisa Bielak, Sarah K Steltz, Patricia K Luoto, Robert R Wolfe, William W Wong, David S Ludwig

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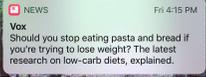
TRIAL REGISTRATION ClinicalTrials.gov NCT02068885

How a Low-Carb Diet Might Help You Maintain a Healthy Weight

Adults who cut carbohydrates from their diets and replaced them with fat sharply increased their metabolisms.



Literally got this push notification as I was making this slide



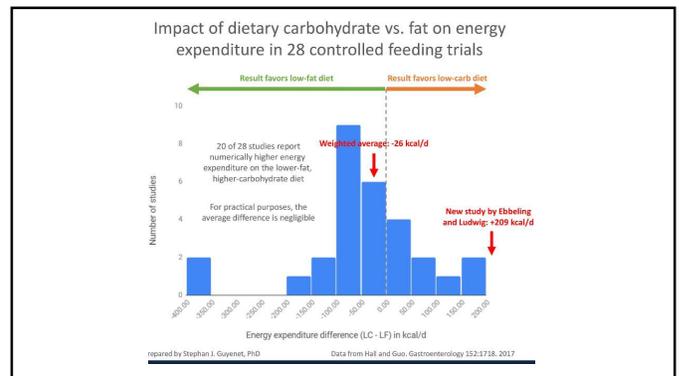
SO, EVEN THE REALLY GOOD \$12 MILLION STUDIES CAN BE EQUIVOCAL

OR IF NOT EQUIVOCAL, THEN NOT REPRODUCIBLE

WE DO HAVE A **REPLICATION PROBLEM**

THIS IS A PROBLEM ACROSS DISCIPLINES

BUT HEAVILY PROBLEMATIC IN NUTRITION STUDIES, PARTICULARLY



"The Replication Problem"



John Ioannidis

IHMC STEM-Talk Episode 77 with John Ioannidis

Episode 77: John Ioannidis discusses why most published research findings...

PLOS MEDICINE A Peer-Reviewed Open Access Journal

PLoS Med. 2005 Aug; 2(8): e124. Published online 2005 Aug 30. doi: 10.1371/journal.pmed.0020124

Why Most Published Research Findings Are False

John P. A. Ioannidis

Original Contribution

July 13, 2005

Contradicted and Initially Stronger Effects in Highly Cited Clinical Research

John P. A. Ioannidis, MD

Article Information

JAMA. 2005;294(2):28-28. doi:10.1001/jama.294.2.28

What drives **bad** nutrition information?

1. Bad or equivocal science
2. Confirmation bias (COI, agendas; funding mechanisms)
3. Ignorance about science
4. Corporate profit

The New York Times | <http://nyti.ms/2b7ZFZR>

The Upshot
PUBLIC HEALTH

We're So Confused: The Problems With Food and Exercise Studies

Gina Kolata @ginakolata AUG. 11, 2016

Nearly everything you have been told about the food you eat and the exercise you do and their effects on your health should be met with a raised eyebrow.

SIGNAL TO NOISE

Signals that diet and exercise research may be looking for may include:

reduced risk for dementia
increased lifespan
reduced obesity
increased or decreased cancer risk
reduced risk for heart disease

Risks are low to begin with (Relative Risk problem)

Impact of diet and/or exercise interventions on risk are tiny, so hard to see

(In contrast to effect of cigarettes on lung cancer, for example)

METHOD STANDARDIZATION

No gold standard of measurement (*double labeled water, example from the recent BMJ article*)

No broad agreement on HOW to measure lifestyle effects (endpoints)

No broad agreement on HOW to design research

How much of any given nutrient (or food?)
How long should the intervention last?
When should endpoints be measured (weight loss, for example)
How much of a change is significant?
What population was measured? Are findings generalizable?

Result: LARGE body of studies with equivocal and unreproducible conclusions

SELECTIVE PUBLICATION OF INTERESTING RESULTS

Negative results (no effect) seldom published

Results contrary to researchers' hypotheses seldom published

HYPOTHESIS DRIVEN RESEARCH? GRANTWRITING?

YOU CAN'T PUBLISH WITHOUT GRANTS. YOU CAN'T GET GRANTS WITHOUT PUBLICATIONS.

A SYSTEM NOT DESIGNED TO PROMOTE DISCOVERY.

- **Interpretation of the data:** Only when all other variables other than the independent variable can be discounted as causes of the results, can the results be stated being caused by the independent variable

OK, Yes. Absolutely.

But this is incredibly problematic for nutrition studies.

We eat food, not nutrients.

THE NEW YORKER

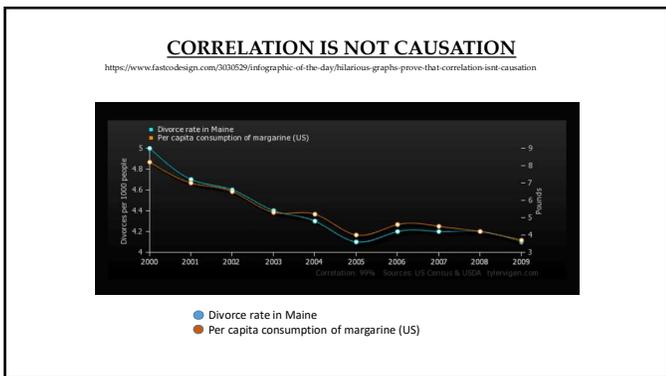
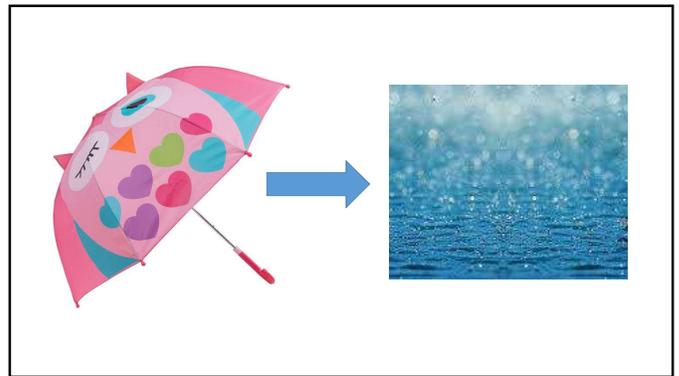
By Sarah Hutto, JULY 22, 2016

Today scientists released the results of a study in which they found that a thing that people used to do and/or eat, and which they were originally assured was healthy, then were later told was unhealthy, only to be encouraged to consume it again, does actually cause cancer, after all.



One of the biggest mistakes seen in interpretation of data is **assignment of CAUSE inappropriately**

Just because two variables fluctuate in tandem does not prove they are meaningfully related to one another.



BUT

when we **LIKE** the association

or when it makes sense

or if we have an **AGENDA**

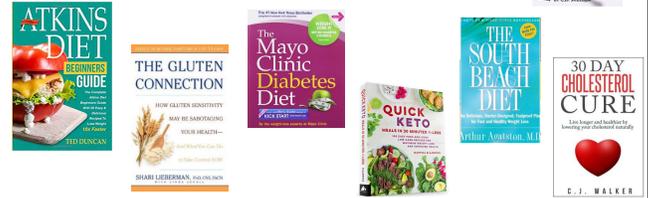
or if our research is funded by someone who benefits from a causal relationship

... it's a slippery slope from correlation to causation.

SO...we end up with a lot of ambiguity

- 1) Confusion and Mistrust
- 2) Exploitation by personal agendas
- 3) Exploitation by political agendas
- 4) **Exploitation by the food industry**

- **\$32 BILLION SPENT IN FOOD MARKETING**
- **(\$10 billion directed to children/youth...)**
- **CHANGE IS GOOD FOR THEM**
- **CREATE AND MARKET NEW FOODS TO FIT THE FADS/TRENDS**



THE FOOD ENVIRONMENT



A commendable public health message, under attack by the Food Industry

THE FOOD ENVIRONMENT



**Leanwashing:
A HIDDEN FACTOR IN THE OBESITY
CRISIS**

Aneel Kamani
Brent McFerran
Anirban Mukhopadhyay

CALIFORNIA MANAGEMENT REVIEW VOL. 56, NO. 4 SUMMER 2014 CMR.BERKELEY.EDU

Leanwashing:

“About 50% of the population is misinformed about ... (diet and) obesity, *which impacts their likelihood of being overweight or obese*”.

“The food industry is at least partly responsible for the misinformed lay theories of obesity because it *systematically deflects the public discourse from bad diet to exercise*.”

CASE IN POINT: LET'S MOVE...

SO WHAT?

Why does it matter?

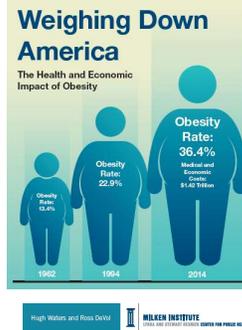
Why is it important that the “correct” or “best possible” nutrition messages be disseminated by science and by the media?

BECAUSE:

lay opinions about diet impact choices and impact obesity

Why an evidence-based food strategy escapes us:

What we can do to make a difference anyways



--The obesity epidemic is not waiting for science to figure out the **BEST** answer.

--There never will be a **BEST** answer (3 million MORE studies, and a richer Food Industry...)

--We need to get out of being caught up in finding the magic answer and just eat properly

--FOR EXAMPLE:



2008: CDC names Huntington, WV, the fattest city in America

Emmy-winning “Food Revolution” Jamie Oliver

But, actually, 2 subsequent LOCAL responses have made the difference:

1. The Wild Ramp: food market run on consignment
Convenient
Revenue local and back to farmers
2. Huntington school kitchen reform
Fresh produce from student farms
Fresh produce from local farms
80% scratch kitchen



Perspective | This Appalachian town was America's 'fattest city.' Here's how it slimmed down...
washingtonpost.com



IT'S NOT EASY

Changing the food culture of a community, let alone a diverse and divided nation of 328 million souls, is a matter of...changing what is normal in people's lives. That takes time."

10 years later:

45.5% ↓ **32.6%**



Perspective | This Appalachian town was America's 'fattest city.' Here's how it slimmed down...
washingtonpost.com

The Washington Post
Democracy Dies in Darkness

Outlook • Perspective

This Appalachian town was America's 'fattest city.' Here's how it slimmed down.

There's no quick fix. Success in fighting obesity takes a lot of little things — but they add up.



Perspective | This Appalachian town was America's 'fattest city.' Here's how it slimmed down... washingtonpost.com

Margaret Mead on the problem of changing food habits: (c. 1940)

“To devise...a system of education, communication, and change which will link the daily habits of the people to the insight of the laboratory, and at the same time contribute to the development of a culture which produces individuals who are generally better adjusted as well as specifically better fed, is a task which requires a recognition of the total cultural equilibrium.”

BACK TO BASICS

Instead of trying to engineer a “perfect diet”, use the knowledge we DO have to move forward

And try to have an impact on health in the community

BACK TO BASICS

Nothing new here

Upton Sinclair, The Jungle (p.417)

“And then...place beside this fact of an unlimited food supply, the newest discovery of physiologists, that most of the ills to the human system are due to overfeeding”!

BACK TO BASICS

REALLY nothing new here!

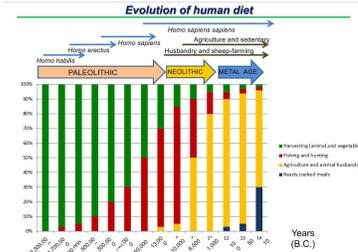
THE TRUTH IS:

VASTLY different food patterns across the globe have promoted health

Over time, humans have adapted to what is available to us

MANY, MANY DIFFERENT TYPES OF FOOD PATTERNS CAN PROMOTE GOOD HEALTH AND PREVENT CHRONIC DISEASE

BUT NOT THE HIGHLY INDUSTRIALIZED AND PROCESSED “WESTERN DIET”



BACK TO BASICS

Nothing new here

I had a professor over 30 years ago, who said these two simple things that have stuck with me:

1. Being a dietitian will drive you crazy, because EVERYBODY thinks they already know everything about food and diet (true)
2. Eat food as close to the ground as possible—It's the best advice I ever got. Parallels the now famous: *Eat food, mostly plants, not too much.*

BACK TO BASICS

Nothing new here

So, what is the best way to teach people to eat right?

Teach people (and ourselves) how to EAT REAL FOOD:

- How to buy it
- How to cook it
- How to store it

Community Based Participatory Research: COLLABORATIVE WORK

Several projects on which my lab is involved:

1. **Health Impact: Diabetes Prevention Program (GCFB, NKF, WSU)**
2. La Mesa Saludable/The Healthy Table (GCFB, CHASS, WSU)
3. CHOICES (Detroit Health Department, United Way of Southeast Michigan, WSU)
4. Fresh Prescription (Henry Ford, CHASS, Detroit Health Department, Eastern Market, WSU)

Community Based Participatory RESEARCH:

MISSION:

1. Demonstrate that increasing food security will result in better health outcomes than those experienced by participants that are not food secure
2. Provide evidence that food is a cost effective method for managing and preventing chronic disease
3. Gleaners Community Food Bank conducting multiple projects utilizing a variety of models to determine which interventions and methods of delivery achieve the best outcomes
4. *Requires systematic analysis/evaluation of outcomes*

BACK TO BASICS

Instead of trying to engineer a “perfect diet”, use the knowledge we DO have to move forward

And try to have an impact on health in the community

To know if you've had an impact on health in the community, you must evaluate outcomes

Health Impact: Diabetes Prevention Program Gleaners Community Food Bank

1. Gleaners Community Food Bank and National Kidney Foundation of Michigan (NKF)
2. Pairing FOOD with Diabetes Prevention Program
3. DPP: health education program to reduce risk of type 2 diabetes and chronic kidney disease
4. DPP: demonstrated effectiveness
5. BUT: disparity in outcomes and completion rates in low-income communities
6. *GOAL: will there be improved outcomes if add nutritious foods to the DPP program?*

Health Impact: Diabetes Prevention Program Gleaners Community Food Bank**Targeting Food Insecurity**

1. USDA: lack of “access by all people at all times to enough food for an active, healthy life.”
2. The food insecurity rate in Gleaners’ service area is 13.6%
3. The food insecurity rate in Wayne County is 21% (least food secure in all of Michigan)
4. *Chronic disease and food insecurity are highly correlated, and especially in areas of poverty*
5. *Poor nutrition exacerbates ongoing health problems and increases the risk for developing chronic conditions.*
6. Among Gleaners’ clients:
 1. 21.7% report having a household member in poor health
 2. 48% of clients report having unpaid medical bills
 3. 33.4% report a family member with diabetes
7. Improving access to nutritious food is a critical step towards reducing the disproportionate rate of chronic disease found among residents in low-income communities.

Diabetes Prevention Program

1. DPP: evidence-based, lifestyle change program
<https://www.cdc.gov/diabetes/prevention/resources/curriculum.html>
2. Targets people with prediabetes or at high risk for developing Type 2 diabetes
3. Curriculum developed by Centers for Disease Control and Prevention
4. Shown to reduce progression to Type 2 diabetes by 58%
5. BUT: outcomes in low-income populations are not as encouraging

WHAT HI:DPP LOOKS LIKE:

Six cohorts of 12 low-income DPP participants (72) receive boxes containing healthy, nutritious food delivered to twenty class sessions of each DPP workshop.

Full boxes contain about twenty-five pounds of food; exact contents developed by Gleaners Community Food Bank and the NKFM Registered Dietitians.

Food boxes contain a variety of healthful foods including fresh, frozen, and shelf stable items.

Cooking demonstrations and food tastings are incorporated into the curriculum and recipes are provided to encourage the use of foods participants may not currently eat.

Project outcomes will be evaluated against the following measurements:

≥ 30% (22) of participants will lose at least 5% of their body weight

≥ 50% (36) of participants will report at least 150 minutes of physical activity per week

Measurable outputs:

1. Number of participants receiving food
2. Client satisfaction and experience
3. Number of participants reducing weight at 6 and 12 months and percentage of weight loss
4. Number of participants reporting increased physical activity
5. Average number of minutes of physical activity per week
6. Number of participants reducing A1C
7. Individual weight loss in pounds
8. Percentage of participants reaching both goals – 5-7% weight loss and 150 minutes weekly physical activity.
9. Average session attendance (months 1-6 and 7-12)

Community Based Participatory Research: COLLABORATIVE WORKGleaners Community Food Bank:

Sarah Mills, RD, MPH, Director of Wellness and Nutrition Education
 Cara Rayner, Program Manager
 Molly Sanford, Program Coordinator
 Rachelle Bonelli, Vice President of Programs

National Kidney Foundation of Michigan:

Samuel Shipinski, MMS, Program Manager
 Mary Neumaier, RD, Program Specialist
 Winter Freeman, MPH, Program Coordinator

Wayne State University:

Jeneen Ali, PhD student, Cress Lab
 Mariela Cruz-Rodriguez, Dietetic student (and Gleaners employee)
 Leena Abbas, undergraduate NFS student
 Omar Abbas, Undergraduate NFS student (ReBUILDetroit scholar)
 Patrice Arnold, (very) recently graduated NFS student

Jeneen Ali
 Mariela Cruz-Rodriguez
 Leena Abbas
 Omar Abbas

**Jeneen Ali:**

PhD student:
 Evaluating Community Based Participatory Research
 Participating in data collection for HI:DPP and Healthy Table
 Licensed phlebotomist, Beaumont Health System

Mariela Cruz-Rodriguez:

Nutrition Educator, Gleaners Community Food Bank
 Cooking Matters Program Coordinator, GCFB
 CPD program, WSU (Current student)

YOU ARE WHAT YOU EAT



YOU ARE WHAT YOUR FOOD EATS



YOU ARE WHAT YOUR MICROBIOME EATS

Thank you!