Estimating the cost of childhood obesity

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JANPA WP4 objectives

In the seven participating EU countries; to

1a. Estimate the lifetime impacts & costs of childhood obesity
1b. Breakdown these impacts & costs according to year
1c. Assess the effect of reducing childhood obesity by 1% and 5%

2. Explore feasibility of generalising the approach to other EU MSs
My aim

Reflect on the challenges of estimating & forecasting comprehensive costs of childhood obesity.

“Give you ten tips when reading / reviewing childhood obesity costing studies”

I’ll draw on JANPA WP4
Additional challenges associated with childhood obesity

• Childhood obesity has many impacts & costs occurring in later life
• Childhood obesity linked to adult obesity with many shared impacts
• Evidence directly linking childhood obesity and adult obesity and adult diseases is underdeveloped
• Controversies in economics: Discounting and the Approach to estimating productivity loss
Focus of costing studies

EITHER

1. Total impacts & costs experienced by the whole population in given time period;

OR

1. Lifetime experiences of today’s obese children

Type 1 studies of childhood obesity must include:

• Today’s children who are obese
• Today’s adults who were obese when they were children

Need to understand the relationships between childhood obesity, adult obesity & adult obesity-related impacts
Simulations for lifetime costing studies

- RRs
- Obesity-related diseases
- Obesity-related treatment & deaths
- Adjusted QOL measures & costs
- Deaths from other causes
- Adult productivity losses
- Lifetime income losses

Legend:
- Forecast of (sex -age) population BMI distribution
- Individual BMI trajectory
Existing studies (Hamilton et al)

A systematic review yielded 13 studies:

- A majority of studies (8) in US; just 5 from Europe – Germany (2), Sweden (2), Netherlands (1).
- Both direct & indirect costs (1); direct healthcare costs only (8); indirect costs (4)
- Forecast modelling (11), observational cohort studies (2)
- Only two studies of 13 identified modelled direct costs incurred during childhood (2) – US & probably not generalisable to EU.
Ten tips

1. Economic perspective
2. Uncritical acceptance
3. Undisclosed details
4. Knowledge gaps and the use of proxy research & data
5. Obesity forecast and BMI trajectories
6. Multi-morbidities
7. Implied but unjustified accuracy
8. Controversies in economics practice
9. Study comparisons
10. Simulation models limitations
1. Economic perspective

A health systems perspective considers only costs to the health systems – relevant to health services

A societal perspective also considers also broader costs - more relevant to public health

Health systems perspective usually only includes direct medical costs and does not consider (private) indirect costs borne by patient

Other indirect costs might be adult productivity losses, lifetime income, etc (not related to health care)
Each study type relies on its own particular assumptions, which should be clear to readers. Look for a clear statement of simulation model structure (i.e. assumptions, equations and algorithms), data used, and results of validation exercises (Levy et al., 2011).

Decision-makers should be aware of different purposes, strengths and weaknesses of different studies when interpreting cost outcomes.
3. Undisclosed details

Costing studies (esp simulations) require large amounts of detailed research & data inputs not commonly available.

Gaps are often filled by unstated assumptions about the research, data and model:

- What is meant by obesity?
- How is childhood obesity defined?
- What does “… reducing obesity … “mean?

These can significantly effect estimates of impacts & costs.
4. Knowledge gaps and use of proxy research & data

Evidence linking adult disease & childhood obesity is underdeveloped (eg age-sex specific RRs of obesity–related diseases)

Evidence about societal impacts (especially in childhood) is under-developed

Data about patterns & trends in obesity and obesity-related diseases (eg age-sex specific incidence, prevalence, survival) usually inadequate

Treatment costs data for these diseases relatively poor

Leads to extensive use of proxy research and data

These effect estimates of impacts & costs and relevance
5. Obesity forecasts and BMI trajectories

Forecasts of the population BMI distribution and generation of lifetime BMI trajectories for simulation models are probably the biggest influence on estimates.

Sometimes these methodologies do not develop as fast as other aspects of simulation models.

JANPA WP4 is conducting a validation study (Ireland and Slovenia):

- More advanced statistical methods
- Estimate transition probabilities between BMI categories and use Markov processes to simulate BMI trajectories (Sonttage et al)
- Latent growth curve analyses to identify latent BMI trajectories from longitudinal studies and sample to derive lifetime BMI trajectories (Penneau et al)
6. Multi-morbidities

Comprehensiveness means many impacts must be included.

But

- RRs risks of such mult-morbidities and treatment costs are usually not known
- Diseases processes are assumened to occur independently.
- Individual disease counts and treatment costs are just added

This leads to estimates of disease burden and treatment costs that are biassed (underestimated disease rates & overestimated per case treatment costs)
7. Implied but unjustified accuracy

With such complex costing studies involving many different types of data and research, “uncertainty intervals” are often not provided.

When they are provided it is unclear how they were calculated? What sources of error/variation? What assumptions? Usually such intervals are too narrow.

This often implies an unjustified level of accuracy and the interpretation of results doesn’t take it into account.
8. Controversies in economics

Discounting is our preference to defer and (monetarily devalue) future disease burden and costs

- It is unclear if discounting is appropriate for risk factors like childhood obesity which has long term implications
- Best practice (NICE guidelines for economic evaluation) is to discount

Use of a Human-Capital approach or a Friction-Cost approach when calculating the value of value of lost productivity
9. Study comparisons

Hampered by differences in modelling methods & assumptions (Finkelstein et al., 2014).

- If costs during childhood (<18 years) incorporated
- Methods for calculating costs & cost components included
- How are transitions in BMI status over time dealt with
- Adjustments for differential mortality rates by BMI status
- Are results reported by age, gender and race/ethnicity

Some evidence that differences between studies relate largely to study design parameters (Bierl et al. (2013))
10. Limitations of modelling

Limitations of modelling are widely recognised

Childhood-obesity research projects:
• Conditions that cannot be included in modelling
• Experiences of morbidly obese children
• Childhood obesity and educational outcomes
• Inequalities

Data & methodology projects:
• Obesity forecastings methods
• Improved information systems
• Simulation modelling methods
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Study Principles

1. Relevance to countries & EU
2. Societal economic perspective for public health
3. Capacity building in countries & EU (research & information)
4. Identifying research & informations gaps
5. Stimulating needed research & information developments
6. Health equity
Conclusions

Costing studies are important.

However,

• Research and data inadequacies impede such studies.
• Addressing these inadequacies will also have benefits for the management of other chronic conditions and build capacity at the country-level.

Proceed but beware!