Lifetime cost of childhood obesity and overweight in Northern Ireland

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Childhood obesity/overweight

Obesity is one of top-three contributors to Global GBD, costing USD $2 trillion dollars per year:

- smoking (USD $2.1 trillion) and armed conflict/violence/terrorism (USD $2.1 trillion)
- alcohol (USD $1.4 trillion)

Annual cost of adult obesity/overweight in Northern Ireland in 2012 was estimated to be £453.2 million (€510.3 million) (adjusted for PPP to 2009 Irish values)

Relative risk of adult obesity associated with being obese as at 12 -18 years olds is around 5.

Childhood obesity is rising although it appears to be stabilising in some high-income countries in some population subgroups but at unacceptably high level (1 in 4 adolescents on the island are obese/overweight)

Many of the consequences of childhood obesity are experienced later in life.
To contribute to halting the rise in obesity/overweight in children & adolescents by 2020 in EU:

- within the global frame of the EU Action Plan on Childhood Obesity 2014 – 2020
- in close link with the European Food and Nutrition Action Plan 2015 – 2020

Sponsored by HLG, DG Sante and CHAFEA


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JANPA WP4: Strengthening the economic rationale

JANPA WP4 aims to “strengthen economic rationale for tackling childhood obesity in Europe”

Lifetime impacts and costs are better indicators of burden than impacts and costs in any particular year. JANPA Wp4 aimed to comprehensively estimate:

• Lifetime human impacts & financial costs of childhood obesity/overweight
• Effect of 1% and 5% reductions in mean childhood BMI

First time the same method was developed & applied in several (8) countries

Irish arms co-funded by JANPA and safefood

Final results in Northern Ireland (NI) (and Ireland (RoI) are presented.)
Consequences of childhood obesity/overweight:

- Adult Obesity
- Disease
- Early Death
Consequences of childhood obesity/overweight

- Adult Obesity
- Disease
- Early Death
- Productivity losses due to premature death
- Lifetime income penalty

People

Economy
Consequences of childhood obesity/overweight

- Adult Obesity Disease
- Early Death
- Productivity losses due to premature death
- Lifetime income penalty
- Productivity losses due to absenteeism

Social Services
Economy
People
Consequences of childhood obesity/overweight

- Adult Obesity Disease
- Early Death
- Productivity losses due to premature death
- Lifetime income penalty
- Productivity losses due to absenteeism

Primary Care
Drugs
Hospital Care
Health Services
Social Services
Economy
<table>
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<th>Research and data inputs (1)</th>
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<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>BMI</td>
</tr>
<tr>
<td>Disease risk</td>
</tr>
</tbody>
</table>
| Disease occurrence          | • Annual incidence rates (risks in healthy weight group)  
|                             | • Annual prevalence rates  
|                             | • One-year survival probabilities (for initial virtual child cohort &disease transition probabilities) |
| Direct healthcare costs     | Annual per case direct healthcare costs  
|                             | • Primary care  
|                             | • Hospital inpatient / outpatient care  
|                             | • Drugs |
| Lifetime income penalty     | “Income penalty” + Annual average income |
| Productivity losses due to  | Annual average income |
| premature mortality         |
## Research and data inputs (2)

| Productivity losses due to absenteeism | • Average number of days absent  
| • Social welfare payments |
| Other | • Life expectancies at birth (for 18 calendar years ending chosen start year)  
• Annual all-causes mortality rate  
• EQ-5D (QALY weightts)  
• Disability (YLLD & DALY) weights  
• Minimum legal working ages  
• Productivity after retirement |

**Theoretically:**
- Data provided for all ages and not just children.
- Broken down by gender, age, BMI status and disease.
Conceptual framework

OBESE CHILD

Increased morbidity in childhood

Increased obesity in adulthood

Increased morbidity in adulthood

INCREASED DIRECT HEALTH CARE COSTS

Increased mortality in adulthood
Conceptual framework

OBESE CHILD

Increased obesity in adulthood

Increased morbidity in adulthood

INCREASED DIRECT HEALTH CARE COSTS

Increased mortality in adulthood

Increased morbidity in childhood
Conceptual framework

LIFETIME INCOME LOSSES

OBESE CHILD

Increased obesity in adulthood

Increased morbidity in adulthood

INCREASED PRODUCTIVITY LOSSES (ABSENTEEISM)

Increased morbidity in childhood

INCREASED DIRECT HEALTH CARE COSTS

PRODUCTIVITY LOSSES (PREMATURE DEATH)

Increased mortality in adulthood
How the model works

Disease

Incidence + RR

Treatment

Age

Sex

Death

Productivity loss:
- Premature death
- Absenteeism

Lifetime income penalty

Legend
- Forecast of (sex - age) population BMI distribution
- Individual BMI trajectory
## Model outputs

<table>
<thead>
<tr>
<th></th>
<th>HUMAN IMPACTS</th>
<th>FINANCIAL COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADULT OBESITY/OVERWEIGHT</strong></td>
<td>Prevalence</td>
<td>Lifetime Income Losses</td>
</tr>
<tr>
<td><strong>MORBIDITY</strong></td>
<td>Incidence</td>
<td>Direct healthcare costs</td>
</tr>
<tr>
<td></td>
<td>Prevalence</td>
<td>Productivity losses due to absenteeism</td>
</tr>
<tr>
<td></td>
<td>Years Lost due to Disability (YLD)</td>
<td></td>
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<tr>
<td></td>
<td>Quality Adjusted Life Years (QALY)</td>
<td></td>
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<tr>
<td><strong>MORTALITY</strong></td>
<td>Premature death</td>
<td>Productivity losses due to premature death</td>
</tr>
<tr>
<td></td>
<td>Years of Life Lost (YLL)</td>
<td></td>
</tr>
</tbody>
</table>

All future costs are discounted to 2015 values using annual discounting rate of 3.5% (5.0% in the RoI)
How we estimate excess impacts and costs

Excess costs attributable to childhood obesity/overweight (for each impact and cost)

Cost (Obese/overweight as child) – Cost (Healthy weight as child)
Total lifetime financial cost in Northern Ireland (2015 values)

To pay for these future costs ...

The nation would have to:

- Deposit £2.25B (€2.53B) in 2015 (€4.52B in RoI)
- Earn 3.5% compound interest pa (5.0% in RoI) for the lifetimes of the children
- Withdraw only to pay costs when they occur

When the last child of 2015 dies, there will be no money left in the bank account.

Each effected family would have to deposit £20,156 (€22,647) in 2015 values (€16,036 in RoI) into such a bank account for each obese/adolescent child.
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Breakdown of lifetime financial costs (2015 values)

Republic of Ireland:
€4,518.1M (€16,036 pp)

Northern Ireland:
£2,254.9 or £20,156 pp
(€2,533.7M or €22,647 pp)

Direct Healthcare Costs €679.6M
Lost productivity (premature deaths) €1,607.3M
Lifetime Income losses €116.3M
Lost productivity due to absenteeism €130.6M

Republic of Ireland:
Lifetime Income losses €256.1M
Lost productivity due to absenteeism €521.9M
Lost productivity (premature deaths) €2,795.4M
Direct Healthcare Costs €944.7M
Gender differences in Northern Ireland

Lifetime financial costs:

• Higher for males than for females £29,803 pp vs £12,704 pp (€33,487 pp vs 14,275 pp) (€21,115 pp vs €11,694 pp in RoI)
• Males incur higher lifetime income penalty and excess productivity losses due to premature mortality
• Females incur higher excess direct healthcare costs and excess productivity losses due to absenteeism.

Explained in part by
• later more severe disease occurrence, higher premature mortality rates & higher average incomes amongst males
• greater care-utilisation amongst females.
North – South comparisons

Lifetime financial costs pp (obese/overweight adolescent):

- Higher in NI than RoI
- Direct healthcare costs relatively higher in NI while Productivity losses due to absenteeism were relatively higher in RoI

Differences explained in part by differences in

- Annual discount rates (5.0% pa in RoI vs 3.5% pa in NI)
- Health care systems in NI (universal health care) and the RoI (two-tiered public–private system)

Importance of national socio-demographic & health and social services context
How we estimate expected savings

First run: current childhood BMI

Second run: reduced childhood BMI

Expected savings from a reduction in mean childhood BMI

Total cost (current childhood BMI) – Total cost (reduced childhood BMI)
Expected savings with 5% reduction in mean childhood BMI (2015 values)

NI: £353.2M (or £3,156 pp) in 2015 values: 15.7%

(€396.8M or €3,546 pp)

RoI: €1,127.1M or €4,000 pp (2015 values): 25%
Conclusions

Such costing studies subject to significant methodological limitations.

Nevertheless, the study indicates that lifetime costs of the obesity/overweight that is present amongst today’s (2015) children are staggering. Unaddressed, they represent a huge burden for future generations.

Substantial savings could be achieved from “modest” reductions in mean childhood BMI.

There is a strong economic imperative for tackling childhood obesity.
Next steps

JANPA recommendations:

• JANPA costing model be incorporated into OECD’s economics of public health project
• Deploy the JANPA costing model in all European countries for which good-quality data are available

Working with OECD, we have confirmed that this was feasible

A formal proposal approved by OECD’s Health Committee meeting on 27 June in Paris

Currently negotiating final details
Benefits of the project

- Methodology can be adapted for Cost Effective Analysis of intervention trials

- Methodology applies to other childhood risk factors with long term consequences (e.g., smoking and alcohol consumption initiation)

- Process can help guide the development of research and data infrastructure so they can focus on evaluation of public health actions
Thank you for listening

Questions?

Comments?

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