# Fedt, muskler og BMI på den lange bane

**Årskonference Holbæk-modlelen**
**Nyborg d. 21/10-2024**

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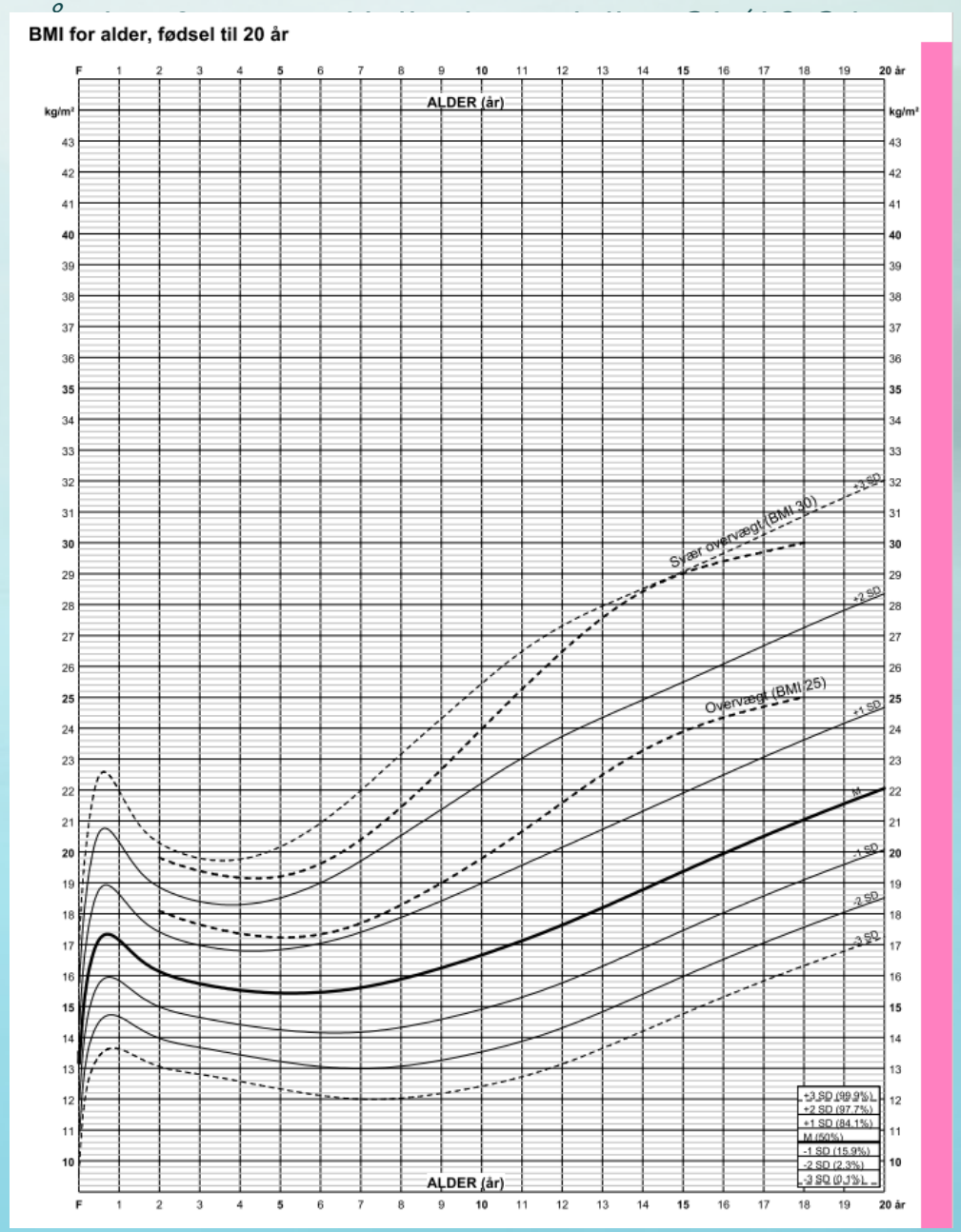
# Definition af adipositas

- Eksessiv (eller abnorm) fedtmasse der kan påvirke helbredet negativt.

- BMI er således blot en proxy – et værktøj
- Vigtigere er fedt% og komplikationer




Tinggaard J *et al. Acta Paediatr Scand 2014*; Feb;103(2):214-24.

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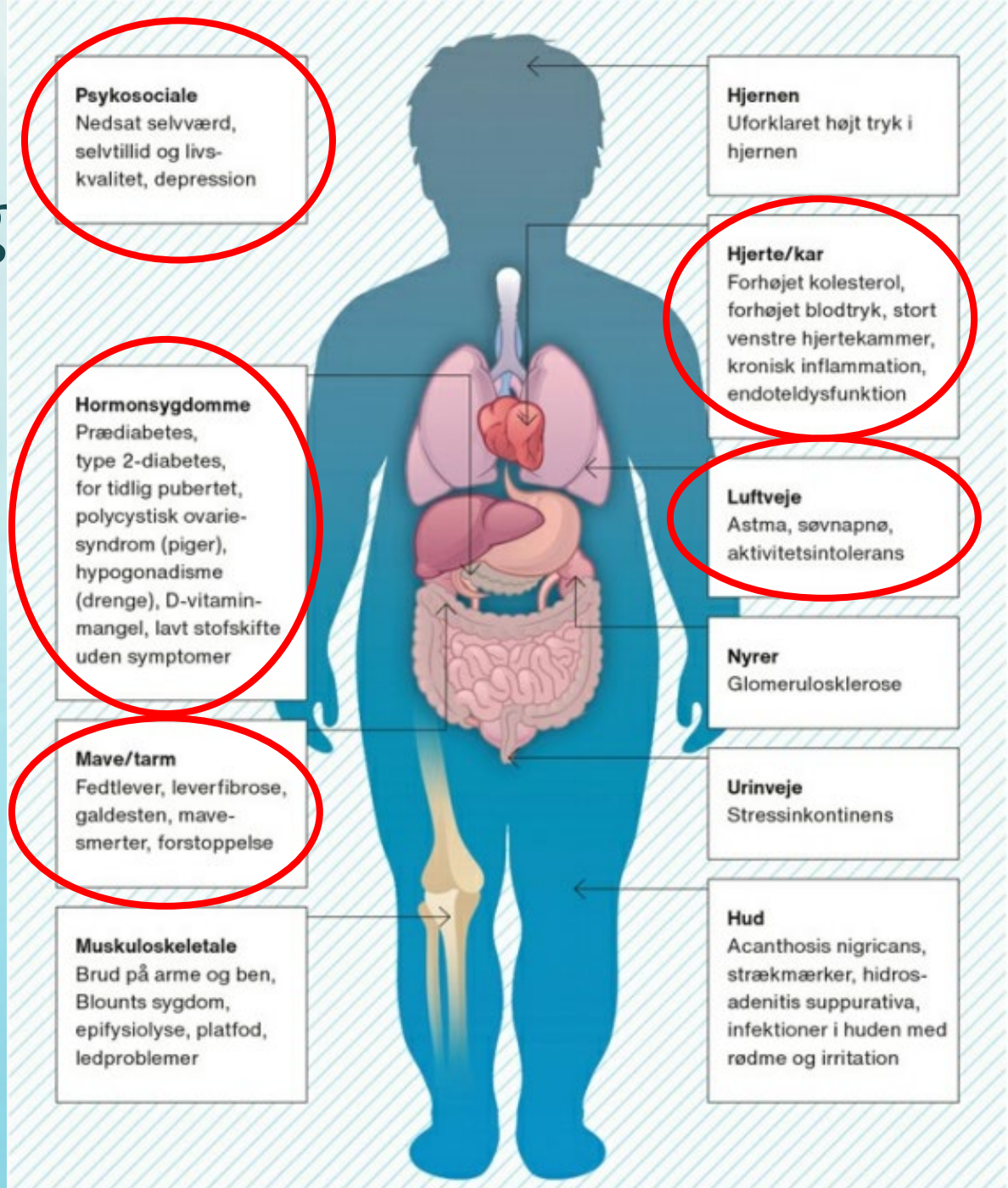
# Komplikationer til adipositas hos børn/ung

- 75% med nedsat selvværd, selvtillid eller livskvalitet Fogh, *J Paediatr Child Health*. 2020; 56(4):542-549
- 82% med forstyrret spisning
  Fogh, *J Paediatr Child Health*. 2020; 56(4):542-549
- 50% med forhøjet blodtryk
  Mollerup, *J Hum Hypertens*. 2017;31(10):640-646
- 28% med forhøjet kolesterol
  Nielsen, *BMC Pediatr*. 2017 Apr 28;17(1):116
- 60% med lavt D-vitamin
  Plesner, *J Pediatr Endocrinol Metab*. 2018;26;31(1):53-61
- 14% med prædiabetes
  Kloppenborg, *Pediatr Diabetes*. 2018 May;19(3):356-365
- 45% med søvnapnø
  Andersen, *Eur Arch Otorhinolaryngol*. 2019 Mar;276(3):871-878
- 31% med fedtlever
  Fonvig, PLoS One. 2015 Aug 7;10(8):e0135018




Tegning fra Det Bedste For Barnet, JC Holm, Politikens Forlag 2017

# Tidlige forandringer

Obesity Research & Clinical Practice

journal homepage: www.elsevier.com/locate/orcp

Early detection of childhood overweight and related complications in a Danish population-based cohort aged 2–8 years

Christine Frithioff-Bøjsøe[a,b,*], Morten Asp Vonsild Lund[a,c], Ulrik Lausten-Thomsen[d], Cilius Esmann Fonvig[a,b,e], Ida Olivia Juhl Lankjær[a], Tina Hansen[f], Torben Hansen[b,g], Jennifer Lyn Baker[b,h], Jens-Christian Holm[a,b,i]

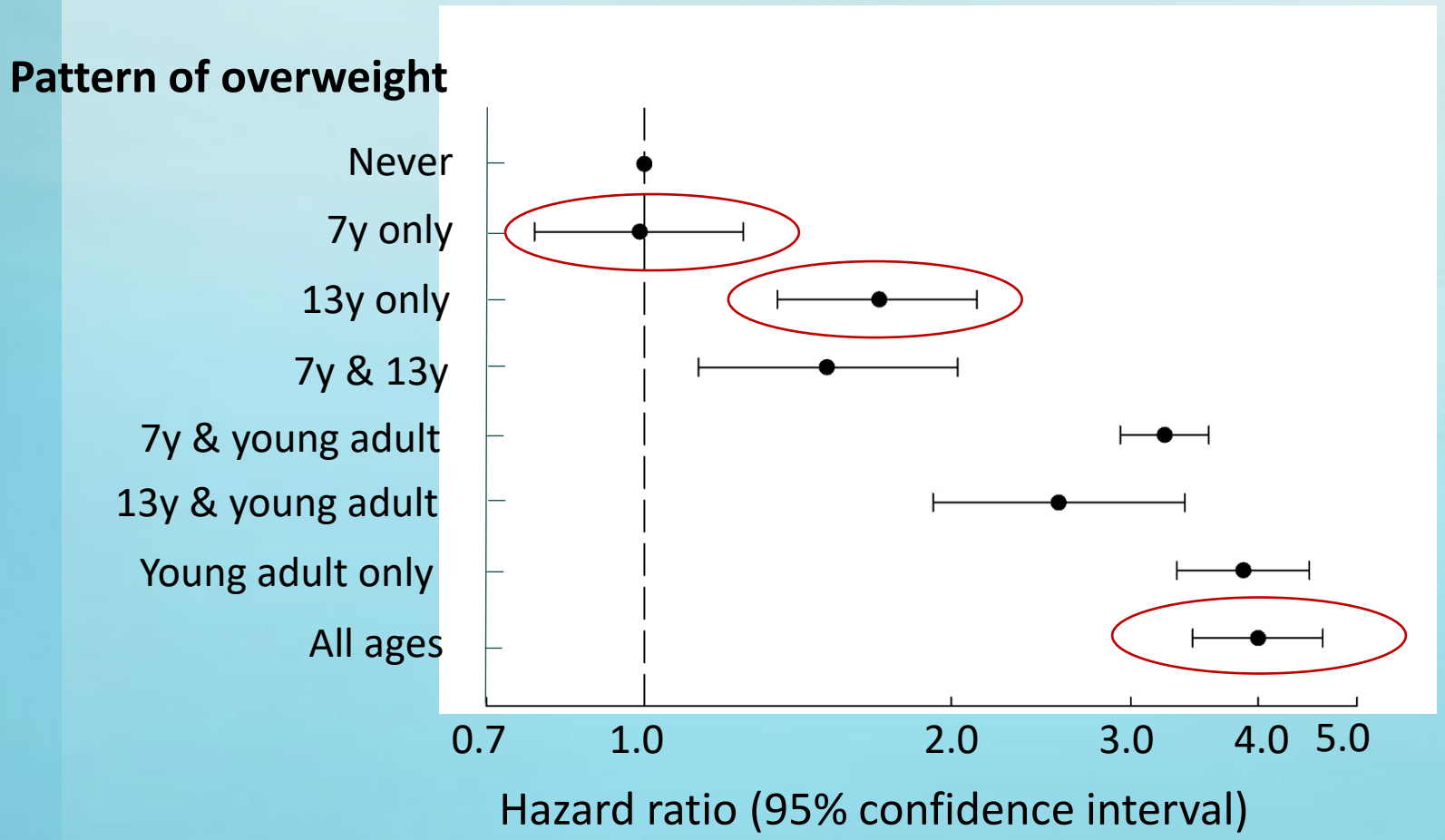
| | Pre-school children (2-5 yrs) | | | School children (6-8 yrs) | | |
|---|---|---|---|---|---|---|
| | BMI SDS <P90 (n=135) | BMI SDS >P90 (n=15) | p | BMI SDS <P90 (n=215) | BMI SDS >P90 (n=27) | p |
| Systolic blood pressure SDS | 0.08 | 0.43 | 0.96 | 0.11 | 0.57 | **0.001** |
| Glucose (mmol/L) | 4.7 | 4.4 | **0.028** | 4.7 | 5.0 | **0.002** |
| Insulin (pmol/L) | 27.1 | 25.8 | 0.94 | 25.4 | 58.6 | **<0.001** |
| HOMA-IR | 0.9 | 0.9 | 0.74 | 0.9 | 2.2 | **<0.001** |
| HDL-C (mmol/L) | 1.4 | 1.8 | **0.030** | 1.5 | 1.3 | **0.007** |
| ALT (U/l) | 22.0 | 27.5 | **0.018** | 22.0 | 27.0 | **<0.001** |

# Hvis man vil finde, kræver det man leder

- Selv uden tilstedeværelsen af åbenlyse komplikationer kan adipositas i barnealderen kompromittere den normale vækst og udvikling
- samt være en signifikant indikator for fremtidig sygelighed og dødelighed
- Risiko for komplikationer ↔ varighed og graden af adipositas


- Geserick, N Engl J Med 2018;379:1303-12
- Baker, N Engl J Med 2007;357:2329-37
- Weiss, Best Pract Res Clin Endocrinol Metab 2005;19:405-19
- Latzer, J Eat Disord 2013;1:7
- Reis JP. JAMA 2013;310:280-8.
- Aarestrup J. Tracking of body mass index from 7 to 69 years of age. Int J Obes 2016;40:1376-83.

# BMI fra barn til ung voksen-alder, type 2 diabetes




Jo tidligere man behandler adipositas des lavere risiko for type 2 diabetes

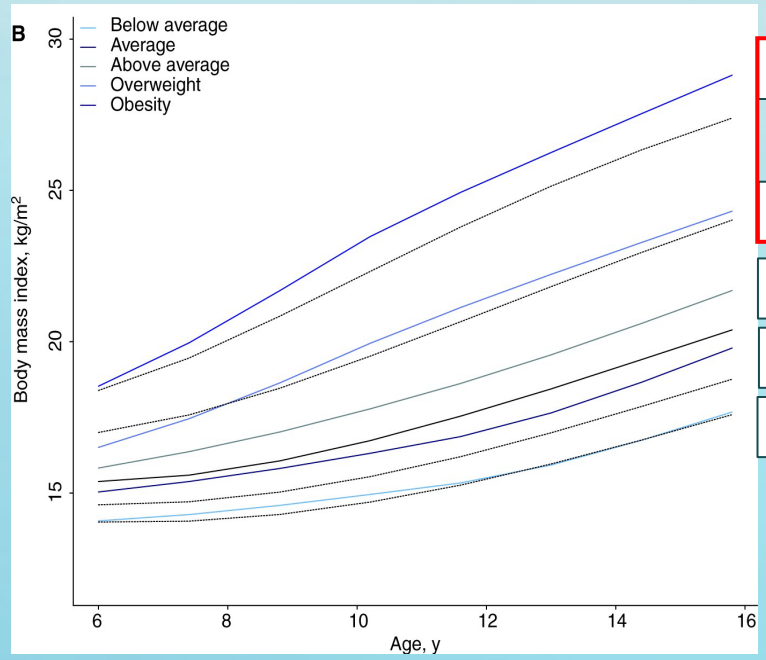
Source: Bjerregaard L et al. *New Engl J Med* 2018;378:1302-1312

Med tilladelse fra Jennifer L. Baker

Cilius Esmann Fonvig (DK) | mail: ciliusf@gmail.com | *Årskonferencen Holbæk-modellen 21/10-24*

# Adipositas hos børn/unge og adipositasrelateret cancer

**Figure 1.** Mean childhood body mass index trajectories for n=301,927 boys and girls
(shown: boys, n=152,602).




Obesity

Overweight

Above average

Average

Below average

**Figure 2.** Rates of cancer among women and men by childhood BMI trajectory.

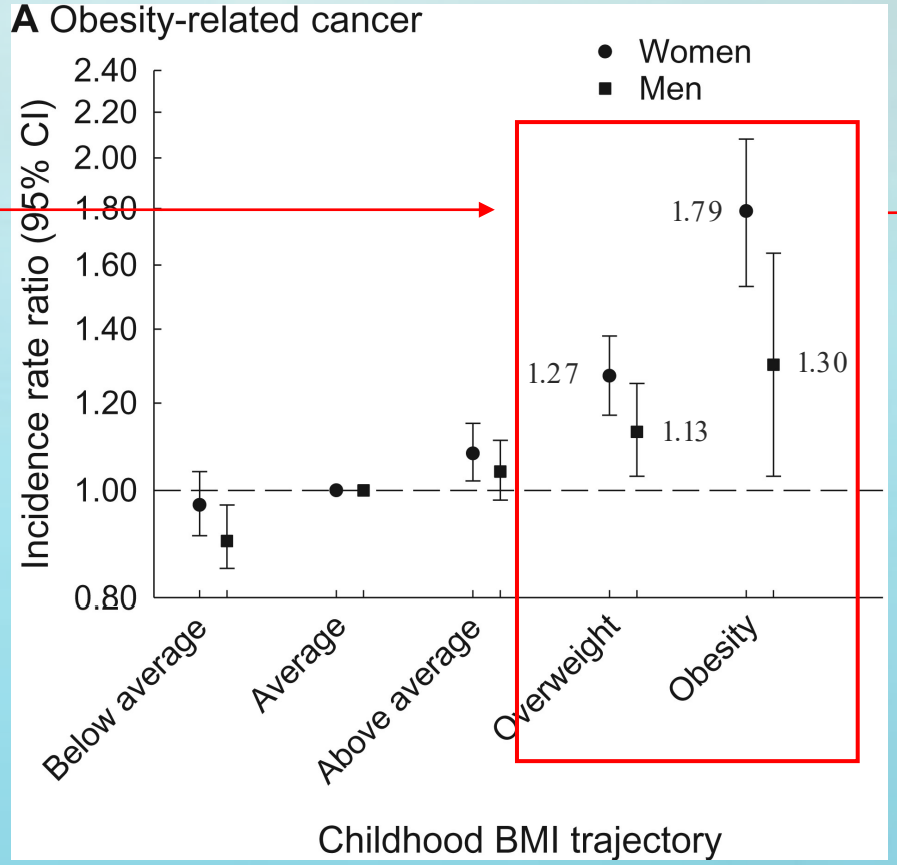



**Table 2.** Number of women

| Cancer form |
|---|
| Colon |
| Corpus uteri |
| Esophagus |
| Gallbladder |
| Gastric cardia |
| Kidney |
| Liver |
| Meningioma |
| Multiple myeloma |
| Ovary |
| Pancreas |
| Rectum |
| Thyroid |
| Total |

a From 1978 onward, IC
recoding project in 20
ICD-10 codes (29). ICD

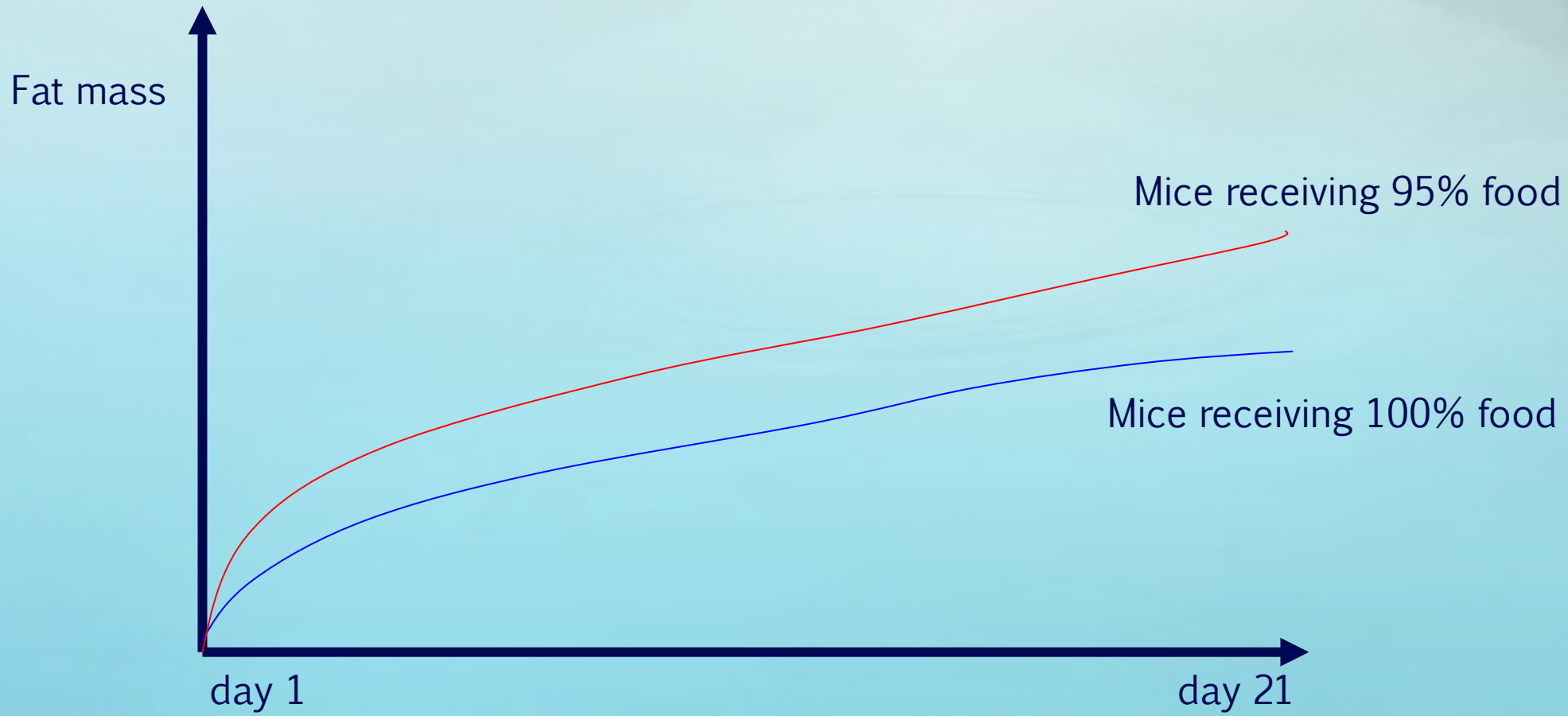
the Copenhagen School Health Records Register

*J Natl Cancer Inst*, Volume 115, Issue 1, January 2023, Pages 43–51, https://doi.org/10.1093/jnci/djac192



OXFORD UNIVERSITY PRESS

# The fat mass is actively defended




Li X *et al. Obesity 2010*; 18(3):456-62.

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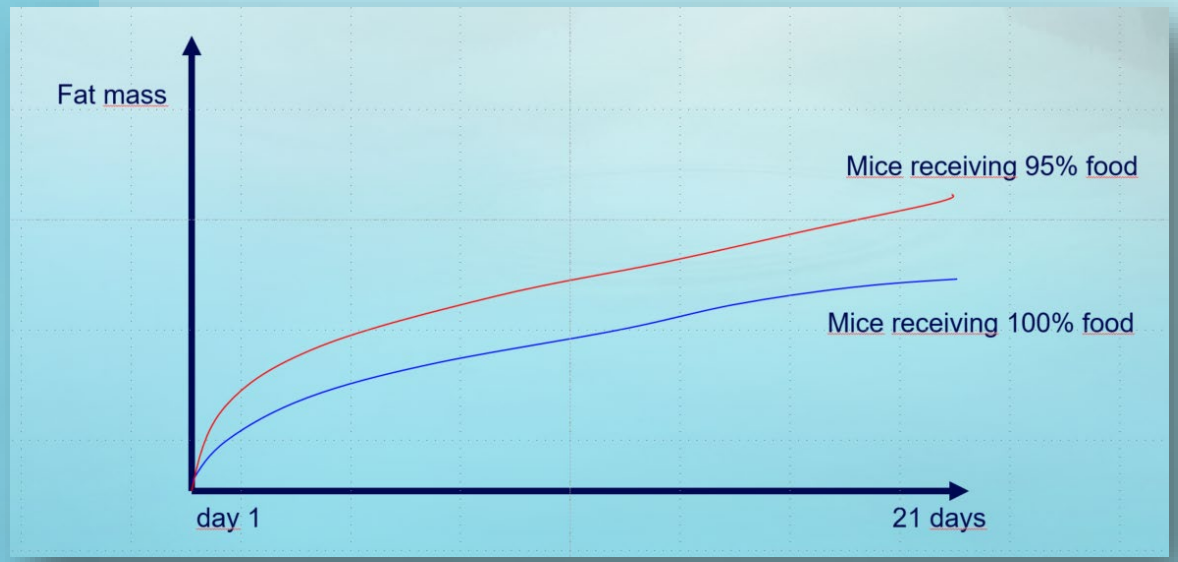
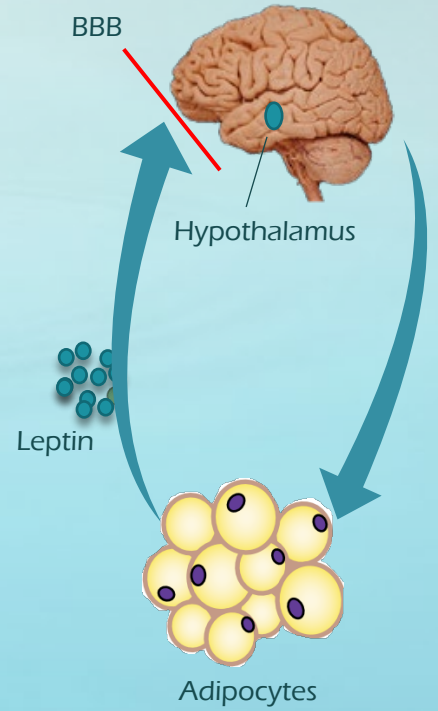
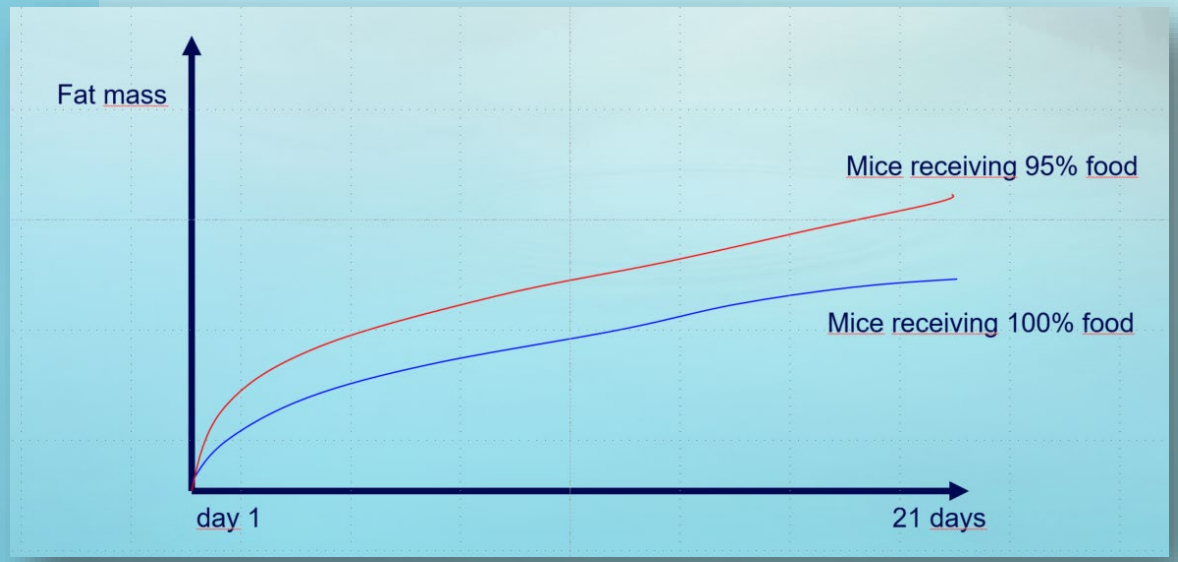



Li X *et al. Obesity 2010*; 18(3):456-62.

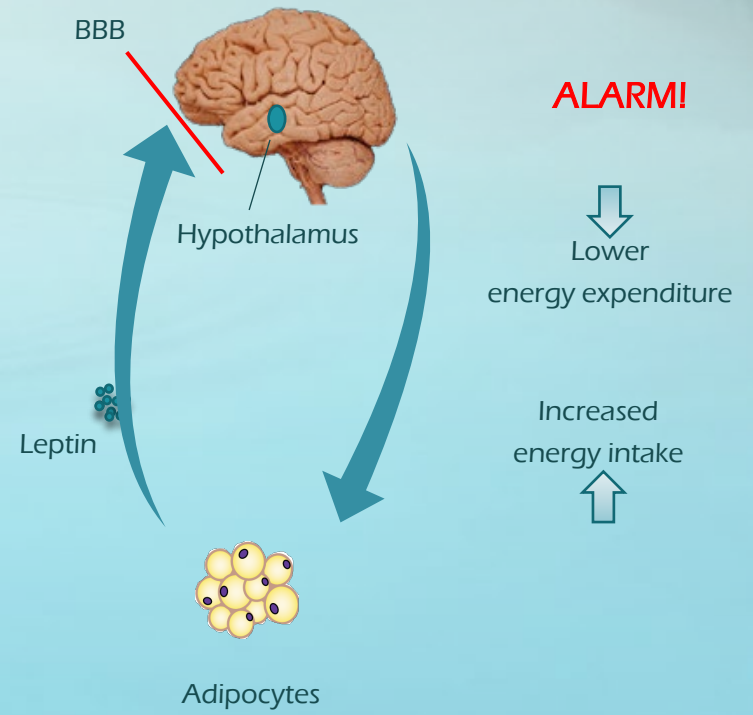



Rosenbaum M, Leibel RL. *J Endocrinol. 2014*;223(1):T83-T96.

# The fat mass is defended actively




Li X *et al. Obesity 2010*; 18(3):456-62.




Rosenbaum M, Leibel RL. *J Endocrinol. 2014*;223(1):T83-T96.

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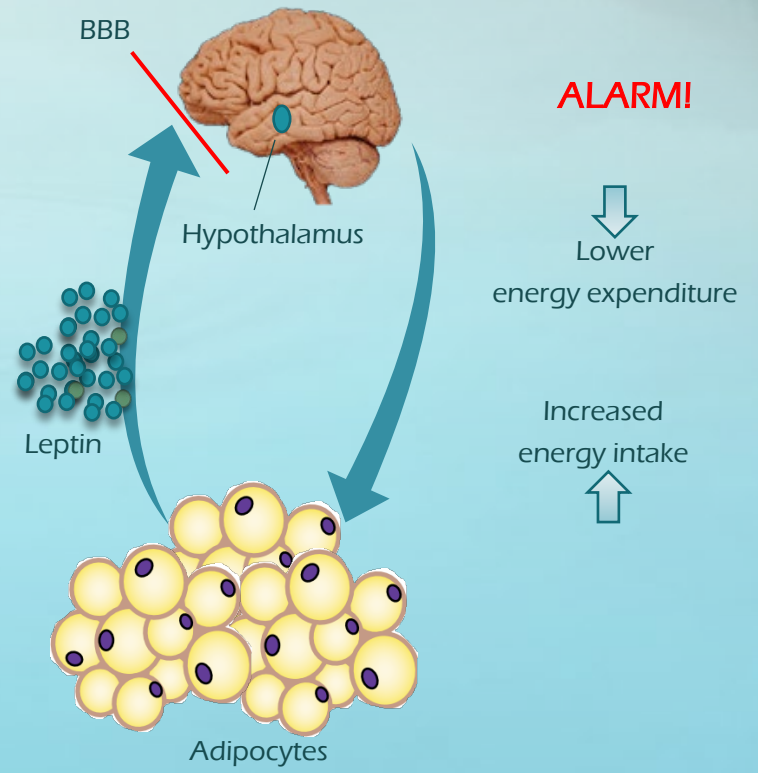
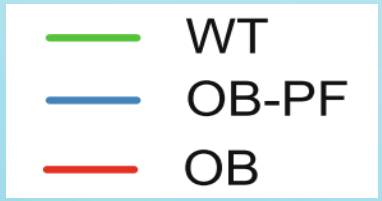
Li X *et al. Obesity 2010*; 18(3):456-62.

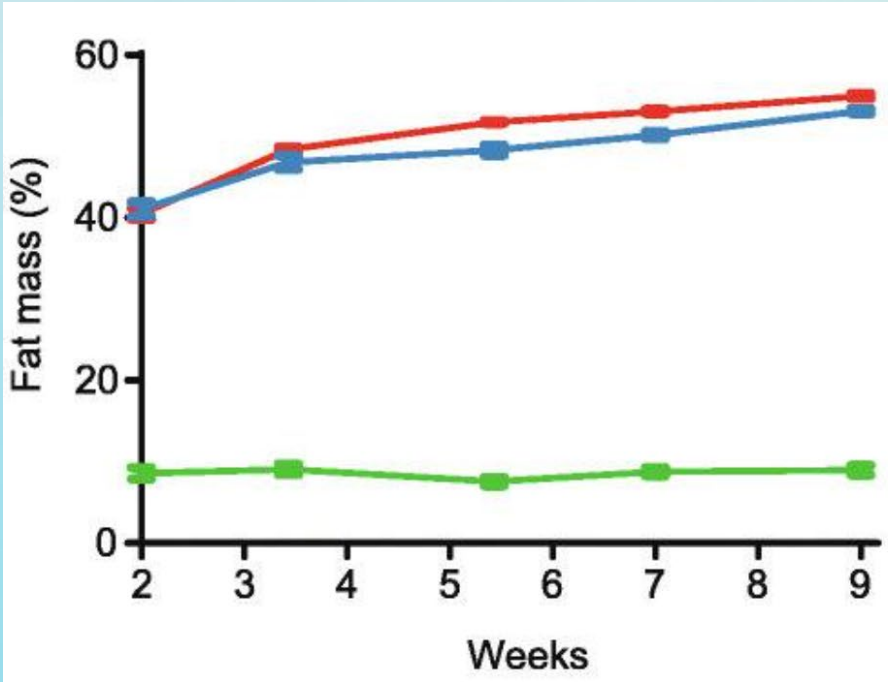


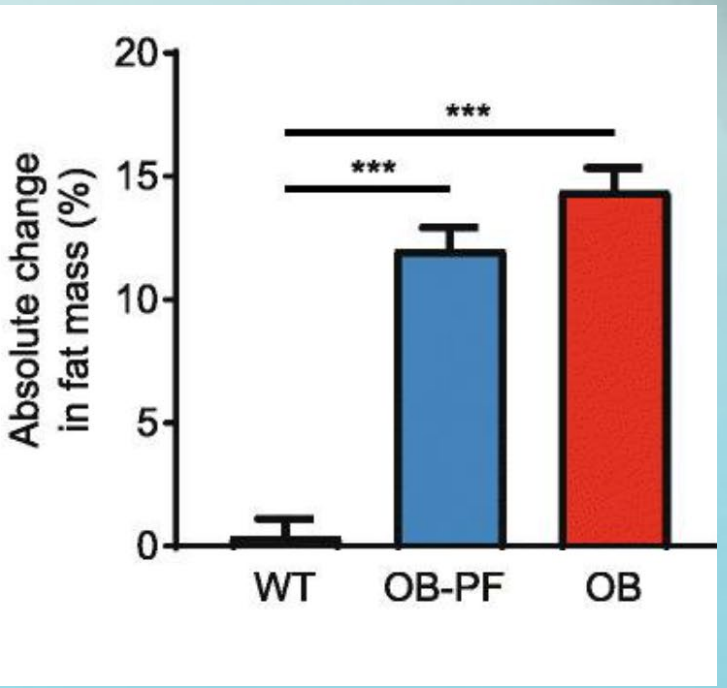

Rosenbaum M, Leibel RL. *J Endocrinol. 2014*;223(1):T83-T96.

# The fat mass is defended actively



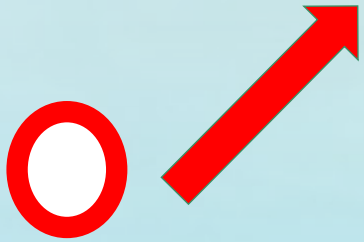




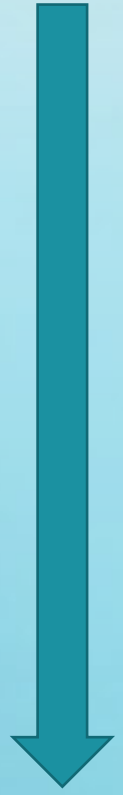




Kashani *et al. Anim microbiome* 2019; **1**: 11.

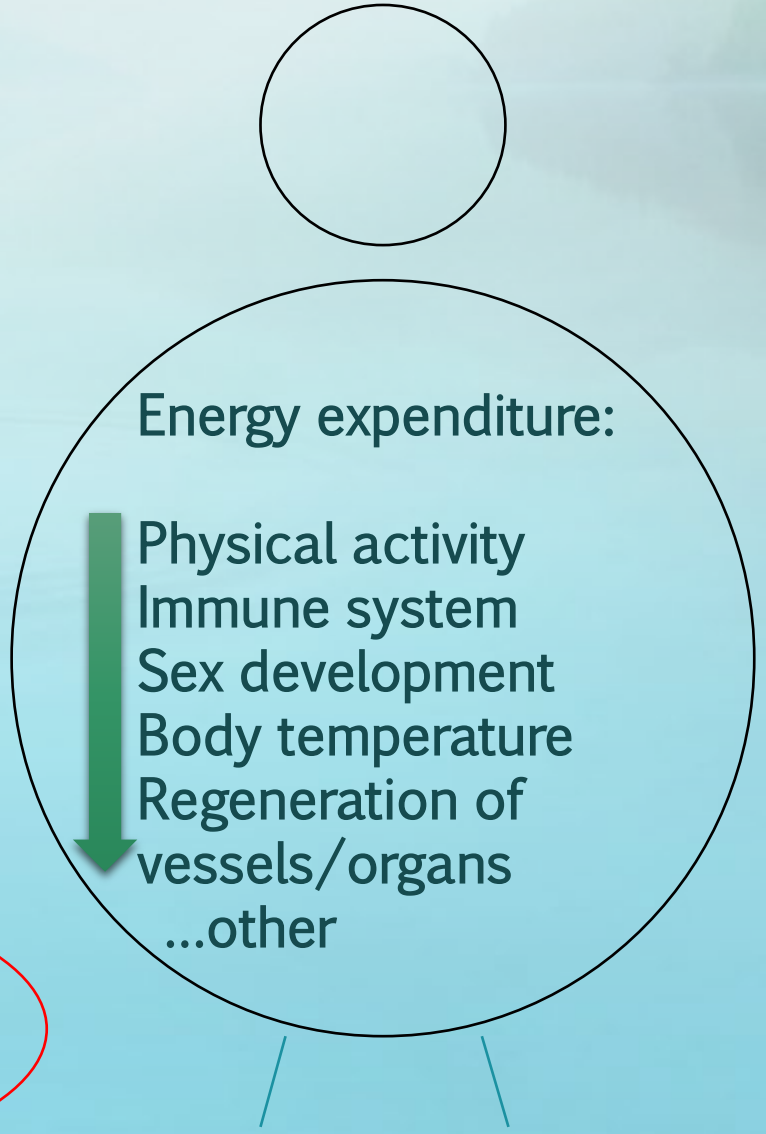
# Energy (fat mass) regulation



1. Picky eating
2. Breakfast
3. Pre-noon meal
4. Lunch
5. Afternoon meal
6. Dinner
7. Night-time meal
8. Candy
9. Snacks
10. Fast food
11. Soda
12. juice
13. Ice tea
14. cocoa
15. lemonade
16. Energy drink
17. Milk
18. Screen time
19. Inactivity
20. Physical activity
21. ...
22. ...



More physical activity
Less fat and sugar intake
...and more



# Hvor god er behandlingen?

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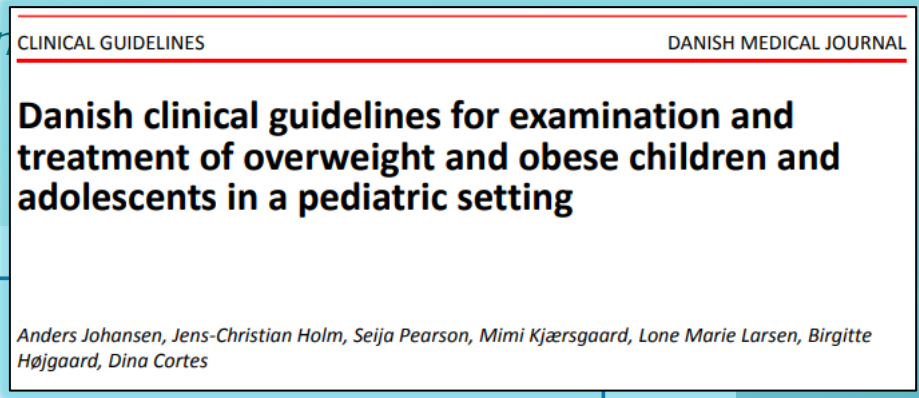
# Hvor god er behandlingen?


CLINICAL GUIDELINES DANISH MEDICAL JOURNAL

**Danish clinical guidelines for examination and treatment of overweight and obese children and adolescents in a pediatric setting**

*Anders Johansen, Jens-Christian Holm, Seija Pearson, Mimi Kjærsgaard, Lone Marie Larsen, Birgitte Højgaard, Dina Cortes*

## Holbæk-modellen

4-5 timer sundhedsprofessionel tid pr. patient pr. år (før den digitale løsning)

### Reducerer graden af overvægt hos 74-76% (90%) af børn og unge med overvægt

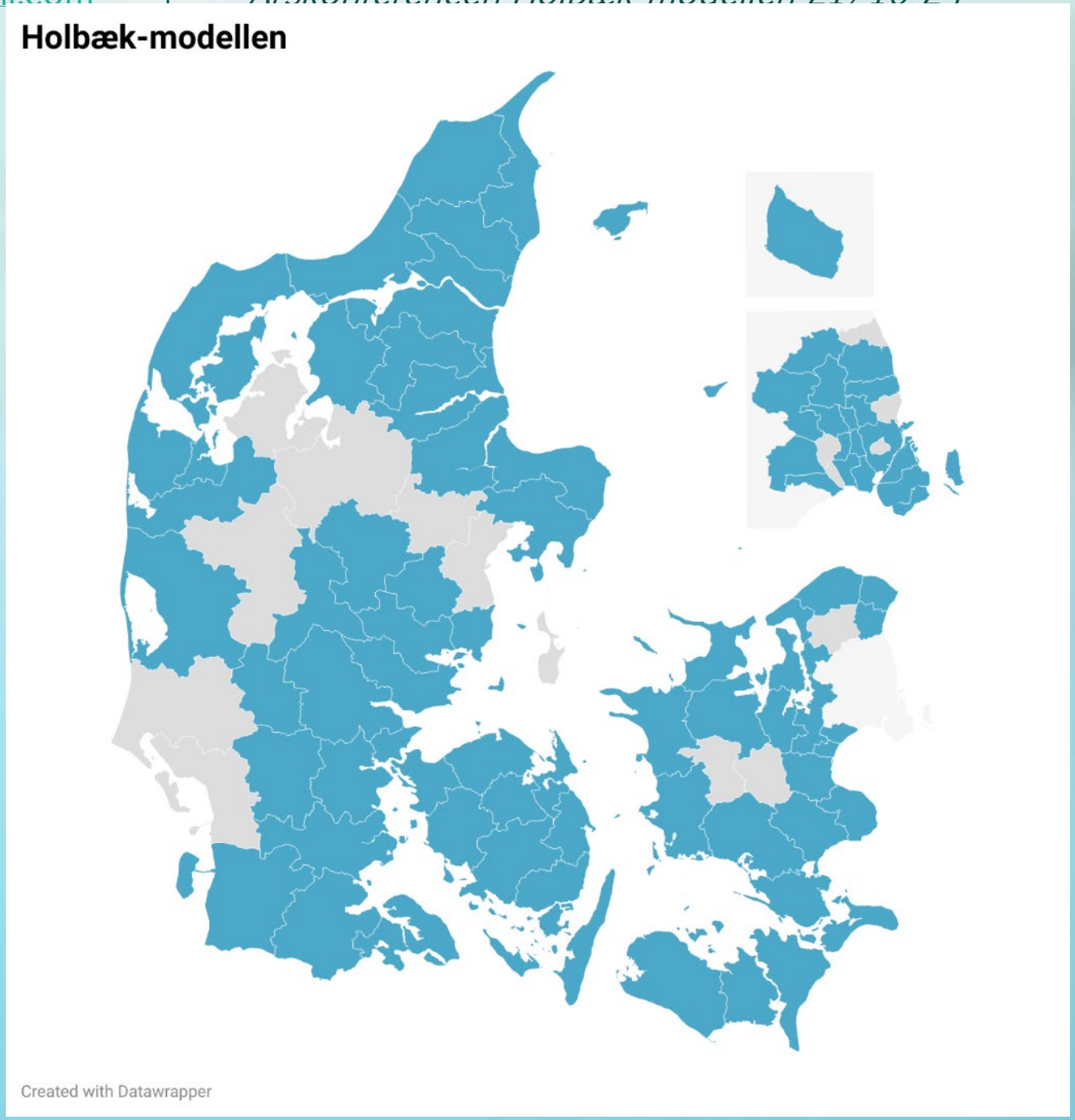
Fogh, M., J Paediatr Child Health 2020; Mollerup, P., PLoS One 2017; Most, SW., BMC Pediatr. 2015; Nielsen TRH., PLoS One 2018;

| | | | | |
|---|---|---|---|---|
| Reducerer fedtlever og dyslipidæmi<br>Fonvig, CE., BMC Pediatr. 2015<br>Nielsen, TRH., Child Obes. 2012 | Reducerer graden af hypertension<br>Hvidt, KN., J Hypertens. 2014 | Reducerer søvnapnø<br>Andersen IG, Int. J. Pediatr. Otorhinolaryngol. 2019 | Reducerer graden af overvægt hos forældrene<br>Trier, C., PLoS One. 2016 | Reducerer appetit og mobning<br>Fonvig, CE., Qual Life Res. 2017 |
| Implementeret i primær og sekundær sektor<br>Holm, J-C., Int J Pediatr Obes. 2011;<br>Mollerup, P., PLoS One 2017 | Livskvalitet og selvværd øges<br>Mollerup, P., Qual Life Res. 2017 | Uafhængigt af genetisk risikoscore (15 gener)<br>Hollensted, M., Obes. 2018 | Uafhængigt af fødselsvægt og fødselslængde<br>Lausten-Thomsen U. J Pediatr 2021 | eHealth løsning: vægtreduktion hos 85% voksne<br>Langkjær, IOJ., Mhealth. 2022 |
| Uafhængigt af SØS og graden af overvægt ved start<br>J-C., Int J Pediatr Obes. 2011 | Uafhængigt af | Uafhængigt af | Uafhængigt af | Uafhængigt af |

2024 nationale kliniske retningslinjer for udredning og behandling af adipositas hos børn og unge er bygget på Holbæk-modellen (siden 2015)
(2015-version: Johansen A. Dan Med J 2015;62(5):C5024)

# Holbæk-modellen i DK og udlandet

- > 80% af kommunerne i DK
- > 1000 SHP'er
- Implementeret i Norge



# Internationalt anerkendt

World Obesity Day March 4 | Europe

EASO
European Association for the Study of Obesity


## 2022 AWARD WINNERS

**Congratulations to Dr Jens-Christian Holm, The Children's Obesity Clinic, European Centre for Obesity Management, Holbaek University Hospital, Denmark**

Winner of the 2022 EASO World Obesity Day Europe Award for the Best National Training Programme

Meet all the winners: woday.eu/winners

WOday.eu #ObesityDayEurope

EASO
European Association for the Study of Obesity

EASO ECPO European Coalition for People living with Obesity

World Obesity Day March 4 | Europe

**AWARDS 2022**

## THE EASO AWARD
### FOR THE BEST NATIONAL TRAINING PROGRAMME

Dr. Jens-Christian Holm

The Children's Obesity Clinic, European Centre for Obesity Management
Holbaek University Hospital, Denmark

Inventor of The HOLBAEK Model

# SLIDES MISSING DUE TO PRELIMINARY DATA...

- Reduktion i BMI SDS
- Reduktion i fedt%
- Øgning af muskelmasse

# Tab af muskler (fedtfri masse) m/u medicinsk behandling

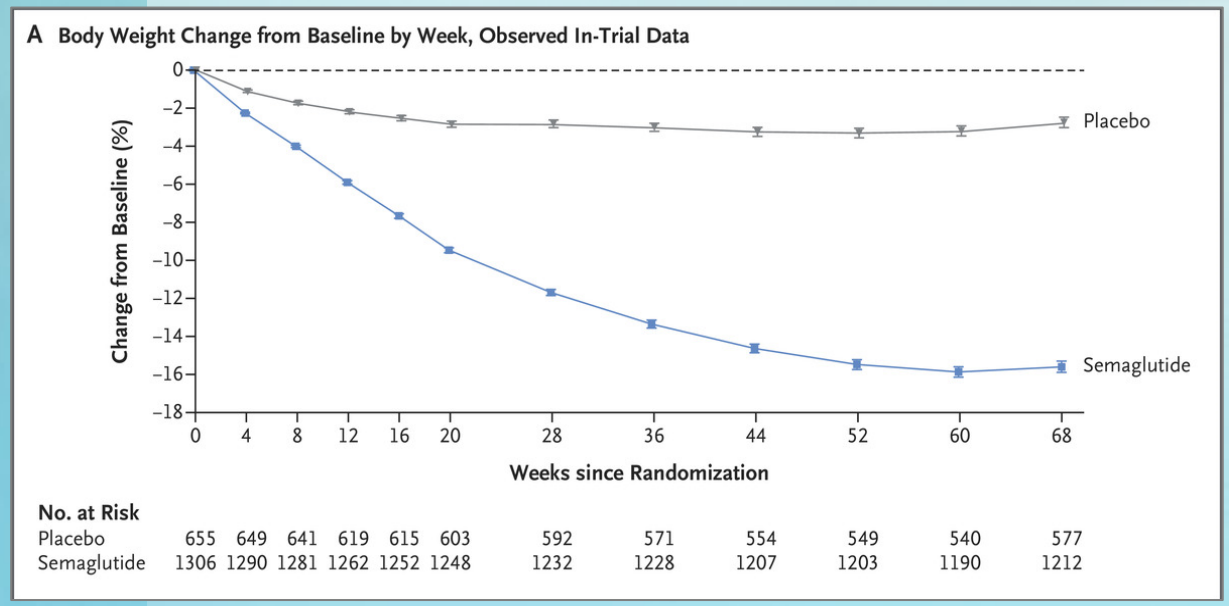



**Table S2. Co-primary, Confirmatory and Selected Supportive Secondary Endpoints for the Trial**

**Product Estimand*†**

| | Semaglutide 2.4 mg once weekly (N=1306) | Placebo once weekly (N=655) | Treatment comparison for semaglutide vs. placebo [95% CI] |
|---|---|---|---|
| *Co-primary endpoint assessed in the overall population* | | | |
| Body weight change from baseline to week 68 – % | −16.86 | −2.44 | ETD: −14.42 [−15.29; −13.55] |
| *Supportive secondary endpoints assessed in the DEXA subpopulation* | | | |
| | N=95 | N=45 | |
| Body composition change from baseline to week 68 (DEXA) | | | |
| Total fat mass | | | |
| Kg change | −10.40 | −1.17 | ETD: −9.23 [−12.72; −5.74] |
| Percentage-points change in total fat mass proportion§ | −4.19 | −0.19 | ETD: −4.00 [−6.27; −1.73] |
| Total lean body mass | | | |
| Kg change | −6.92 | −1.48 | ETD: −5.44 [−7.07; −3.81] |
| Percentage-points change in total lean body mass proportion§ | 3.61 | 0.11 | ETD: 3.50 [1.35; 5.64] |

JP Wilding et al. N Engl J Med 2021;384:989-1002.

The NEW ENGLAND JOURNAL of MEDICINE