Meatless Monday & the Johns Hopkins Bloomberg School of Public Health

10TH ANNIVERSARY
SCIENTIFIC SYMPOSIUM & CELEBRATION

#MM10clf
Panel Discussion:

“Why Meatless? The Public Health Impacts of a High Meat Diet”

#MM10clf
Dietary Patterns in 2010 Dietary Guidelines for Americans

- Patterns highlighted as healthful
  - DASH-Style Dietary Patterns
  - Mediterranean-style Dietary Patterns
  - Vegetarian Dietary Patterns

- Evidence on vegetarian diets
  - 5 clinical trials with blood pressure as outcome
  - 5 cohort studies with mortality as outcome

- Excerpts about healthful dietary patterns
  - “associated with lower blood pressure and a reduced risk of cardiovascular and total mortality”
  - “common feature is emphasis on plant-based foods”
Dietary Approaches to Stop Hypertension
Servings per Day of Food Groups

- **Fruits/Vegetables**
  - CONTROL: 3 servings/day
  - F/V: 8 servings/day
  - DASH DIET: 9 servings/day

- **Dairy Products**
  - CONTROL: 1 serving/day
  - F/V: 2 servings/day
  - DASH DIET: 2 servings/day

- **Meat/Fish Poultry**
  - CONTROL: 3 servings/day
  - F/V: 2 servings/day
  - DASH DIET: 2 servings/day

- **Fats/Oils**
  - CONTROL: 2 servings/day
  - F/V: 0 servings/day
  - DASH DIET: 2 servings/day
Weekly BP by Diet During Intervention Feeding

Appel, NEJM 1997;336:1117
Associations of Mediterranean Diet† with Mortality Over 44 months in Greek Population (Primary Prevention)

- Total: 25%*
- CHD: 33%*
- Cancer: 24%*

* p < .05

† Per 2 unit increase in Mediterranean Diet Score

Trichopoulou, NEJM, 2003
Associations of Mediterranean Diet† with Mortality Over 44 months in Greek Patients with Coronary Heart Disease

<table>
<thead>
<tr>
<th>Category</th>
<th>% Risk Reduction†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>27% *</td>
</tr>
<tr>
<td>CHD</td>
<td>31% *</td>
</tr>
<tr>
<td>Other</td>
<td>18%</td>
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* p < .05

† Per 2 unit increase in Mediterranean Diet Score

Trichopoulou, Arch Int Med, 2005
Associations of Vegetarian Diets with Mortality in Seventh Day Adventists

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>IHD</th>
<th>CVD</th>
<th>Cancer</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>Risk Reduction</td>
<td>12% *</td>
<td>19%</td>
<td>13%</td>
<td>8%</td>
<td>15% *</td>
</tr>
</tbody>
</table>

* p < .05

Orlich, Arch Int Med, 2013
Associations of Semi-Vegetarian Diets with Mortality in Seventh Day Adventists

% Risk Reduction

- Total: 8%
- IHD: 8%
- CVD: 15%
- Cancer: 6%
- Other: 1%

* p < .05

Orlich, Arch Int Med, 2013
Summary and Comments

• Reduced meat intake is one characteristic of healthful dietary patterns.

• Consistent evidence of potential benefit from vegetarian diets, more so in men than women.

• Limitations of evidence
  – Potential for residual confounding (e.g. preservatives, cooking method).
  – Remarkably few studies of vegetarians in US.
From farm to fork

Production

Processing

Distribution

Retail

Consumption

Keeve Nachman
Food animal production in the US has been transformed over the last 50 years.

Food animal production in the US has been transformed over the last 50 years.

Change in Hog Industry Structure
1959 - 2007

Average number of hogs per operation

Number of hog operations (1000s of farms)

Localization of production

1949
Poultry processing plants

• Each dot represents a plant processing 50,000 or more chickens each year

2007
Chicken production

• Each dot represents annual production of 1 million or more chickens
Practices and outputs of a truly broken system

• Use of:
  – Arsenic-based drugs
  – Routine antibiotic use

• Consequences for:
  – Food safety
  – Community health
Arsenic-based drugs

- **Roxarsone and nitarsone**
  - Also p-arsanilic acid, carbarsone, arsanilate sodium

- Additives in poultry and swine feed since mid-1940s

- Approved for growth promotion, improved pigmentation, coccidiostat, treatment of swine dysentery

- Primary human exposure concerns are animal waste management and residues in animal products
Arsenic-based drugs

- **Roxarsone and nitarsone**
  - Also p-arsanilic acid, carbarsone, arsanilate sodium

- Use of arsenic-based drugs in poultry production increases the concentrations of inorganic (toxic) arsenic in chicken meat

- Inorganic arsenic is a carcinogen and linked to other outcomes (CVD, diabetes, neurological effects, immunosuppression, others)

- Roxarsone was banned in October 2013, whereas nitarsone is still in use in turkeys

are animal waste management and residues in animal products
Antimicrobial Misuse

Prevention and growth promotion

- Lower dose
- Longer duration
- Feed and water
- Limited veterinary oversight
- Selection for ABR bacteria
- Environmental exposure pathways and food safety risks
- Risk of infection that does not respond to antibiotic therapy

Antimicrobial Sales, by Dosage Form, 2009

- 74% Feed
- 16% Water
- 10% Other
Antimicrobial Misuse

Prevention and

- Non-therapeutic use of antibiotics is widespread in industrial food animal production
- Federal efforts to curtail irresponsible use have been ineffective
- Resistant pathogen foodborne outbreaks continue to occur
  - 2013 MDR Salmonella Heidelberg in Foster Farms chicken
- Rural communities are in greatest proximity and likely have increased exposure to drug-resistant pathogens
- Risk of infection that does not respond to antibiotic therapy
Mean manure concentration quintiles (gal/km²)

- 0
- 1 - 13782
- 13783 - 464709
- 464710 - 1156132
- 1156133 - 689942033

Patients
- HA-MRSA
- CA-MRSA
- SSTI
- Control
## Associations of **Seasonal Crop Field Manure Exposure** with HA-MRSA, CA-MRSA and SSTI (full multilevel model\(^a\))

<table>
<thead>
<tr>
<th></th>
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<th>CA-MRSA</th>
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<tbody>
<tr>
<td></td>
<td>Adjusted OR (95% CI)</td>
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<tr>
<td><strong>Swine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>1.0</td>
<td>1.0</td>
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<tr>
<td>Q2</td>
<td>1.19 (0.97-1.46)</td>
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<tr>
<td><strong>p</strong> (^b)</td>
<td><strong>0.01</strong></td>
<td><strong>&lt; 0.001</strong></td>
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<td><strong>Dairy/veal</strong></td>
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<td>Q2</td>
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<td>Q3</td>
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<td>Q4</td>
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CA-MRSA = community-associated methicillin-resistant *S. aureus*; HA-MRSA = healthcare-associated MRSA; SSTI = skin and soft tissue infection

\(^a\) Controlled for sex, age, race/ethnicity, ever-smoking status, antibiotic prescription in prior 2 years, community type, and community socioeconomic deprivation

\(^b\) *p*-value for linear trend

*In press, *JAMA Internal Medicine*
### Associations of Seasonal Crop Field Manure Exposure with HA-MRSA, CA-MRSA and SSTI (full multilevel model\(^a\))

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\(p < 0.001\)

\(\text{CA-MRSA} = \text{community-associated methicillin-resistant ~}\)\(S. \text{aureus} ; \text{HA-MRSA} = \text{healthcare-associated MRSA} ; \text{SSTI} = \text{skin and soft tissue infection}\)

\(\text{\(a\) Controlled for sex, age, race/ethnicity, ever-smoking status, antibiotic prescription in prior 2 years, community type, and community socioeconomic deprivation}\)

\(\text{\(b\) p-value for linear trend}\)

- Living near swine production facilities was associated with increased risk of MRSA and SST infections
- Living near cropfields where swine waste is land applied is a risk factor for MRSA and SST infections
- Persons living in agricultural communities face additional risk burdens beyond those borne by society via foodborne pathogens

In press, *JAMA Internal Medicine*
Why Meatless Monday?: Resource, Climate and Food Security Perspectives

Roni Neff, PhD MS
Program Director, Food System Sustainability and Public Health, Center for a Livable Future
Assistant Scientist, Environmental Health Sciences
Johns Hopkins Bloomberg School of Public Health
Rneff@jhsph.edu
Basic Inefficiency

- 4.5 kg feed $\rightarrow$ 1 kg chicken meat
- 9.4 kg feed $\rightarrow$ 1 kg pork
- 25 kg feed $\rightarrow$ 1 kg beef (Smil 2002 based on USDA longterm data)
Resource use in meat production

- **Energy**
  - >40 kcals energy/1 kcal beef

- **Soil**
  - 20-100 yrs/inch topsoil; losing 1 inch/34 years

- **Fertilizers**
  - Nitrogen – GHG, energy intensive, water contam
  - Phosphorus – peak phosphorus
  - Manure – 130x human waste; runoff; contamination

- **Water**
  - 27% global human water footprint: animal production
  - Ogallala aquifer: >25% US irrigated land overlies, drinking water to 82% within boundary; *May be drained in 25 years.*
  - Industrial countries, veg diet can reduce food-related water footprint by 36%
Climate Change

- Livestock-related greenhouse gas emissions
  - 14.5% of global anthropogenic GHG
  - 6% in US; 9%
  - Is grassfed better?
  - Probably not for climate change
    (yes for other reasons.)
Impacts

- 4 person family, 1 day/week for 1 year
  - Skip meat/cheese = not driving for 5 weeks
  - Skip steak = not driving for almost 3 months
- Everyone in US, 1 day/week for 1 year
  - Skip meat/cheese = like not driving 91 billion miles, or taking 76 million cars off the road.
Food Security

- By 2050
  - Need 50% more food
  - Global meat demand may rise by 73%

- Yet:
  - Crop yield increases may be reaching limit;
  - Little available extra land;
  - Climate change;
  - Soil, water depletion and contamination
  - Depletion of fossil fuels and phosphorus, etc....

- What if we used our resources differently?
- If land for feed used to grow food crops, could feed 1b on predominantly veg diets
  - 870 million undernourished 2012
Panel Discussion:
“Why Monday?
The Idea and Research behind Monday as a Day for Health Behavior Change”

#MM10clf
What to do

When to do it

MEATLESS MONDAY

Morgan Johnson
It’s already on the calendar!

How can we make health a part of our routine?
The Monday Mindset

Online survey conducted by FGI Research among 2000 18+ representative sample. Sampling error is +/- 2% at the 95% confidence level.
Monday & Health Behaviors

According to 2011 nationwide survey Monday is the most popular day for new health behaviors.

Source: FGI Resources Inc May 2011 marketing survey of 2,000 US-based adults (margin of error +/-2%)
T.G.I.M.
Leveraging Monday for Smoking Cessation

Joanna Cohen, PhD, MHSc
Director, Institute for Global Tobacco Control
Tobacco quitline calls, by day of the week
July 2010

Google search queries for smoking cessation, by day of the week

Quit & Stay Quit Monday
Monday in obesity
Lawrence Cheskin, MD
Director, JH Weight Management Center
Mondays and weight loss

- Monday concept is conducive to small steps & reminders
- Especially useful in the emerging field of mHealth
  - Tailored rapid interactive mobile messaging program (TRIMM)
What do people struggling to lose weight request?

Results of focus groups at the JHWMC

- Focused attention to their specific situation and needs
- Periodic “reminding”
- Respect for their time and schedule

- Patients of the Center were very receptive to periodic messages to help keep them on track
- None were opposed to trying it

- All thought a Monday focus made a great deal of sense
Lifestyle Tailoring & Behavioral Goals

Michael:
- Wakes up at 6am, lunch at 12pm
- Exercises regularly
- Loves Twinkies, not veggies
- Munchies when studying

Michael's Mom:
- Wakes up at 9am, lunch at 2pm
- Mostly sedentary, little physical activity
- Loves fried foods
- Large portions

TRIMM Goals
- Reduce Sugar Intake
- More Balanced Diet
- Eat Only When Hungry

TRIMM Goals
- Reduce Fat Intake
- Practice Portion Control
- Increase Physical Activity
Interactive Messages

• Response to Michael is based on his progress:

*Please Respond! Michael, how much do you weigh today?*

You've lost 3 pounds since the first week, Michael! Keep up the great work. Aim to lose another 1 or 2 pounds this week!
TRIMM results

• 6-month weight loss:

<table>
<thead>
<tr>
<th></th>
<th>Standard Care</th>
<th>TRIMM Intervention</th>
<th>P-value</th>
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</thead>
<tbody>
<tr>
<td>Mean Weight Loss</td>
<td>1.3 lbs</td>
<td>8.0 lbs</td>
<td>&lt;0.03</td>
</tr>
<tr>
<td>Mean % Body Weight Loss</td>
<td>0.6%</td>
<td>3.7%</td>
<td>&lt;0.02</td>
</tr>
</tbody>
</table>

• Engagement: participants read and responded to ~60% of text messages overall

• Each additional engagement percentage predicted an additional 0.25 lb of weight loss at 6 months
Feedback from TRIMM participants

• Participant satisfaction averaged 4.4 / 5.0
• Specific Feedback:
  – “It’s like having a partner who is concerned about your eating habits.”
  – “TRIMM has changed my lifestyle.”
  – “I have lost weight that I could not lose before.”
  – “This is better than having a buddy ‘cause it’s always there.”
Monday TRIMM and the future

• We are designing Monday TRIMM, a further enhancement of TRIMM, applied to Mondays
• We are planning to pilot integration into community and clinical practice settings
• Monday TRIMM is being integrated into the JHWMC’s programs offered to members of the general public seeking weight loss
Meatless Monday is changing behavior

35.8% of those aware said MM had influenced their decision to cut back on meat.

62% of those influenced said they try to incorporate MM into their weekly routine.

Respondents reported increases in a range of healthy meatless alternatives:

- Fruits: 65%
- Vegetables: 73%
- Beans: 42%
- Whole grains: 47%
- Nuts: 38%
It’s now in 29 countries, including Israel and Iran!
有利于你，
有利于我们，
有利于地球。

China??
Hot weekend?

Get checked for HIV and STDs

MANUP
Monday.org
B’ More Healthy Communities for Kids
Exercise your feet, not your fingers.
FIVE TIPS for caregivers

1. MANAGE YOUR STRESS LEVEL
   Consider how stress affects your body (stomach aches, high blood pressure) and your emotions (irritability). Find ways to relax.

Me Time Monday Video Tip

Me Time Monday Celebrity Secrets 2012.

Shaun Robinson
TV Anchor - “Access Hollywood”
MONDAY

THE DAY ALL HEALTH BREAK LOOSE!