Food Choice at Work
From Evaluation to Practical Application in Everyday Workplace Settings

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Where are Sustainable methods to improve dietary behaviours needed?
Tolerant of complex interventions

Longer working hours & dependent on workplace meals

Limited evidence on workplace dietary interventions

Access to large homogenous population

Tolerant of complex interventions

Priority environment (WHO)

Workplace

Food Choice

Priority environment (WHO)

Longer working hours & dependent on workplace meals

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Tolerant of complex interventions

Workplace

Food Choice
Obesity: shaped by global drivers & local environments

Environments  Behaviours  Physiology

Systemic drivers  Environmental drivers  Environmental moderators  Behaviour patterns  Energy imbalance
Policy and economic systems enable and promote high growth and consumption  Food supply and marketing environments promote high energy intake  Sociocultural, socioeconomic, recreation, and transport environments which amplify or attenuate the drivers  High food and energy consumption with associated low physical activity levels  High total energy intake pushing energy imbalance

Policy interventions

Health promotion programmes, social marketing, etc

Population effect and political difficulty

(Swinburn et al., Lancet 2011)

FOOD CHOICE AT WORK
**Story So Far**

- **2011** Observational Study
- **2013** Systematic Review
  - Evidence was limited (n=6 studies)
  - Concluded that future workplace interventions should be developed according to recommended guidelines and include measures that facilitate assessment of long-term impact
- **2013** Cross-sectional Study in 2 hospitals (n=100 employees)
  - Employees' fat, saturated fat, sugar and salt intakes were lower in the workplace that received the initiative
- **2013** Food Choice at Work Study Protocol
- **2015** Sub-study: Cross-sectional Study
- **2016** Food Choice at Work Trial
  - Cluster controlled trial in 4 large manufacturing workplaces in Cork for 9 months
  - Data collected at individual level, the primary unit of analysis was at the workplace level
  - Higher nutrition knowledge was associated with better diet quality and lower blood pressure but the inter-relationships between these variables are complex
  - Evidence was limited (n=6 studies)
  - Cluster controlled trials were implemented in workplaces to reduce obesity among employees
Food Choice at Work Intervention Design

Cluster-controlled trial in 4 large multinational manufacturing workplaces in Ireland

- **Control**
- **Nutrition Education**
- **Environmental Modification**
- **Combined**
  Environmental modification + nutrition education
MRC Framework For Developing and Evaluating Complex Interventions

(A) Development
1. Identifying the evidence base
2. Identifying/developing theory
3. Modelling process and outcomes

(B) Feasibility/piloting
1. Testing procedures
2. Estimating recruitment
3. Determining sample size

(C) Evaluation
1. Assessing effectiveness
2. Understanding change process
3. Assessing cost-effectiveness

(D) Implementation
1. Surveillance and monitoring
2. Long-term follow-up
3. Dissemination

Soft paternalism “nudge” theoretical perspective + social ecological perspective
Nudge Theory, What is it?

Simple changes in ‘choice architecture’ (presentation of alternatives) that do not interfere with an autonomous choice but provide subtle hints to make another choice

Marchiori, Adriaanse & De Ridder, 2016
Acceptability and Liking of Health Nudges

Survey in 6 EU countries (N=7000) according to the level of intrusiveness

- Government campaigns (e.g. public education campaigns in movie theatre's to reduce smoking and overeating): >77%
- Governmentally mandated rules (caloric/salt labels; traffic lights): >78%
- Default rules (healthy food replacement): >75%
- Manipulation (subliminal advertising): >43%
- Other mandates (e.g. sweet-free cashier zone, meat free day): >60%

Reisch & Sunstein, 2016
Cluster Controlled Trial

Control

Education

Environment

Combined

Baseline Data Collection
- Demographics
- Nutrition knowledge
- Dietary intakes
- Health status: BMI, WC, BP
- Process evaluation
- Cost-effectiveness evaluation

Implementation of Interventions: 9 Month Period

Follow-up 3-4 months
- Dietary Intakes
- Health Status

Follow-up 7-9 months (repeat baseline)
### Study Outcomes

#### Primary Outcomes

Changes in employees’:

- **Dietary intakes of salt** *(on-duty 24-hr dietary recall)*

- **BMI** *(objectively measured by RA)*

  at 7-9 months follow-up

#### Secondary Outcomes

Changes in employees’:

- **Dietary intakes: total fat, saturated fat, total sugars** *(on-duty 24-hr dietary recall)*

- **Health status: midway WC, resting BP** *(objectively measured by RA)*

- **Nutrition knowledge** *(GNKQ)*

  at 7-9 months follow-up
Recruitment of Workplaces

- **Inclusion criteria**
  - Manufacturing multi-national workplace
  - Employ >250 employees
  - Daily workplace canteen for employees
  - Commit to complex intervention for duration of the study

- **Industrial Development Authority website**: list of manufacturing workplaces in Cork (n=107)

- **Workplaces were systematically screened** for eligibility: phone

- **On site face to face meetings** were organised with potential companies (n=20) to discuss feasibility + support for the study

- **Proof of concept study**: 4 most suitable workplaces - purposively selected + allocated
Recruitment of Employees

**Inclusion criteria**
- Any permanent, full-time employee
- Consumes at least one main meal at the workplace canteen every day

**Exclusion criteria**
- Non-permanent, part-time employees
- Travel regularly for work
- Does not purchase + consume a main meal from work daily
- Medically advised not to participate in the study
- Involved in an on-going diet programme external to work (e.g. weight watchers)
Trial Profile

850 recruited

Baseline
n=850
(18-64 years)

Control
111 employees
84 participated

Education
226 employees
160 participated

Environment
113 employees
96 participated

Combined
400 employees
338 participated

Follow-up at 3-4 months
n=678 (80%)

Follow-up at 7-9 months
n=541 (64%)

70 participated
113 participated
74 participated
284 participated
Statistical Analysis

- Food and nutrient analysis were calculated using NetWISP.

- Data were analysed using SPSS version 21.

- **Paired t-tests** were performed to calculate the mean differences (dietary intakes, nutrition knowledge + health status) within each workplace from baseline to follow-up at 7-9 months.

- **MANCOVA** was used to compare the control + the intervention groups at 7-9 months follow-up.

  - Was adjusted for the **potential confounding effects**: age, gender, education, usual working hours (i.e. shift work) and other baseline characteristics.
Majority of participants (i.e. employees):

- male (76%),
- aged 30-44 years (64%)
- married/cohabiting (73%)
- tertiary level education (80%)
- non-managers (76%)
- usually worked during day (65%)
- were overweight/obese (70%)
Changes within Workplaces from Baseline to 7-9 Months

- Total fat (g/day)
  - Control: -14.2
  - Education: -11.4
  - Environment: -7.1
  - Combined (education + environment): 1.9

- Saturated fat (g/day)
  - Control: -8.8
  - Education: -3.2
  - Environment: -7
  - Combined (education + environment): 1.8

- Salt (g/day)
  - Control: 0.5
  - Education: -0.6
  - Environment: -1.4
  - Combined (education + environment): 0.7

- Total sugars (g/day)
  - Control: -6.8
  - Education: -4.6
  - Environment: -11.1
  - Combined (education + environment): 9.1

Line chart with data points for each category, showing the changes in consumption from baseline to 7-9 months.
# Mean Differences in Dietary Intakes at 7-9 Months: Interventions vs. Control

<table>
<thead>
<tr>
<th>Variable</th>
<th>Workplace</th>
<th>Mean differences</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total energy intake</td>
<td>Education</td>
<td>-133.6</td>
<td>(-326.1, 58.9)</td>
<td>0.173</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>+121.1</td>
<td>(-86.9, 329.0)</td>
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<tr>
<td></td>
<td>Combined</td>
<td>-70.6</td>
<td>(-250.2, 109.0)</td>
<td>0.440</td>
</tr>
<tr>
<td>Total fat (g/day)</td>
<td>Education</td>
<td>-9.9</td>
<td>(-20.4, 0.6)</td>
<td>0.066</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>-0.1</td>
<td>(-11.5, 11.2)</td>
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</tr>
<tr>
<td></td>
<td>Combined</td>
<td>-7.7</td>
<td>(-17.6, 2.0)</td>
<td>0.120</td>
</tr>
<tr>
<td>Saturated fat (g/day)</td>
<td>Education</td>
<td>-4.8</td>
<td>(-9.2, -0.4)</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>-2.7</td>
<td>(-7.5, 2.0)</td>
<td>0.261</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>-5.2</td>
<td>(-9.4, -1.1)</td>
<td>0.013</td>
</tr>
<tr>
<td>Total sugars (g/day)</td>
<td>Education</td>
<td>+7.2</td>
<td>(-6.9, 21.3)</td>
<td>0.318</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>+16.4</td>
<td>(1.2, 31.6)</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>+3.5</td>
<td>(-9.6, 16.6)</td>
<td>0.601</td>
</tr>
<tr>
<td>Salt (g/day)</td>
<td>Education</td>
<td>-0.8</td>
<td>(-1.9, 0.3)</td>
<td>0.144</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>-0.4</td>
<td>(-1.6, 0.7)</td>
<td>0.459</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>-1.3</td>
<td>(-2.3, -0.3)</td>
<td>0.010</td>
</tr>
</tbody>
</table>
## Mean Differences in Health Status + Nutrition Knowledge at 7-9 months: Interventions vs. Control

<table>
<thead>
<tr>
<th>Variable</th>
<th>Workplace</th>
<th>Mean differences</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BMI (kg/m²)</strong></td>
<td>Education</td>
<td>-0.8</td>
<td>(-2.1, 0.4)</td>
<td>0.196</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>+0.3</td>
<td>(-1.1, 1.6)</td>
<td>0.711</td>
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<tr>
<td></td>
<td><strong>Combined</strong></td>
<td>-1.2</td>
<td>(-2.4, -0.1)</td>
<td>0.047</td>
</tr>
<tr>
<td><strong>Midway WC (cm)</strong></td>
<td>Education</td>
<td>-1.2</td>
<td>(1.8, 0.5)</td>
<td>0.480</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>+0.5</td>
<td>(-3.2, 4.2)</td>
<td>0.796</td>
</tr>
<tr>
<td></td>
<td><strong>Combined</strong></td>
<td>-1.0</td>
<td>(-4.3, 2.2)</td>
<td>0.530</td>
</tr>
<tr>
<td><strong>BP: Systolic</strong></td>
<td>Education</td>
<td>-3.7</td>
<td>(-7.8, 0.4)</td>
<td>0.080</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>+1.3</td>
<td>(-3.1, 5.8)</td>
<td>0.558</td>
</tr>
<tr>
<td></td>
<td><strong>Combined</strong></td>
<td>-2.4</td>
<td>(-6.7, 1.4)</td>
<td>0.218</td>
</tr>
<tr>
<td><strong>BP: Diastolic</strong></td>
<td>Education</td>
<td>-1.3</td>
<td>(-4.1, 1.4)</td>
<td>0.331</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>+2.0</td>
<td>(-0.9, 5.0)</td>
<td>0.176</td>
</tr>
<tr>
<td></td>
<td><strong>Combined</strong></td>
<td>+0.6</td>
<td>(-1.9, 3.2)</td>
<td>0.633</td>
</tr>
<tr>
<td><strong>Nutrition knowledge score</strong></td>
<td>Education</td>
<td>+1.6</td>
<td>(-2.7, 5.9)</td>
<td>0.462</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>-5.2</td>
<td>(-9.9, -0.6)</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td><strong>Combined</strong></td>
<td>+4.2</td>
<td>(0.3, 8.2)</td>
<td>0.034</td>
</tr>
</tbody>
</table>
Interviews (n=27) were conducted at baseline + 7–9 months follow-up with a purposive sample of workplace stakeholders (managers), participating employees and the FCW team. Contextual factors such as workplace structures and cultures need to be considered in the implementation of future workplace dietary interventions.

Investigated what health and lifestyle factors influence workplace absenteeism (n= 540 employees). Employees who are centrally obese, who consume a poor quality diet and who have low levels of PA were more likely to be absent from work and for longer duration.

Total costs were standardised for 500 employees per workplace. Average annual cost per employee: combined intervention: €62, nutrition education: €57, environmental modification: €7 and control: €0.

Relative cost of implementing and delivering nutrition education elements is high compared to environmental modification strategies.
Economic Evaluation of FCW interventions

- Cost-Utility Analysis (QALYs)
- Cost-Benefit Analysis (Absenteeism)
- Cost-Effectiveness Analysis (Sensitivity Analyses)
  - BMI
  - Waist circumference
  - Weight
Cost of Interventions

**Identify**

1. Set-up costs
2. Maintenance costs
3. Physical assessment costs

**Cost categories**

- Nutritionist, catering, management stakeholders, employees & printing and materials

**Measure**

- Number of units used throughout intervention period measured for each category of costs
- Units included time (hours) and printing materials

**Value**

- Costs valued in monetary terms (2016 €) and unit costs of resources multiplied by quantities used
- Staff costs estimated using market prices and employee time valued using national average wage (€21.94/hour)
## Costs for implementing and delivering the FCW interventions

<table>
<thead>
<tr>
<th></th>
<th>Education Costs (€)</th>
<th>Environment Costs (€)</th>
<th>Combined Costs (€)</th>
<th>Control Costs (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Set-up costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutritionist</td>
<td>600</td>
<td>2,494</td>
<td>3,225</td>
<td>-</td>
</tr>
<tr>
<td>Catering costs</td>
<td>41</td>
<td>490</td>
<td>490</td>
<td>-</td>
</tr>
<tr>
<td>Management stakeholder costs</td>
<td>103</td>
<td>103</td>
<td>103</td>
<td>-</td>
</tr>
<tr>
<td>Printing and materials</td>
<td>1,019</td>
<td>85</td>
<td>1,019</td>
<td>-</td>
</tr>
<tr>
<td>Employee time</td>
<td>53</td>
<td>53</td>
<td>53</td>
<td>-</td>
</tr>
<tr>
<td>Sub-total</td>
<td>1,816</td>
<td>3,225</td>
<td>4,890</td>
<td>-</td>
</tr>
<tr>
<td><strong>Maintaining costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutritionist</td>
<td>12,985</td>
<td>350</td>
<td>12,635</td>
<td>-</td>
</tr>
<tr>
<td>Catering costs</td>
<td>1,573</td>
<td>-</td>
<td>1,573</td>
<td>-</td>
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<tr>
<td>Management stakeholders costs</td>
<td>205</td>
<td>205</td>
<td>205</td>
<td>-</td>
</tr>
<tr>
<td>Printing and materials</td>
<td>282</td>
<td>-</td>
<td>282</td>
<td>-</td>
</tr>
<tr>
<td>Employee time</td>
<td>8,241</td>
<td>-</td>
<td>8,241</td>
<td>-</td>
</tr>
<tr>
<td>Sub-total</td>
<td>23,286</td>
<td>555</td>
<td>22,936</td>
<td>-</td>
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<tr>
<td><strong>Physical assessments</strong></td>
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<td></td>
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</tr>
<tr>
<td>Nutritionist</td>
<td>14,333</td>
<td>13,659</td>
<td>14,333</td>
<td>14,224</td>
</tr>
<tr>
<td>Employee time</td>
<td>10,781</td>
<td>7,906</td>
<td>10,781</td>
<td>7,977</td>
</tr>
<tr>
<td>Sub-total</td>
<td>25,114</td>
<td>21,566</td>
<td>25,114</td>
<td>22,201</td>
</tr>
<tr>
<td><strong>Total cost of intervention</strong></td>
<td>50,215</td>
<td>25,345</td>
<td>52,940</td>
<td>22,201</td>
</tr>
<tr>
<td><strong>Cost per employee per year</strong></td>
<td>97.13</td>
<td>49.02</td>
<td>102.40</td>
<td>42.94</td>
</tr>
<tr>
<td>Variable</td>
<td>Workplace</td>
<td>Baseline (mean (SD))</td>
<td>7-9 months (mean (SD))</td>
<td>Change (baseline to 7-9 months) (SD)</td>
</tr>
<tr>
<td>----------</td>
<td>-----------</td>
<td>----------------------</td>
<td>------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>QALYs</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Control</td>
<td>0.93 (0.12)</td>
<td>0.92 (0.13)</td>
<td>-0.01 (0.11)</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>0.92 (0.11)</td>
<td>0.95 (0.10)</td>
<td>+0.03 (0.12)</td>
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<tr>
<td></td>
<td>Environment</td>
<td>0.90 (0.12)</td>
<td>0.95 (0.11)</td>
<td>+0.05 (0.11)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>0.93 (0.10)</td>
<td>0.94 (0.10)</td>
<td>+0.01 (0.09)</td>
</tr>
<tr>
<td><strong>Absence (days)</strong></td>
<td>Control</td>
<td>1.3 (3.4)</td>
<td>1.6 (4.9)</td>
<td>+0.3 (5.3)</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>2.6 (5.1)</td>
<td>2.2 (2.7)</td>
<td>-0.4 (4.66)</td>
</tr>
<tr>
<td></td>
<td>Environment</td>
<td>2.1 (3.1)</td>
<td>1.4 (2.7)</td>
<td>-0.7 (3.7)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>2.3 (5.1)</td>
<td>1.5 (2.3)</td>
<td>-0.8 (5.4)</td>
</tr>
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</table>
Story So Far

2016
Process Evaluation

2016
Sub-study:
Cross-sectional Study

2016
Cost Analysis of
Food Choice at
Work Interventions

2016
Commercialisation
of Food Choice at
Work
Leading Edge Healthy Eating Management System For Employees
WHAT WE DO

There is no substitute for science when it comes to employee health!
FOOD CHOICE AT WORK

Deal Directly with:
- Caterer
- Workplace Stakeholders
- Employees

Fundamental Positive Changes Seen in:
- Food Purchasing
- Food Preparation
- Food Presentation

How is this achieved?
- Environmental Dietary Modification
- Nutrition Education
Healthier Menus
(DASH-Omni Heart Meals, Lower in FSSS & Catering Training)

Solutions for Healthier Eating Environment
(Choice Architecture): Strategic Positioning

Daily Application of FCW Calorie & Traffic Light Coding System

Monthly Nutrition Themes: Emails, Posters, Videos

Data Driven Programme Monitoring Per Workplace

Health Check and Nutrition Clinics
Example of Shelf Edge Labelling in Microsoft
Our Clients

FOOD CHOICE AT WORK

WHAT DO OUR CLIENTS SAY?

Brian O’Donovan
Senior HR Manager - Microsoft

“Food Choice at Work represents a powerful commitment from us, the employer, to support the health of our employees. This programme is creating a supportive healthy eating environment for all employees here in Microsoft and ensures that the healthy choice is always the convenient choice. We have access to an outstanding Food Choice at Work leader on site who adapts the programme to the culture and climate in Microsoft. We are delighted to be a pioneering company of this programme.”
HEALTHIER MENUS

Since the introduction of Food Choice at Work in Microsoft, the following reductions have been seen on the menu:

- Calories: -22,993
- Saturated Fat: -1,122g
- Salt: -235g
- Sugar: -234g
POSITIVE IMPACT ON EMPLOYEES’ HEALTH

5g LESS SATURATED FAT
Average consumption: 23g/day
**Recommended: 22g/day

2g MORE FIBRE
Average consumption: 24g/day
*Recommended: 24g-35g/day

0.6g LESS SALT
Average consumption: 5.5g/day
**Recommended: 4-6g/day

* Differs depending on age, gender, physical activity, weight
**Based on 2,000kcal daily intake
EMPLOYEES’ MOVING IN THE RIGHT DIRECTION!*  

Average weight loss of 3.8kg  

Average Waist Circumference reduction of 5.1cm  

*Towards reducing the risk of developing cardiovascular diseases such as type 2 diabetes, hypertension & stroke.
CHANGES IN FOOD PURCHASING BEHAVIOUR

Increase of 8,046 sales transactions

66% of this increase in sales includes healthier options: soups, salads and sandwiches

Represents a 4.8% increase in sales volume
Food Choice at Work Software

Caterers
- Plan healthy menus and assess quality
- Monitor food sales

Employees
- Improve diet + overall health
- Log + monitor personal progress
- Share knowledge with families

Employers
- Monitor FCW impact and ROI
  (i.e. absenteeism, food sales, employees health, food waste, carbon footprint)

FCW Researchers
- Monitor impact per workplace
- Analyse big data to inform future FCW improvements, to publish + disseminate
Food Choice at Work Software: Co-Design Theory

1. Work with users to establish goals
2. Learn about their needs and experiences
3. Turn ideas into possible interventions

Engage → Plan → Explore → Develop → Decide → Research

Boyd H et al, NZ Med J 2012
1st release will allow caterers to plan, improve and display healthy menus........
...with considerations for cost, time, allergens and special diets.
Conclusion

- Represents a potentially viable model that is effective + feasible to implement in all public and private workplace settings.

- Future research: Conduct a largescale RCT to measure the effect in different workplace settings.

- Need to ensure that Food Choice at Work is continuously informed by objective, high quality research.

- If adopted by workplace stakeholders + policy makers, may help to reduce the prevalence + economic burden of diet-related disease.
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Lead

Simon Hobeck,
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Business Analyst

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Irish Heart Foundation
HRB

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Business Incubation and Innovation Centre
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