Introduction
The randomized, controlled trials of obesity interventions find remarkable heterogeneity of responses among adult patients—whether the intervention pertains to lifestyle (dietary, physical activity), or is a pharmaceutical or surgical intervention. Indeed, most RCTs for obesity interventions include a mixture of patients that, despite meeting the inclusion criteria for the study, vary remarkably when it comes to the medical history of their disease, their associated comorbidities, and many other factors (including lifestyle and environmental factors) that may drive the heterogeneous responses to the same intervention. Only stratification-driven analysis should allow to decipher the obesity heterogeneity.

However, a consensus from the scientific community is still lacking to define the most relevant phenotyping criteria and their assessment methods on which the obese patient stratification could be based.

Methods
A group of European obesity researchers convened in 2018 to create a plan for helping shape future studies by identifying the minimal set of variables that should be included in trials of different kinds of obesity interventions (whatever the type and the endpoints of the intervention). Of course, besides this minimal core set, RCTs or other trials may collect data on additional variables, depending on the specific area of focus. This initiative, called @OBEDIS and funded by the JPI HDHL, was created with the aim of giving the research community a blueprint for designing future RCTs to allow the sharing and merging of datasets, and to enable meaningful subgroup analyses. To achieve this, the @OBEDIS experts surveyed the scientific literature, shared their expert opinions on a recommended minimal core set of variables to include in all future trials of adult obesity interventions, and sought to reach consensus on both these variables and the related assessment methods. The feasibility aspect, especially regarding the cost, the invasiveness and the size of the minimal core set has been taken into account, to facilitate the widespread adoption of these measures by the European obesity research community.

Minimal core set of variables

<table>
<thead>
<tr>
<th>Category</th>
<th>Questionnaires (validated or custom questionnaires)</th>
<th>Measures (and related assessment method)</th>
<th>Assays</th>
</tr>
</thead>
</table>
| Medical history of obesity                    | 1) At what age did you begin to gain significant weight?  
2) In adulthood (age 18 and older), what has been your lowest body weight?  
3) What has been your highest body weight?  
4) How much weight have you gained or lost in the past 3 months?  
5) How many times have you attempted to lose weight previously?  
6) How would you describe the weight of each of your birth parents around the time you were born? |
| Basic background information                  | 1) How many years of formal education have you had?  
2) In which country did the majority of your education occur? |
| QoL/handicap                                   | EQ-5D-SL                                           | Physical activity and sedentary level ( Accelerometry)  
Cardiorespiratory fitness (6-minute walk test)  
Muscle strength (Southampton grip-strength measurement) |
| Dietary intake & Emotional eating             | Dietary intake : validated FFQ like EPIC-Norfolk FFQ  
Diet quality : validated index like Dutch Healthy Diet Index  
Dutch Eating Behavior Questionnaire           |                                    |
| Physical activity & sedentary behavior        | Paffenbarger Physical Activity Questionnaire        |                                    |
| Sleep                                         | 1) Do you work in shifts? This includes rotating successive morning/evening or rotating successive morning/evening/night shift or other alternate shifts.  
2) Does your work involve working at night (i.e. between 0-5am) even irregularly?  
3) Do you work permanently at night (i.e. between 0-5am)?  
4) How many days in a week do you work?  
5) On nights before workdays, what time do you fall asleep at?  
6) On work days, what time do you normally wake up at?  
7) On nights before free days, what time do you fall asleep at?  
8) On free days, what time do you normally wake up at?  
STOP-BANG                                      |                                    |
| Perceived stress                               | Perceived stress scale                              |                                    |
| Anthropometry, body composition, and energy expenditure | Weight, Height, Waist circ., Hip-circ., Neck circ  
% body fat mass and % body fat free mass (DXA) |                                    |
| Cardiovascular risk factor                    | 1) How many cigarettes a day do you smoke, on average?  
2) For how long have you had a habit of smoking?  
3) What medications do you currently take?  
4) How many times have you attempted to lose weight previously?  
5) How many years of formal education have you had?  
6) In which country did the majority of your education occur? | Blood pressure & heart rate (tensiometer)  
Heart function (15 min ECG)  
Cardiorespiratory fitness (6-minute walk test)  
Total cholesterol  
HDL cholesterol  
Triglycerides  
CRP  
Fasting glycaemia  
TSH  
Hemoglobin A1C  
Fasting insulin & insulin-derived insulin sensitivity indices  
NFS and FB-4 |
| Hormonal status & Diabetes                    | 1) Does a parent or anyone in your immediate family have type 2 diabetes?  
2) (For females) Have you ceased menstruation?  
3) Which medications do you currently take?  
4) How many times have you attempted to lose weight previously?  
5) How many years of formal education have you had?  
6) In which country did the majority of your education occur? |                                    |
| Liver disease                                  |                                                    |                                    |

Given to the current high cost of genetic and omics analysis, the @OBEDIS study group has decided to not include them in the minimal core set, however, the collection of blood was highly recommended by the group.

Conclusions
The minimal core set represents a practical advancement in the field of obesity research and paves the way to new generation of stratification in relevant subgroups of persons with obesity, driving a paradigm shift in the future obesity treatment, going from ‘one-size-fits-all’ to precision medicine. The adoption of this core set will also allow to facilitate in the future the sharing and re-use of data collected in clinical intervention in the field of obesity. The @OBEDIS study group fully expects to revised this minimal core set after having been tried as a full set in some future trials, but add further variables to it as more data become available in each of the identified domains.