J Rehabil Med 2004; Suppl. 44: 107–113

Taylor & Francis
healthsciences

ICF CORE SETS FOR OBESITY

Armin Stucki,[1] Peter Daansen,[2] Michaela Fuessl,[3,4] Alarcos Cieza,[4] Erika Huber,[5] Richard Atkinson,[6] Nenad Kostanjsek,[7] Gerold Stucki[3,4] and Jörg Ruof[8]

From the [1]Department of Internal Medicine, University Hospital Bern, Switzerland, [2]Department of Eating Disorder and Obesity, Parnassia Psychomedical Centre, The Hague, The Netherlands, [3]Department of Physical Medicine and Rehabilitation, Ludwig-Maximilians-University, Munich, Germany, [4]ICF Research Branch, WHO FIC Collaborating Center (DIMDI), IMBK, Ludwig-Maximilians-University, Munich, Germany, [5]Swiss Association of Physiotherapy, Sursee, Switzerland, [6]Obesity Institute, MedStar Research Institute, Washington, DC, USA, [7]Classification, Assessment, Surveys and Terminology Team, World Health Organization, Geneva, Switzerland and [8]Division of Rheumatology, Hannover Medical School, Germany

Objective: **To report on the results of the consensus process integrating evidence from preliminary studies to develop the first version of the Comprehensive ICF Core Set and the Brief ICF Core Set for obesity.**

Methods: **A formal decision-making and consensus process integrating evidence gathered from preliminary studies was followed. Preliminary studies included a Delphi exercise, a systematic review and an empirical data collection. After training in the ICF and based on these preliminary studies relevant ICF categories were identified in a formal consensus process by international experts from different backgrounds.**

Results: **The preliminary studies identified a set of 219 ICF categories at the second, third and fourth ICF levels with 87 categories on *body functions*, 34 on *body structures*, 53 on *activities and participation* and 45 on *environmental factors*. Twenty-one experts attended the consensus conference on obesity (18 physicians with various sub-specializations and 3 physical therapists). Altogether 109 categories (108 second-level and one third-level categories) were included in the Comprehensive ICF Core Set with 30 categories from the component *body functions*, 18 from *body structures*, 28 from *activities and participation* and 33 from *environmental factors*. The Brief ICF Core Set included a total of 9 second-level categories with 3 on *body functions*, 4 on *activities and participation* and 2 on *environmental factors*. No *body-structures* categories were included in the Brief ICF Core Set.**

Conclusion: **A formal consensus process integrating evidence and expert opinion based on the ICF framework and classification led to the definition of ICF Core Sets for obesity. Both the Comprehensive ICF Core Set and the Brief ICF Core Set were defined.**

Key words: obesity, consensus development conferences, outcome assessment, quality of life, ICF.

J Rehabil Med 2004; suppl. 44: 107–113

Correspondence address: Gerold Stucki, Department of Physical Medicine and Rehabilitation, University of Munich, DE-81377 Munich, Germany.
Tel: +49 89 7095 4050. Fax: +49 89 7095 8836.
E-mail: gerold.stucki@med.uni-muenchen.de

 ISSN 1650–1977
DOI: 10.1080/16501960410016064

INTRODUCTION

The prevalence of obesity is currently estimated at about 300 million people worldwide (1, 2) and is continuing to rise (3, 4). Therefore, obesity is increasingly becoming a significant cause of disability (5, 6) and appears to lessen life expectancy markedly (7). In developed and low-mortality developing countries obesity is already considered to be the fifth most serious risk factor for disease burdens measured in disability-adjusted life years (DALYs) (8). The major dangers of obesity on a person's functioning and health include among other things the increased risk of hypertension, dyslipidaemia, type-2 diabetes mellitus, coronary artery disease, stroke, gall-bladder disease, osteoarthritis, sleep apnoea and respiratory problems, as well as certain types of cancer (9, 10). From a societal perspective, obesity is associated with a decreased quality of life (11, 12) and increased healthcare costs (13, 14).

Based on our current understanding of obesity as a complex, multifactor condition with interactions between genetic, metabolic, environmental and personal factors (10), a patient-centred approach is critical for effective treatment (15–17). Accordingly, patient-centred outcomes are necessary both to measure the burden of disease and to evaluate treatment outcomes. The most frequently applied measures focus on surrogates for body fat and its distribution, such as body weight, body mass index (BMI), waist circumference and others. However, condition-specific health-status measures have only recently been developed (18, 19). Several research groups recently reviewed the outcome measures applied in obese patients (20–22). They underline the importance of measurement of health status and suggest the application of both, generic and condition-specific measures. In addition, a number of organizations such as the American Obesity Association (AOA) and "Shape Up America" (www.shapeup.org) consider quality of life a major goal in the treatment of adult obesity (23). Quality of life is also an important dimension in the task force on developing obesity outcomes and learning standards by the North American Association for the Study of Obesity (NAASO) (24). However, no systematic framework that covers the spectrum of symptoms and limitations in functioning of patients with obesity has been established so far.

With the approval of the new International Classification of Functioning, Disability and Health (ICF, formerly ICIDH-2 http://www.who.int/classification/icf) (25) we can now rely on a globally agreed framework and classification to define the typical spectrum of problems in functioning of patients with obesity. It would be therefore most helpful to determine the most relevant ICF categories in patients with obesity. Such a generally-agreed-upon list of ICF categories can serve as Brief ICF Core Set to be rated in all patients included in a clinical study with obesity or as Comprehensive ICF Core Set to guide multidisciplinary assessments in patients with obesity. The objective of this paper is to report on the results of the consensus process, integrating evidence from preliminary studies to develop the first version of the Comprehensive ICF Core Set and the Brief ICF Core Set for obesity.

METHODS

The development of the ICF Core Sets for obesity involved a formal decision-making and consensus process integrating evidence gathered from preliminary studies including a Delphi exercise (26), a systematic review (27) and an empirical data collection using the ICF checklist (28). After training in the ICF and based on these preliminary studies relevant ICF categories were identified in a formal consensus process by international experts from different backgrounds.

Twenty-one experts (18 physicians with various sub-specializations and 3 physical therapists) from 8 different countries attended the consensus process for obesity. The decision-making process for obesity involved 3 working groups with 7 experts each. The process was facilitated by the condition co-ordinator for obesity (JR) and the 3 working-group leaders (PD, RA, EH).

The tables on the pre-conference studies (26–28) presented to the participants included 219 ICF categories at the second, third and fourth levels (87 on *body functions*, 34 on *body structures*, 53 on *activities and participations* and 45 on *environmental factors*).

RESULTS

Tables I–IV show the second- and third-level ICF categories included in the Comprehensive ICF Core Set. Table V shows the second-level ICF categories that were selected for the Brief ICF Core Set, as well as the percentage of experts willing to include the respective category in the Brief ICF Core Set. In addition, Table VI shows categories that were discussed controversially but not included in the ICF Core Sets and Table VII represents categories that were not pre-selected by the pre-conference studies but which were considered to be important.

Comprehensive ICF Core Set

The number of second-level categories in the Comprehensive ICF Core Set is 108, only one category was on the third level. Those 108 categories are made up of 30 (28%) categories from the component *body functions*, 18 (16%) from the component *body structures*, 28 (26%) from the component *activities and participation* and 33 (30%) from the component *environmental factors*.

Twenty-nine of the 30 categories of the component *body functions* are at the second and one is at the third level of the classification. The 29 categories at the second level represent

Table I. *International Classification of Functioning, Disability and Health (ICF) – categories of the component body functions included in the Comprehensive ICF Core Set for obesity*

ICF code		ICF category title
2nd level	3rd level	
b126		Temperament and personality functions
b130		Energy and drive functions
b134		Sleep functions
b152		Emotional functions
b180		Experience of self and time functions
	b1801	Body image
b280		Sensation of pain
b410		Heart functions
b415		Blood vessel functions
b420		Blood pressure functions
b430		Haematological system functions
b435		Immunological system functions
b440		Respiration functions
b455		Exercise tolerance functions
b510		Ingestion functions
b515		Digestive functions
b520		Assimilation functions
b530		Weight maintenance functions
b535		Sensations associated with the digestive system
b540		General metabolic functions
b545		Water, mineral and electrolyte balance functions
b555		Endocrine gland functions
b610		Urinary excretory functions
b620		Urination functions
b640		Sexual functions
b650		Menstruation functions
b660		Procreation functions
b710		Mobility of joint functions
b820		Repair functions of the skin
b830		Other functions of the skin

Table II. *International Classification of Functioning, Disability and Health (ICF) – categories of the component body structures included in the Comprehensive ICF Core Set for obesity*

ICF code	ICF category title
s110	Structure of brain
s140	Structure of sympathetic nervous system
s150	Structure of parasympathetic nervous system
s410	Structure of cardiovascular system
s420	Structure of immune system
s430	Structure of respiratory system
s520	Structure of oesophagus
s530	Structure of stomach
s550	Structure of pancreas
s560	Structure of liver
s570	Structure of gall bladder and ducts
s580	Structure of endocrine glands
s630	Structure of reproductive system
s710	Structure of head and neck region
s750	Structure of lower extremity
s760	Structure of trunk
s770	Additional musculoskeletal structures related to movement
s810	Structure of areas of skin

Table III. *International Classification of Functioning, Disability and Health (ICF) – categories of the component activities and participation included in the Comprehensive ICF Core Set for obesity*

ICF code	ICF category title
d240	Handling stress and other psychological demands
d410	Changing basic body position
d415	Maintaining a body position
d430	Lifting and carrying objects
d450	Walking
d455	Moving around
d465	Moving around using equipment
d470	Using transportation
d475	Driving
d510	Washing oneself
d520	Caring for body parts
d530	Toileting
d540	Dressing
d570	Looking after one's health
d620	Acquisition of goods and services
d640	Doing housework
d660	Caring for others
d710	Basic interpersonal interactions
d750	Informal social relationships
d760	Family relationships
d770	Intimate relationships
d820	School education
d830	Higher education
d845	Acquiring, keeping and terminating a job
d850	Remunerative employment
d870	Economic self-sufficiency
d910	Community life
d920	Recreation and leisure

Table IV. *International Classification of Functioning, Disability and Health (ICF) – categories of the component environmental factors included in the Comprehensive ICF Core Set for obesity*

ICF code	ICF category title
e110	Products or substances for personal consumption
e115	Products and technology for personal use in daily living
e120	Products and technology for personal indoor and outdoor mobility and transportation
e125	Products and technology for communication
e140	Products and technology for culture, recreation and sport
e150	Design, construction and building products and technology of buildings for public use
e155	Design, construction and building products and technology of buildings for private use
e225	Climate
e310	Immediate family
e320	Friends
e325	Acquaintances, peers, colleagues, neighbours and community members
e330	People in positions of authority
e340	Personal care providers and personal assistants
e355	Health professionals
e360	Other professionals
e410	Individual attitudes of immediate family members
e420	Individual attitudes of friends
e425	Individual attitudes of acquaintances, peers, colleagues, neighbours and community members
e440	Individual attitudes of personal care providers and personal assistants
e450	Individual attitudes of health professionals
e455	Individual attitudes of other professionals
e460	Societal attitudes
e465	Social norms, practices and ideologies
e510	Services, systems and policies for the production of consumer goods
e525	Housing services, systems and policies
e535	Communication services, systems and policies
e540	Transportation services, systems and policies
e560	Media services, systems and policies
e570	Social security services, systems and policies
e575	General social support services, systems and policies
e580	Health services, systems and policies
e585	Education and training services, systems and policies
e590	Labour and employment services, systems and policies

19% of the total number of ICF categories at the second level in this component.

With exception of chapter b3 *voice and speech functions*, all *body-functions* chapters are represented in the Comprehensive ICF Core Set. Most of the *body-functions* categories belong to chapter 5 *functions of the digestive, metabolic and endocrine systems* (8 categories) and to chapter 4 *functions of the cardiovascular, haematological, immunological and respiratory systems* (7 categories). Chapter 1 *mental functions* is represented by 6 categories, b1801 *body image* is a specification at the third level of the included second-level category b180 *experience of self and time functions*. Chapter 6 *genitourinary and reproductive functions* is represented by 5 categories and chapter 8 *functions of the skin and related structures* by 2 categories. Chapter 2 *sensory functions and pain* as well as chapter 7 *neuromusculoskeletal and movement-related functions* are represented by one category, respectively. Five categories were discussed controversially but not included in the Comprehensive ICF Core Set and 4 categories considered by the condition group as important could not be included as they were not pre-selected. The categories are listed in Table VI and VII, respectively.

The 18 categories of the component *body structures* represent 32% of the total number of ICF categories at the second level in this component. Most of the *body-structures* categories belong to chapter 5 *structures related to the digestive, metabolic and endocrine systems* (6 categories). Chapter 7 *structures related to movement* is represented by 4 categories and chapter 1 *structures of the nervous system* as well as chapter 4 *structures of the cardiovascular, immunological and respiratory systems* by 3 categories, respectively. Chapter 6 *structures related to the genitourinary and reproductive systems* as well as chapter 8 *skin and related structures* are represented by one category, respectively.

The 28 categories of the component *activities and participation* represent 24% of the total number of ICF categories at the second level in this component. Most of the *activities and participation* categories belong to chapter 4 *mobility* (8 categories). Chapter 5 *self-care* as well as chapter 8 *major life areas* are represented by 5 categories, respectively, chapter 7 *interpersonal interactions and relationships* by 4 categories, chapter 6 *domestic life* by 3 categories, chapter 9 *community, social and civic life* by 2 categories and chapter 2 *general tasks and demands* by one category.

Table V. *International Classification of Functioning, Disability and Health (ICF) categories included in the Brief ICF Core Set for obesity. Percentage of experts willing to include the named category in the Brief ICF Core Set. 50% represent a preliminary cut-off. >50% is bold*

ICF component	%	ICF code	ICF category title
Body functions	**100**	**b130**	**Energy and drive functions**
	100	**b530**	**Weight maintenance functions**
	50	b540	General metabolic functions
Activities and participation	**100**	**d240**	**Handling stress and other psychological demands**
	100	**d450**	**Walking**
	89	**d455**	**Moving around**
	89	**d570**	**Looking after one's health**
Environmental factors	**100**	**e110**	**Products or substances for personal consumption**
	100	**e310**	**Immediate family**

The 33 categories of the component *environmental factors* represent 45% of the total number of ICF categories at the second level in this component. Most of the *environmental-factors* categories belong to chapter 5 *services, systems and policies* (10 categories). However, all 5 chapters of this component are represented in the Comprehensive ICF Core Set. Chapter 4 *attitudes* is represented by 8 categories, chapter 1 *products and technology* as well as chapter 3 *support and relationships* by 7 categories, respectively, and chapter 2 *natural environment and human-made changes to the environment* by the category e225 *climate*.

Brief ICF Core Set

The total number of second-level categories included in the Brief ICF Core Set is 9. No third-level category was selected for the Brief ICF Core Set. Three categories (10%) were chosen from the component *body functions*, 4 (14%) from *activities and participation*, and 2 (6%) from *environmental factors*. No *body-structures* categories were included in the Brief ICF Core Set. Exclusively categories at the second-level were included.

All ICF categories taken into account in the final decision process are presented in Table V. However, a preliminary cut-off was established at 50% to reflect majority opinion.

DISCUSSION

The formal consensus process integrating evidence from preliminary studies and expert knowledge at the second ICF Core Sets conference led to the definition of the Brief ICF Core

Table VI. *International Classification of Functioning, Disability and Health (ICF) categories that were discussed controversially but not included in the ICF Core Sets*

ICF component	ICF code	ICF category title	Arguments that were discussed
Body Functions	b160	Thought functions	Obsessive and compulsive disorders are usually considered common in obesity. Nevertheless, the evidence regarding their prevalence is not clear from the literature.
	b270	Sensory functions related to temperature and other stimuli	Temperature sensitivity may be increased in obese patients. This may be addressed to some extent by "sensation of pain" which includes "unpleasant feelings.
	b525	Defecation functions	Increased flatulence in obese patients. Prevalence of this symptom considered to be low.
	b730	Muscle power functions	Not considered to be affected by obesity per se.
	b780	Sensations related to muscles and movement functions	Domain related to level of training rather than level of obesity.
Body structures	s540	Structure of intestine	Unclear whether lipomatosis of the intestine represents an impairment.
	s610	Structure of urinary system	Anatomical impairment due to fat, no structural changes per se.
Activities and participation	d177	Making decisions	The ability to freely make decisions when and what to eat may be altered in obese persons.
	d220	Undertaking multiple tasks	In obese class III (BMI $\geq$40) the undertaking of multiple tasks may be a problem.
	d630	Preparing meals	Same argument as d220.
	d730	Relating with strangers	Obese might have issues with contacting.
Environmental factors	e240	Light	Syndrome of seasonal defective disorder: i.e. increase of weight in winter times and loss of weight under increasing light radiation.

Table VII. *Domains that were not pre-selected but were considered to be important*

ICF component	ICF code	ICF category title	Arguments that were discussed
Body Functions	b445	Respiratory muscle functions	There are known respiratory muscle dysfunctions in obesity.
	b460	Sensations associated with cardiovascular and respiratory functions	Respiratory symptoms like dyspnoea, sensations of tightness of chest, feelings of irregular beat are common in obesity.
	b559	Functions related to metabolism and the endocrine system, other specified and unspecified	Gut hormones are an area of research and future interest in obesity.
	b740	Muscle endurance functions	Considered to be affected by obesity.

Set and the Comprehensive ICF Core Set for multidisciplinary assessment.

A crucial point during the development of the ICF Core Sets for obesity was to cover the typical symptoms and experiences that are most likely to occur in obese patients – changes in body functions and structures, as well as restrictions of activity and participation – and not to pay too much attention to its serious health consequences, such as cardiovascular events, obstructive sleep apnoea and diabetes. The co-morbidities are moreover in part subject to separate ICF Core Sets.

As has been shown by Fontaine et al. (29) and Fine et al. (30) there is an association between BMI and health status. Patients with higher BMI classes experience greater limitations in function. Therefore, the Comprehensive ICF Core Set may contain functioning and disability categories related to the health condition obesity not necessarily relevant to all obesity patients.

The consensus group felt that some individual clinical and aetiological factors are difficult to capture by the ICF: (i) genetic factors are not explicitly included; (ii) it is not clear how important surrogate parameters (e.g. HbA1C) that are frequently used in clinical trial settings are represented; (iii) another important outcome parameter in obesity, waist circumference, is not clearly presented.

The selection of *body functions* included in the Comprehensive ICF Core Set showed results consistent with the organ functions usually involved in obesity and in agreement with the evidence from the preliminary studies. As obesity is a systemic disease almost all body organ functions are mentioned in the Comprehensive ICF Core Set. Concurrent to its prominence in the preliminary studies the important role of *pain* (b280) as an independent contributor to impaired Health Related Quality of Life in obesity was emphasized (31).

Some categories were discussed controversially but not included in the ICF Core Sets (Table VI), for example concerning *thought functions* (b160) there is no clear evidence in the literature that obsessive and compulsive disorders are more prevalent in obese people.

Additionally, there was a discussion regarding the category b559 (*functions related to metabolism and the endocrine system, other specified and unspecified*). As supported by the literature (32), several experts indicated that gut hormones are an important area in obesity research. However, as it was not pre-selected in the pre-conference studies this category (b559) was not included in the ICF Core Sets. The same applied to limitations in *respiratory functions* (b445 and b460). More details are given in Table VII.

According to the large number of body organs involved in obesity, the selection of *body structures* included almost all chapters of this component. Congruent with *body functions*, the *body structures* related to the *digestive, metabolic and endocrine system* were captured in great depth.

The important criteria waist circumference was allocated to the category *structure of trunk* (s760) but the condition group considered this category to be too general and suggested a specification of this domain.

After discussion, the recommendation by some group members to include the *structure of intestine* (s540) was rejected.

Limitations and restrictions in *activities and participation* are, indeed, of great relevance to patients with obesity. This is reflected by the fact that this component is represented in almost as many categories (28 categories) as the *body-functions* (30 categories) component. The areas that are covered represent key issues for patients with obesity, including mobility, self care and major life areas such as education, work and employment. Especially the 2 categories *walking* (d450) and *moving around* (d455), including *climbing*, were ranked highest by both the condition group and the preliminary empirical patient data collection (26–28). Similarly the category d570 (*looking after one's health*) comprising managing diet and fitness received highest ranks. These categories were included in the Brief ICF Core Set.

Handling stress and other psychological demands (d240) is included in both ICF Core Sets. This is in line with the characteristics that seem to be typical in patients with obesity. They are frequently described as a treatment seeking population with emotional problems (15, 33). Although there is little evidence to support the view that obesity is associated with mental problems, this picture is mostly derived by case studies (34). Nevertheless, obese persons suffer from psychological problems specific to their obesity, including disparagement of the body and body image and binge eating (35). Of the clinically obese, nearly 35% have a binge eating disorder (36), which causes severe psychological impairment.

Several additional categories were discussed but not included in the ICF Core Sets mainly because they may be relevant only in severely obese patients, i.e. patients that, according to one definition mentioned by experts, can be classified in the category "obese class III" with a BMI ≥ 40 (37). For more details see Table VI.

It is significant that 33 categories representing 30% of the categories of the Comprehensive ICF Core Set belong to the component *environmental factors*. This responds to the current understanding of obesity as a complex condition with many interactions, especially between genetics and environment. Compared with health outcome measures for obesity (38–44) this proportion clearly seems to be higher.

Services, systems and policies but also *products and technology*, *support and relationships* and *attitudes* are highly important to patients with obesity because they can serve as either a barrier or a facilitator. There was general agreement about the essential role of food and that obesity has an enormous impact on the *immediate family* (e310).

The aim to create a mandatory Brief ICF Core Set short enough to be practical in clinical studies resulted in a noticeable reduction in only 9 categories. Nevertheless the condition group encountered difficulties in determining cut-offs. Different from the Comprehensive ICF Core Set, which is intended for multidisciplinary assessments for example in the context of rehabilitation and teaching, the Brief ICF Core Set, which is primarily intended as a standard for reporting of clinical studies, may well serve as a more practical tool for clinical practice.

The ICF does not currently have categories for genetic factors, and for body composition. The category *structure of trunk* (s760) was considered too general to cover the item waist circumference which also was the case for, the category of *haematological system functions* (b430) for the important marker HbA1C. The experts recommended the specification of the mentioned domains.

Although the participants were provided with the option to define the categories not only on the second, but possibly also on the third or fourth levels of the classification, it was decided to keep the definition, except of one category – *body image* (b 1801), on the second level.

The organizers of the consensus process took great care in the selection of the experts and were successful in reaching 21 experts with different professional backgrounds and from 8 different countries. However, no dieticians or psychologists were participating. In addition, the results of any consensus process may differ with different groups of experts. This emphasizes the importance of the extensive validation of this first version of the ICF Core Sets from the perspectives of different professions and in different countries. The first version of the ICF Core Sets will also be tested from the patients' points of view and in different clinical settings. Validation studies are also needed to explore the problems of functioning in subsets of patients. For example, it is not clear whether patients with severe obesity (BMI > 40) may simply have more severe problems or whether the profile of problems differs. Similarly, age and gender, as well as a number of other socioeconomic factors, may influence the spectrum of problems and the severity of these problems. It is important to note that this first version of the ICF Core Sets is recommended only for validation or pilot studies.

ACKNOWLEDGEMENTS

We are grateful for the contributions made by the following experts attending the conference: Olaf Adam, Sebastian Baumann, Behrends, Michael Borches, Fritz Horber, Farid Iounoussov, Gloria Mazzali, Karin Niedermann, Martin Nuhr, Natascha Potoczna, Barbara Rau, Susanne Schwarzkopf, Tanja Sigl, James Stubbs, Mathias Wiezoreck, David A. York and Mauro Zamboni.

We also thank the Center for Obesity, Osteoporosis and Metabolism, Clinic Hirslanden, Switzerland for providing an unrestricted educational grant.

REFERENCES

1. World Health Organization. World Health Report – life in the 21st century: a vision for all. World Health Organization, Geneva; 1998.
2. Preventing and managing the global epidemic of obesity: report of a WHO Consultation on Obesity. Geneva, 3–5 June, 1997. Geneva: WHO/NUT/NCD98.1; 1998.
3. Freedman DS, Khan LK, Serdula MK, Galuska DA, Dietz WH. Trends and correlates of class 3 obesity in the United States from 1990 through 2000. JAMA 2002; 288: 1758–1761.
4. Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among US children and adolescents, 1999–2000. JAMA 2002; 288: 1728–1732.
5. World Health Organization. Diet, nutrition and the prevention of chronic diseases. Report of a Joint WHO/FAO Expert Consultation. Geneva: World Health Organization; 2003.
6. Flegal KM, Carroll MD, Ogden CL, Johnson CL. Prevalence and trends in obesity among US adults, 1999–2000. JAMA 2002; 288: 1723–1727.
7. Fontaine KR, Redden DT, Wang C, Westfall AO, Allison DB. Years of life lost due to obesity. JAMA 2003; 289: 187–193.
8. World Health Organization. World Health Report 2002: reducing risks, promoting healthy life. Geneva: World Health Organization; 2002.
9. Pi-Sunyer FX. Medical hazards of obesity. Ann Intern Med 1993; 119: 655–660.
10. National Institute of Health. The practical guide: identification, evaluation, and treatment of overweight and obesity in adults. National Institute of Health: Publication 00-4084; 2000.
11. Seidell JC. The impact of obesity on health status: some implications for health care costs. Int J Obes Relat Metab Disord 1995; 19 (suppl 6): S13–S16.
12. Larsson U, Karlsson J, Sullivan M. Impact of overweight and obesity on health-related quality of life-a Swedish population study. Int J Obes Relat Metab Disord 2002; 26: 417–424.
13. Wolf AM. Economic outcomes of the obese patient. Obes Res 2002; 10 (suppl 1): 58S–62S.
14. Colditz GA. Economic costs of obesity and inactivity. Med Sci Sports Exerc 1999; 31 (suppl 11): S663–667.
15. Wadden TA, Phelan S. Assessment of quality of life in obese individuals. Obes Res 2002; 10 (suppl 1): 50S–57S.
16. Brownell KD, Wadden TA. Etiology and treatment of obesity: understanding a serious, prevalent, and refractory disorder. J Consult Clin Psychol 1992; 60: 505–517.
17. Connors AF Jr. The transformation of medicine: the role of outcomes research. Obes Res 2002; 10 (suppl 1): 3S–5S.
18. McHorney CA. Health status assessment methods for adults: past accomplishments and future challenges. Annu Rev Public Health 1999; 20: 309–335.

19. Kolotkin RL, Head S, Brookhart A. Construct validity of the Impact of Weight on Quality of Life Questionnaire. Obes Res 1997; 5: 434–441.
20. Kushner RF, Foster GD. Obesity and quality of life. Nutrition 2000; 16: 947–952.
21. Fontaine KR, Barofsky I. Obesity and health-related quality of life. Obes Rev 2001; 2: 173–182.
22. Kolotkin RL, Meter K, Williams GR. Quality of life and obesity. Obes Rev 2001; 2: 219–229.
23. Shape Up America, American Obesity Association. Guidance for treatment of adult obesity. Bethesda, MD. Available from: Shape Up America! at 6707 Democracy Boulevard, Suite 107, Bethesda, MD 20817, USA. URL: http://www.shapeup.org; 1996.
24. Wolf AM. Introduction: Task Force on Developing Obesity Outcomes and Learning Standards (TOOLS). Obes Res 2002; 10 (suppl 1): 1S–2S.
25. World Health Organization. International Classification of Functioning, Disability and Health: ICF. Geneva: WHO; 2001.
26. Weigl M, Cieza A, Andersen A, Kollerits B, Amann E, Füssl M, et al. Identification of the most relevant ICF categories in patients with chronic health conditions: a Delphi exercise. J Rehabil Med 2004; 36: suppl 44: 12–21.
27. Wolff B, Cieza A, Parentin A, Rauch A, Sigl T, Brockow T, et al. Identifying the concepts contained in the outcome measures of clinical trials on four internal disorders using the International Classification of Functioning, Disability and health as a reference. J Rehabil Med 2004; 36: suppl 44: 37–42.
28. Ewert T, Fuessl M, Cieza A, Andersen A, Chatterji S, Kostanjsek N, et al. Identification of the most common patient problems in patients with chronic conditions using the ICF checklist. J Rehabil Med 2004; 36: suppl 44: 22–29.
29. Fontaine KR, Cheskin LJ, Barofsky I. Health-related quality of life in obese persons seeking treatment. J Fam Pract 1996; 43: 265–270.
30. Fine JT, Colditz GA, Coakley EH, Moseley G, Manson JE, Willett WC, et al. A prospective study of weight change and health-related quality of life in women. JAMA 1999; 282: 2136–2142.
31. Barofsky I, Fontaine KR, Cheskin LJ. Pain in the obese: impact on health-related quality-of-life. Ann Behav Med 1998; 19: 408–410.
32. Batterham RL, Cohen MA, Ellis SM, Le Roux CW, Withers DJ, Frost GS, et al. Inhibition of Food Intake in Obese Subjects by Peptide YY 3-36. N Engl J Med 2003; 349: 941–948.
33. Daansen PJ. Cognitive behavioural therapy for weight reduction in primary obesity. Huisarts en Wetenschap 2003; 46: 262–266.
34. Becker ES, Margraf J, Turke V, Soeder U, Neumer S. Obesity and mental illness in a representative sample of young women. Int J Obes Relat Metab Disord 2001; 25 (suppl 1): S5–9.
35. Stunkard AJ, Sobal J. Psychosocial Consequences of Obesity. In: Brownell K, Fairburn C, eds. Eating disorder and obesity. New York/London: Guilford Press; 1995.
36. Marcus M. Binge eating and obesity. In: Brownell K, Fairburn C, eds. Eating disorder and obesity. New York/London: Guilford Press; 1995.
37. Obesity: preventing and managing the global epidemic. Technical Report series No. 894. Geneva: World Health Organization; 1998.
38. Kolotkin RL, Head S, Hamilton M, Tse CK. Assessing impact of weight on quality of life. Obes Res 1995; 3: 49–56.
39. Ryden A, Karlsson L, Persson O, Sjöström L, Sullivan M. The obesity-related coping questionnaire (OCQ) from the Swedish obese subjects (SOS) study. Quality of Life Research 1999; 8: 580.
40. Sullivan M, Karlsson J, Bengtsson C, Furunes B, Lapidus L, Lissner L. "The Goteborg Quality of Life Instrument" – a psychometric evaluation of assessments of symptoms and well-being among women in a general population. Scand J Prim Health Care 1993; 11: 267–275.
41. Mathias SD, Williamson CL, Colwell HH, Cisternas MG, Pasta DJ, Stolshek BS, et al. Assessing health-related quality-of-life and health state preference in persons with obesity: a validation study. Qual Life Res 1997; 6: 311–322.
42. Mannucci E, Ricca V, Barciulli E, Di Bernardo M, Travaglini R, Cabras PL, et al. Quality of life and overweight: the obesity related well-being (Orwell 97) questionnaire. Addict Behav 1999; 24: 345–357.
43. Butler GS, Vallis TM, Perey B, Veldhuyzen van Zanten SJ, MacDonald AS, Konok G. The Obesity Adjustment Survey: development of a scale to assess psychological adjustment to morbid obesity. Int J Obes Relat Metab Disord 1999; 23: 505–511.
44. Le Pen C, Levy E, Loos F, Banzet MN, Basdevant A. "Specific" scale compared with "generic" scale: a double measurement of the quality of life in a French community sample of obese subjects. J Epidemiol Community Health 1998; 52: 445–450.