
Adult abdominal circumference

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

NHIK identifier: 000371 Version number: 1

Data element type: DATA ELEMENT CONCEPT

Definition: A person's abdominal circumference

Relational and representational attributes

Related data: relates to Adult abdominal circumference – measured, version 1

Adult abdominal circumference—measured

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000372 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's abdominal circumference measured half way between the inferior margin of the last rib and the crest of the ilium in the mid-axillary plane. The measurement is taken at the end of normal expiration.

The measurement of abdominal circumference is not the same as that of waist circumference where the minimum girth is measured.

Adult abdominal circumference: measured is a continuous variable measured to the nearest 0.1 cm.

In order to ensure consistency in measurement, the measurement protocol described under Data Collection Methods should be used.

Context: Public health and health care:

Its main use is to enable the calculation of Adult abdomen to hip ratio which requires the measurement of hip circumference and abdominal circumference.

There is evidence that abdominal circumference alone might be used to identify people at health risk both from being overweight and from having a central fat distribution (Lean et al. 1995; Han et al. 1995; Pouliot et al. 1994; Seidell et al. 1992).

Relational and representational attributes

Datatype: Numeric Field size: Min. 3 Max. 4 Layout: NNN.N

Data domain: Distance in centimetres

Guide for use: If measured abdominal circumference is not able to be collected, code 999.9

Collection methods: Measurement protocol:

The measurement of abdominal circumference requires a narrow (< 7 mm wide), flexible, inelastic tape measure. The kind of tape used should be described and reported. The graduations on the tape measure should be at 0.1 cm intervals and the tape should have the capacity to measure up to 200 cm. Measurement intervals and labels should be clearly readable under all conditions of use of the tape measure.

The subject should remove any belts and heavy outer clothing. Measurement of abdominal circumference should be taken over at most one layer of light clothing. Ideally the measure is made directly over the skin.

The subject stands comfortably with weight evenly distributed on both feet, and the feet separated about 25–30 cm. The arms should hang loosely at the sides. Posture can affect abdominal circumference.

The measurement is taken midway between the inferior margin of the last rib and the crest of the ilium, in the mid axillary plane. Each landmark should be palpated and marked, and the midpoint determined with a tape measure and marked.

Collection methods
(continued):

The circumference is measured with an inelastic tape maintained in a horizontal plane, at the end of normal expiration. The tape is snug, but does not compress underlying soft tissues. The measurer is positioned by the side of the subject to read the tape. To ensure contiguity of the two parts of the tape from which the circumference is to be determined, the cross-handed technique of measurement, as described by Norton et al. (1996), should be used. Ideally an assistant will check the position of the tape on the opposite side of the subject's body.

The measurement is recorded at the end of a normal expiration to the nearest 0.1 cm. Take a repeat measurement and record it to the nearest 0.1 cm. If the two measurements disagree by more than 1 cm, then take a third measurement. All raw measurements should be recorded on the data collection form. If practical, it is preferable to enter the raw data into the database as this enables intra-observer and, where relevant, inter-observer errors to be assessed. The subject's measured abdominal circumference is subsequently calculated as the mean of the two observations, or the mean of the two closest measurements if a third is taken, and recorded on the form. If only a mean value is entered into the database then the data collection forms should be retained.

It may be necessary to round the mean value to the nearest 0.1 cm. If so, rounding should be to the nearest even digit to reduce systematic over reporting (Armitage and Berry 1994). For example, a mean value of 72.25 cm would be rounded to 72.2 cm, while a mean value of 72.35 cm would be rounded to 72.4 cm.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

National health data elements currently exist for sex, date of birth, country of birth and Indigenous Status. Data elements are being developed for physical activity and smoking.

Validation and quality control measures:

Steel tapes should be checked against a 1 metre engineer's rule every 12 months. If tapes other than steel are used they should be checked daily against a steel rule.

Within- and, if relevant, between-observer variability should be reported. They can be assessed by the same (within-) or different (between-) observers repeating the measurement, on the same subjects, under standard conditions after a short time interval. The standard deviation of replicate measurements (technical error of measurement (Pederson & Gore 1996)) between observers should not exceed 2% and be less than 1.5% within observers.

Extreme values at the lower and upper end of the distribution of measured abdominal circumference should be checked both during data collection and after data entry. Individuals should not be excluded on the basis of true biological difference.

Last digit preference, and preference or avoidance of certain values, should be analysed in the total sample and (if relevant) by observer, survey site and over time if the survey period is long.

Related data:

is used in the calculation of Adult abdomen to hip ratio, version 1

Administrative attributes

Source document:

The measurement protocol described below is that recommended by the World Health Organization (WHO Expert Committee 1995).

Source organisation:

World Health Organization (see also Comments)

Comments:

Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.

Responsible organisations: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys and health care settings.

Presentation of data:

Means, 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

For reporting purposes, it may be desirable to present abdominal circumference in categories. It is recommended that 5 cm groupings are used for this purpose. Abdominal circumference should not be rounded before categorisation. The following categories may be appropriate for describing the abdominal circumferences of Australian men and women, although the range will depend on the population.

Abdom < 60 cm

60 cm = Abdom < 65 cm

65 cm = Abdom < 70 cm

... in 5 cm categories

105 cm = Abdom < 110 cm

Abdom = 110 cm

Adult abdomen to hip ratio

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000373 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's abdomen to hip ratio.

Adult abdomen to hip ratio is a continuous variable. Adult abdomen to hip ratio is calculated by: abdominal circumference (cm) divided by hip circumference (cm).

Context: Public health and health care:

Body fat distribution has emerged as an important predictor of obesity-related morbidity and mortality. Abdominal obesity, which is more common in men than women, has, in epidemiological studies, been closely associated with conditions such as coronary heart disease, stroke, non-insulin dependent diabetes mellitus and high blood pressure.

Abdomen to hip ratio (AHR) can be used:

- to indicate the prevalence of abdominal obesity and its sociodemographic distribution (problem identification);
- to evaluate health promotion and disease prevention programs (assessment of interventions);
- to monitor progress towards National Health Goals and Targets;
- to ascertain determinants and consequences of abdominal obesity; and
- in nutritional surveillance and long-term planning.

Cutoff points for abdomen to hip ratio that may define increased risk of cardiovascular disease and all cause mortality range from 0.9 to 1.0 for men and 0.8 to 0.9 for women (Croft et al. 1995; Bray 1987; Bjorntorp 1985). These values are based primarily on evidence of increased risk of death in European populations, and may not be appropriate for all age and ethnic groups.

In Australia and New Zealand, the cutoffs of > 0.9 for males and > 0.8 for females were used in the Australian Bureau of Statistics' 1995 National Nutrition Survey.

Relational and representational attributes

Datatype: Numeric Field size: Min. 3 Max. 3 Layout: N.NN

Guide for use: Adult abdomen to hip ratio cannot be calculated if either component necessary for its calculation (i.e. abdominal circumference or hip circumference) has not been collected (i.e. is coded to 999.9).

Collection methods: AHR should be derived after the data entry of abdominal circumference and hip circumference. It should be stored on the raw data set as a continuous variable and should not be aggregated or rounded.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

Related data: is calculated using Adult hip circumference – measured, version 1
is calculated using Adult abdominal circumference – measured, version 1

Administrative attributes

Source organisation: Responsible organisations: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. (See also Comments)

Comments: Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.
Date of submission: October 1997

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys and health care settings.

Presentation of data:

Means, 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

Adult body mass index

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000367 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's weight (body mass) relative to height. It is a measure of body mass corrected for height which is used to assess the extent of weight deficit or excess. In sedentary populations, body mass index (BMI) also provides an imprecise but practical indicator of the level of body fat.

Adult body mass index is a continuous variable.

Adult body mass index is calculated by: weight (kg) divided by (height (m) squared)

Context: Public health and health care:

BMI is used as an indicator of both underweight and, overweight and obesity, in sedentary Western adults. On a population basis there is a strong association between BMI and health risk.

In population based surveys, BMI may be used:

- to indicate the prevalence of thinness and overweight and their sociodemographic distribution (problem identification);
- to evaluate health promotion and disease prevention programs (assessment of interventions);
- to monitor progress towards National Health Goals and Targets;
- to ascertain determinants and consequences of thinness and overweight; and
- in nutritional surveillance and long-term planning.

Relational and representational attributes

Datatype: Numeric Field size: Min. 3 Max. 4 Layout: NN.NN*/NN.N**

Guide for use: Adult body mass index cannot be calculated if either component necessary for its calculation (i.e. weight or height) is unknown or has not been collected (i.e. is coded to 888.8 or 999.9)

Collection methods: *NN.NN for BMI calculated from measured height and weight.

**NN.N for BMI calculated from self-reported height and/or self-reported weight
 BMI calculated from measured height and weight should be distinguished from BMI calculated from self-reported height and/or weight. When either self-reported height or self-reported weight is used in the calculation, BMI should be recorded as self-reported BMI.

BMI should be derived after the data entry of weight and height. It should be stored on the raw data set as a continuous variable and should not be aggregated or rounded.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

Collection methods (continued): National health data elements currently exist for sex, date of birth, country of birth and Indigenous Status. Data elements are being developed for physical activity and smoking.

Related data: is calculated using Adult height – measured, version 1
 is calculated using Adult height – self-reported, version 1
 is calculated using Adult weight – measured, version 1
 is calculated using Adult weight – self-reported, version 1
 is used in the derivation of Adult body mass index – classification, version 1

Administrative attributes

Source organisation: Responsible organisations: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. (See also Comments)

Comments: Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. Date of submission: October 1997.

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys and health care settings.

Presentation of data:

Means, 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

Body mass index can be calculated from measured height and weight, or self-reported height and weight.

Body mass index tends to be underestimated when based on self-reported, rather than measured, height and weight. This is due to the fact that, on average, height tends to be overestimated and weight tends to be underestimated when self-reported by respondents.

There are many individuals for whom BMI is an inappropriate measure of body fatness. These are individuals whose high body mass is due to excess muscle rather than fat (e.g. body builders or others in whom the level of physical activity promotes an increase in muscle mass); or in those with osteoporosis who will have a lower than usual BMI; or those who have a different body build (e.g. individuals with unusually long or short legs or a different body fat distribution) (WHO Expert Committee 1995). This is particularly important when assessing individuals but should also be taken into account in interpreting data from populations in which there are sub-groups with genetic or environmental differences in body build, composition, skeletal proportions or body fat distribution.

Epidemiological research shows that there is a strong association between BMI and health risk. Excess adipose tissue in adults is associated with excess morbidity and mortality from conditions such as hypertension, unfavourable blood lipid concentrations, diabetes mellitus, coronary heart disease, some cancers, gall bladder disease, and osteoarthritis. It may also lead to social and economic disadvantage as well as psychosocial problems. It is a major public health issue in most industrialised societies.

Comments (continued): Thinness (low BMI) is also an indicator of health risk, often being associated with general illness, anorexia, cigarette smoking, drug addiction and alcoholism. Low BMI is consistently associated with increased risk of osteoporosis and fractures in the elderly.

Adult body mass index—classification

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000368 Version number: 1

Data element type: DATA ELEMENT

Definition: The category of weight deficit or excess.

Context: Public health and health care:

BMI is used as an indicator of both underweight and, overweight and obesity, in sedentary Western adults. On a population basis there is a strong association between BMI and health risk.

Relational and representational attributes

Datatype: Numeric Field size: Min. 1 Max. 1 Layout: N

Data domain:

1	Grade 3 thinness (BMI < 16.00)
2	Grade 2 thinness (BMI 16.00–16.99)
3	Grade 1 thinness (BMI 17.00–18.49)
4	Normal range (BMI 18.50–19.99)
5	(BMI 20.00–24.99)
6	Grade 1 overweight (BMI 25.00–29.99)
7	Grade 2 overweight (BMI 30.00–39.99)
8	Grade 3 overweight (BMI > or = 40.00)

(WHO Expert Committee 1995; NHMRC 1984, 1985)

Collection methods: This data element applies to persons aged 18 years or older. It is recommended for use in population surveys and health care settings.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

National health data elements currently exist for sex, date of birth, country of birth and Indigenous Status. Data elements are being developed for physical activity and smoking.

Standard definitions of overweight and obesity in terms of BMI are used to derive age-specific and age-adjusted indicators of overweight and obesity for reporting progress towards National Health Goals and Targets.

Related data: used in conjunction with Adult body mass index, version 1

Administrative attributes

Source document: 'Physical status: the use and interpretation of anthropometry' (WHO Expert Committee 1995)

Source organisation: World Health Organization (see also Comments)

Comments:

Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.

Responsible organisation: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.

There are, however, many individuals for whom BMI is an inappropriate measure of body fatness. These are individuals whose high body mass is due to excess muscle rather than fat (e.g. body builders or others in whom the level of physical activity promotes an increase in muscle mass); or in those with osteoporosis who will have a lower than usual BMI; or those who have a different body build (e.g. individuals with unusually long or short legs or a different body fat distribution) (WHO Expert Committee 1995). This is particularly important when assessing individuals but should also be taken into account in interpreting data from populations in which there are sub-groups with genetic or environmental differences in body build, composition, skeletal proportions or body fat distribution.

Epidemiological research shows that there is a strong association between BMI and health risk. Excess adipose tissue in adults is associated with excess morbidity and mortality from conditions such as hypertension, unfavourable blood lipid concentrations, diabetes mellitus, coronary heart disease, some cancers, gall bladder disease, and osteoarthritis. It may also lead to social and economic disadvantage as well as psychosocial problems. It is a major public health issue in most industrialised societies.

Overweight and obesity, as defined by NHMRC guidelines for the interpretation of BMI (NHMRC 1984, 1985), are exceedingly common in Australia and their prevalence is increasing. The direct economic cost of obesity (BMI = 30) to Australia was estimated to be over \$500 million in 1992–93 (NHMRC 1997).

Thinness (low BMI) is also an indicator of health risk, often being associated with general illness, anorexia, cigarette smoking, drug addiction and alcoholism. Low BMI is consistently associated with increased risk of osteoporosis and fractures in the elderly.

The WHO may revise this classification to:

- 1 Grade 3 thinness (BMI < 16.00)
- 2 Grade 2 thinness (BMI 16.00–16.99)
- 3 Grade 1 thinness (BMI 17.00–18.49)
- 4 Normal range (BMI 18.50–24.99)
- 5 Overweight (BMI 25.00–29.99)
- 6 Obesity Grade 1 (BMI 30.00–34.99)
- 7 Obesity Grade 2 (BMI 35.00–44.99)
- 8 Obesity Grade 3 (BMI ≥ 45.00)

Presentation of data:

Methods used to establish cut-off points for overweight have been arbitrary and, as a result, cut-off points vary between countries. The data are derived mainly from studies of mortality and morbidity risk performed in people living in western Europe or the United States of America, and cut-off points for BMI as an indicator of adiposity and risk in populations who differ in body build and genetic disposition are likely to vary. Caution is required in relation to BMI cut-off points when used for different ethnic groups because of limited outcome data for some ethnic groups, e.g. Aboriginal and Torres Strait Islander peoples. Further, the cut-off points for adults should not be used for children.

Comments (continued): There are no recognised reference standards for the lower limit of the 'normal' range. The classification below is that recommended by the World Health Organization. This is regarded as an interim classification. As with overweight the cut-off points for a given level of risk are likely to vary with body build, genetic background and physical activity.

The classification above is different to ones that have been used in the past and it is important that in any trend analysis consistent definitions are used.

BMI should not be rounded before categorisation to the classification below.

Adult height

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000361 Version number: 1

Data element type: DATA ELEMENT CONCEPT

Definition: *A person's height.*

Relational and representational attributes

Related data: relates to Adult height – measured, version 1

relates to Adult height – self-reported, version 1

Adult height—measured

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000362 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's measured height.
 Adult height: measured is a continuous variable measured to the nearest 0.1 cm. In order to ensure consistency in measurement, the measurement protocol described under Data Collection Methods should be used.

Context: Public health and health care:
 Stature is a major indicator of general body size and of bone length. It is important in screening for disease or malnutrition, and in the interpretation of weight (Lohman et al. 1988). Shortness is known to be a predictor of all cause mortality, coronary heart disease mortality in middle aged men, and of less favourable gestational outcomes in women (Marmot et al. 1984, Kramer 1988).
 Its main use is to enable the calculation of Adult body mass index which requires the measurement of height and weight.

Relational and representational attributes

Datatype: Numeric Field size: Min. 3 Max. 4 Layout: NNN.N

Guide for use: If measured height is not able to be collected, code 999.9.

Collection methods: Measurement protocol:
 The measurement of height requires a vertical metric rule, a horizontal headboard, and a non-compressible flat even surface on which the subject stands. The equipment may be fixed or portable, and should be described and reported.
 The graduations on the metric rule should be at 0.1 cm intervals, and the metric rule should have the capacity to measure up to at least 210 cm. Measurement intervals and labels should be clearly readable under all conditions of use of the instrument.
 Apparatus that allows height to be measured while the subject stands on a platform scale is not recommended.
 The subject should be measured without shoes (i.e. is barefoot or wears thin socks) and wears little clothing so that the positioning of the body can be seen. Anything that may affect or interfere with the measurement should be noted on the data collection form (e.g. hairstyles and accessories, or physical problems).
 The subject stands with weight distributed evenly on both feet, heels together, and the head positioned so that the line of vision is at right angles to the body. The correct position for the head is in the Frankfort horizontal plan (Norton et al. 1996). The arms hang freely by the sides. The head, back, buttocks and heels are positioned vertically so that the buttocks and the heels are in contact with the vertical board.
 To obtain a consistent measure, the subject is asked to inhale deeply and stretch to their fullest height. The measurer applies gentle upward pressure through the mastoid processes to maintain a fully erect position when the measurement is taken. Ensure that the head remains positioned so that the line of vision is at right angles to the body, and the heels remain in contact with the base board.

Collection methods (continued): The movable headboard is brought onto the top of the head with sufficient pressure to compress the hair.

The measurement is recorded to the nearest 0.1 cm. Take a repeat measurement. If the two measurements disagree by more than 0.5 cm, then take a third measurement. All raw measurements should be recorded on the data collection form. If practical, it is preferable to enter the raw data into the database as this enables intra-observer and, where relevant, inter-observer errors to be assessed. The subject's measured height is subsequently calculated as the mean of the two observations, or the mean of the two closest measurements if a third is taken, and recorded on the form. If only a mean value is entered into the database then the data collection forms should be retained.

It may be necessary to round the mean value to the nearest 0.1 cm. If so, rounding should be to the nearest even digit to reduce systematic over reporting (Armitage and Berry 1994). For example, a mean value of 172.25 cm would be rounded to 172.2 cm, while a mean value of 172.35 cm would be rounded to 172.4 cm.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

National health data elements currently exist for sex, date of birth, country of birth and Indigenous Status. Data elements are being developed for physical activity and smoking.

Validation and quality control measures:

All equipment, whether fixed or portable should be checked prior to each measurement session to ensure that both the headboard and floor (or footboard) are at 90 degrees to the vertical rule. With some types of portable anthropometer it is necessary to check the correct alignment of the headboard, during each measurement, by means of a spirit level.

Within- and, if relevant, between-observer variability should be reported. They can be assessed by the same (within-) or different (between-) observers repeating the measurement of height, on the same subjects, under standard conditions after a short time interval. The standard deviation of replicate measurements (technical error of measurement (Pederson & Gore 1996)) between observers should not exceed 5 mm and be less than 5 mm within observers.

Extreme values at the lower and upper end of the distribution of measured height should be checked both during data collection and after data entry. Individuals should not be excluded on the basis of true biological difference. Last digit preference, and preference or avoidance of certain values, should be analysed in the total sample and (if relevant) by observer, survey site and over time if the survey period is long.

Related data: is used in the calculation of Adult body mass index, version 1

Administrative attributes

Source document: The measurement protocol described below is those recommended by the International Society for the Advancement of Kinanthropometry as described by Norton et al. (1996), and the World Health Organization (WHO Expert Committee 1995), which was adapted from Lohman et al. (1988).

Source organisation: International Society for the Advancement of Kinanthropometry and the World Health Organization. (See also Comments)

Comments:

Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.
Date of submission: October 1997.

Responsible organisation: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys and health care settings.

Presentation of data:

Means, 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

For some reporting purposes, it may be desirable to present height data in categories. It is recommended that 5 cm groupings are used for this purpose. Height data should not be rounded before categorisation. The following categories may be appropriate for describing the heights of Australian men and women, although the range will depend on the population. The World Health Organization's range for height is 140–190 cm.

Ht <140 cm

140 cm = Ht < 145 cm

145 cm = Ht < 150 cm

... in 5 cm categories

185 cm = Ht < 190 cm

Ht = 190 cm

Adult height—self-reported

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000363 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's self-reported height.

Context: Public health and health care:

Stature is a major indicator of general body size and of bone length. It is important in screening for disease or malnutrition, and in the interpretation of weight (Lohman et al. 1988). Shortness is known to be a predictor of all cause mortality and coronary heart disease mortality in middle aged men (Marmot et al. 1984) and of less favourable gestational outcomes in women (Kramer 1988).

Its main use is to enable the calculation of body mass index which requires the measurement of height and body mass (weight).

Relational and representational attributes

Datatype: Numeric Field size: Min. 2 Max. 3 Layout: NNN

Guide for use: If self-reported height is unknown, code 888
If self-reported height is not responded to, code 999

- Collection methods:** The method of data collection, e.g. face to face interview, telephone interview or self-completion questionnaire, can affect survey estimates and should be reported.
- The data collection form should include a question asking the respondent what their height is. For example, the ABS National Health Survey 1995 included the question 'How tall are you without shoes?'. The data collection form should allow for both metric (to the nearest 1 cm) and imperial (to the nearest 0.5 inch) units to be recorded.
- If practical, it is preferable to enter the raw data into the database before conversion of measures in imperial units to metric. However if this is not possible, height reported in imperial units can be converted to metric prior to data entry using a conversion factor of 2.54 cm to the inch.
- Rounding to the nearest 1 cm will be required for measures converted to metric prior to data entry, and may be required for data reported in metric units to a greater level of precision than the nearest 1 cm. The following rounding conventions are desirable to reduce systematic over reporting (Armitage and Berry 1994):
- nnn.x where $x < 5$ – round down, e.g. 172.2 cm would be rounded to 172 cm.
- nnn.x where $x > 5$ – round up, e.g. 172.7 cm would be rounded to 173 cm.
- nnn.x where $x = 5$ – round to the nearest even number, e.g. 172.5 cm would be rounded to 172 cm, while 173.5 cm would be rounded to 174 cm.
- It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.
- National health data elements currently exist for sex, date of birth, country of birth and Indigenous Status. Data elements are being developed for physical activity and smoking.
- Related data:** is used in the calculation of Adult body mass index, version 1
- Source organisation:** Responsible organisations: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. (See also Comments)

Comments:

Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.
Date of submission: October 1997.

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys when it is not possible to measure height.

Presentation of data:

Means, 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

For some reporting purposes, it may be desirable to present height data in categories. It is recommended that 5 cm groupings are used for this purpose. Height data should not be rounded before categorisation. The following categories may be appropriate for describing the heights of Australian men and women, although the range will depend on the population. The World Health Organization's range for height is 140–190 cm.

Ht <140 cm

140 cm = Ht < 145 cm

145 cm = Ht < 150 cm

... in 5 cm categories

185 cm = Ht < 190 cm

Ht = 190 cm

On average, height tends to be overestimated when self-reported by respondents. Data for Australian men and women aged 20–69 years in 1989 indicated that men overestimated by an average of 1.1 cm (sem of 0.04 cm) and women by an average of 0.5 cm (sem of 0.05 cm) (Waters 1993). The extent of overestimation varied with age.

Adult hip circumference

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000369 Version number: 1

Data element type: DATA ELEMENT CONCEPT

Definition: A person's hip circumference

Relational and representational attributes

Related data: relates to Adult hip circumference – measured, version 1

Adult hip circumference—measured

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000370 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's hip circumference measured at the level of maximum posterior extension of the buttocks.
Adult hip circumference: measured is a continuous variable measured to the nearest 0.1 cm.
In order to ensure consistency in measurement, the measurement protocol described under Data Collection Methods should be used.

Context: Public health and health care:
Its main use is to enable the calculation of Adult abdomen to hip ratio which requires the measurement of hip circumference and abdominal circumference.

Relational and representational attributes

Datatype: Numeric Field size: Min. 3 Max. 4 Layout: NNN.N

Guide for use: If measured hip circumference is not able to be collected, code 999.9

Collection methods: Measurement protocol:
The data collection form should allow for up to three measurements of hip circumference to be recorded in centimetres to 1 decimal place. The data collection form should also have the capacity to record any reasons for the non-collection of hip circumference data.
The measurement of hip circumference requires a narrow (< 7 mm wide), flexible, inelastic tape measure. The kind of tape used should be described and reported. The graduations on the tape measure should be at 0.1 cm intervals and the tape should have the capacity to measure up to 200 cm. Measurement intervals and labels should be clearly readable under all conditions of use of the tape measure.
The subject should wear only non-restrictive briefs or underwear, a light smock over underwear or light clothing. Belts and heavy outer clothing should be removed. Hip measurement should be taken over one layer of light clothing only.
The subject stands erect with arms at the sides, feet together and the gluteal muscles relaxed. The measurer sits at the side of the subject so that the level of maximum posterior extension of the buttocks can be seen. An inelastic tape is placed around the buttocks in a horizontal plane. To ensure contiguity of the two parts of the tape from which the circumference is to be determined, the cross-handed technique of measurement, as described by Norton et al. (1996), should be used. Ideally an assistant will check the position of the tape on the opposite side of the subject's body. The tape is in contact with the skin but does not compress the soft tissues. Fatty aprons should be excluded from the hip circumference measurement.
The measurement is recorded to the nearest 0.1 cm. Take a repeat measurement and record it to the nearest 0.1 cm. If the two measurements disagree by more than 1 cm, then take a third measurement.

**Collection methods
(continued):**

All raw measurements should be recorded on the data collection form. If practical, it is preferable to enter the raw data into the data base as this enables intra-observer and, where relevant, inter-observer errors to be assessed. The subject's measured hip circumference is subsequently calculated as the mean of the two observations, or the mean of the two closest measurements if a third is taken, and recorded on the form. If only a mean value is entered into the database then the data collection forms should be retained.

It may be necessary to round the mean value to the nearest 0.1 cm. If so, rounding should be to the nearest even digit to reduce systematic over reporting. For example, a mean value of 102.25 cm would be rounded to 102.2 cm, while a mean value of 102.35 cm would be rounded to 102.4 cm.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

Validation and quality control measures:

Steel tapes should be checked against a 1 metre engineer's rule every 12 months. If tapes other than steel are used they should be checked daily against a steel rule.

Within- and, if relevant, between-observer variability should be reported. They can be assessed by the same (within-) or different (between-) observers repeating the measurement, on the same subjects, under standard conditions after a short time interval. The standard deviation of replicate measurements (technical error of measurement (Pederson & Gore 1996)) between observers should not exceed 2% and be less than 1.5% within observers.

Extreme values at the lower and upper end of the distribution of measured hip circumference should be checked both during data collection and after data entry. Individuals should not be excluded on the basis of true biological difference.

Last digit preference, and preference or avoidance of certain values, should be analysed in the total sample and (if relevant) by observer, survey site and over time if the survey period is long.

Related data: is used in the calculation of Adult abdomen to hip ratio, version 1

Administrative attributes

Source document: The measurement protocol described below is that recommended by the World Health Organization (WHO Expert Committee 1995).

Source organisation: World Health Organization (see also Comments)

Comments: Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. Date of submission: October 1997.

Responsible organisation: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys and health care settings.

Presentation of data:

Means, 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

Comments (continued): For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

For some reporting purposes, it may be desirable to present hip circumference data in categories. It is recommended that 5cm groupings be used for this purpose. Hip circumference data should not be rounded before categorisation.

Adult weight

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000364 Version number: 1

Data element type: DATA ELEMENT CONCEPT

Definition: A person's weight (body mass).

Relational and representational attributes

Related data: relates to Adult weight – measured, version 1
relates to Adult weight – self-reported, version 1

Adult weight—measured

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000365 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's measured weight (body mass) without any clothing or in light indoor clothes.

Adult weight: measured is a continuous variable measured to the nearest 0.1 kg. In order to ensure consistency in measurement, the measurement protocol described under Data Collection Methods should be used.

Context: Public health and health care:

Weight is an overall measure of body size that does not distinguish between fat and muscle. Weight is an indicator of nutrition status and health status. Low pre-pregnancy weight is an indicator of poorer gestational outcome in women (Kramer 1988). Low weight is also associated with osteoporosis. In general, change in weight in adults is of interest because it is an indicator of changing health status.

It is used to enable the calculation of Adult body mass index which requires the measurement of height and weight.

Relational and representational attributes

Datatype: Numeric Field size: Min. 3 Max. 4 Layout: NNN.N

Guide for use: If measured weight is not able to be collected, code 999.9

Collection methods: Measurement protocol:

Equipment used should be described and reported. Scales should have a resolution of at least 0.1kg and should have the capacity to weigh up to at least 200 kg. Measurement intervals and labels should be clearly readable under all conditions of use of the instrument.

The subject stands over the centre of the weighing instrument, with the body weight evenly distributed between both feet.

Heavy jewellery should be removed and pockets emptied. Light indoor clothing can be worn, excluding shoes, belts, and sweater. Any variations from light indoor clothing (e.g. heavy clothing, such as kaftans or coats worn because of cultural practices) should be noted on the data collection form.

Adjustments for non-standard clothing (i.e. other than light indoor clothing) should only be made in the data checking/cleaning stage prior to data analysis.

If the subject has had one or more limbs amputated, record this on the data collection form and weigh them as they are.

If they are wearing an artificial limb, record this on the data collection form but do not ask them to remove it. Similarly, if they are not wearing the limb, record this but do not ask them to put it on.

**Collection methods
(continued):**

The measurement is recorded to the nearest 0.1 kg. If the scales do not have a digital readout, take a repeat measurement. If the two measurements disagree by more than 0.5 kg, then take a third measurement. All raw measurements should be recorded on the data collection form. If practical, it is preferable to enter the raw data into the database as this enables intra-observer and, where relevant, inter-observer errors to be assessed. The subject's measured weight is subsequently calculated as the mean of the two observations, or the mean of the two closest measurements if a third is taken, and recorded on the form. If only a mean value is entered into the database then the data collection forms should be retained.

It may be necessary to round the mean value to the nearest 0.1 kg. If so, rounding should be to the nearest even digit to reduce systematic over reporting (Armitage and Berry 1994). For example, a mean value of 72.25 kg would be rounded to 72.2 kg, while a mean value of 72.35 kg would be rounded to 72.4 kg.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

National health data elements currently exist for sex, date of birth, country of birth and Indigenous Status.

Validation and quality control measures:

If practical, equipment should be checked daily using one or more objects of known weight in the range to be measured.

Within- and, if relevant, between-observer variability should be reported. They can be assessed by the same (within-) or different (between-) observers repeating the measurement of weight, on the same subjects, under standard conditions after a short time interval. The standard deviation of replicate measurements (technical error of measurement) between observers should not exceed 0.5 kg and be less than 0.5 kg within observers.

Extreme values at the lower and upper end of the distribution of measured height should be checked both during data collection and after data entry. Individuals should not be excluded on the basis of true biological difference.

Last digit preference, and preference or avoidance of certain values, should be analysed in the total sample and (if relevant) by observer, survey site and over time if the survey period is long.

Related data: is used in the calculation of Adult body mass index, version 1

Administrative attributes

Source document: The measurement protocol described below is that recommended by the World Health Organization (WHO Expert Committee 1995).

Source organisation: World Health Organization (see also Comments)

Comments: Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. Date of submission: October 1997.

Responsible organisation: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare.

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys and health care settings.

Comments (continued): Presentation of data:

Means and 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

For some reporting purposes, it may be desirable to present weight data in categories. It is recommended that 5 kg groupings are used for this purpose. Weight data should not be rounded before categorisation.

Adult weight—self-reported

Admin. status: CURRENT 1/07/1998

Identifying and definitional attributes

Knowledgebase ID: 000366 Version number: 1

Data element type: DATA ELEMENT

Definition: A person's self-reported weight (body mass) without any clothing or in light indoor clothes.

Context: Public health and health care:

Weight is an overall measure of body size that does not distinguish between fat and muscle. Weight is an indicator of nutrition status and health status. Low pre-pregnancy weight is an indicator of poorer gestational outcome in women (Kramer 1988). Low weight is also associated with osteoporosis. In general, change in weight is of interest in adults because it is an indicator of changing health status.

It is used to enable the calculation of body mass index which requires the measurement of height and weight.

Relational and representational attributes

Datatype: Numeric Field size: Min. 2 Max. 3 Layout: NNN

Guide for use: If self-reported body mass (weight) is unknown, code 888

If self-reported body mass (weight) is not responded to, code 999

Collection methods: The method of data collection, e.g. face to face interview, telephone interview or self-completion questionnaire, can affect survey estimates and should be reported.

The data collection form should include a question asking the respondent what their weight is. For example, the ABS National Health Survey 1989-90 included the question 'How much do you weigh without clothes and shoes?'. The data collection form should allow for both metric (to the nearest 1 kg) and imperial (to the nearest 1 lb) units to be recorded.

If practical, it is preferable to enter the raw data into the data base before conversion of measures in imperial units to metric. However, if this is not possible, weight reported in imperial units can be converted to metric prior to data entry using a conversion factor of 0.454 kg to the lb.

Rounding to the nearest 1 kg will be required for measures converted to metric prior to data entry, and may be required for data reported in metric units to a greater level of precision than the nearest 1 kg. The following rounding conventions are desirable to reduce systematic over reporting (Armitage and Berry 1994):

nnn.x where $x < 5$ —round down, e.g. 72.2 kg would be rounded to 72 kg.

nnn.x where $x > 5$ —round up, e.g. 72.7 kg would be rounded to 73 kg.

nnn.x where $x = 5$ —round to the nearest even number, e.g. 72.5 kg would be rounded to 72 kg, while 73.5 kg would be rounded to 74 kg.

It is recommended that in population surveys, sociodemographic data including ethnicity should be collected, as well as other risk factors including physiological status (e.g. pregnancy), physical activity, smoking and alcohol consumption. Summary statistics may need to be adjusted for these variables.

Collection methods (continued): National health data elements currently exist for sex, date of birth, country of birth and Indigenous Status. Data elements are being developed for physical activity and smoking.

Related data: is used in the calculation of Adult body mass index, version 1

Administrative attributes

Source organisation: Responsible organisations: National Health Data Committee (NHDC)/National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. (See also Comments)

Comments: Submitting organisation: The Expert Working Group on Data Standards for Indicators of Body Fatness in Australian Adults through the National Centre for Monitoring Cardiovascular Disease, Australian Institute of Health and Welfare. Date of submission: October 1997.

This data element applies to persons aged 18 years or older. It is recommended for use in population surveys when it is not possible to measure weight.

Presentation of data:

Means and 95% confidence intervals, medians and centiles should be reported to one decimal place. Where the sample permits, population estimates should be presented by sex and 5-year age groups. Estimates based on sample surveys may need to take into account sampling weights.

For consistency with conventional practice, and for current comparability with international data sets, recommended centiles are 5, 10, 15, 25, 50, 75, 85, 90 and 95. To estimate the 5th and 95th centiles a sample size of at least 200 is recommended for each group for which the centiles are being specified.

For some reporting purposes, it may be desirable to present weight data in categories. It is recommended that 5 kg groupings are used for this purpose. Weight data should not be rounded before categorisation. The following categories may be appropriate for describing the weights of Australian men and women, although the range will depend on the population. The World Health Organization's range for weight is 30–140 kg.

Wt < 30 kg

30 kg = Wt < 35 kg

35 kg = Wt < 40 kg

... in 5 kg categories

135 kg = Wt < 140 kg

Wt = 140 kg

On average, body mass (weight) tends to be underestimated when self-reported by respondents. Data for men and women aged 20–69 years in 1989 indicated that men underestimated by an average of 0.2 kg (sem of 0.05 kg) and women by an average of 0.4 kg (sem of 0.04 kg) (Waters 1993). The extent of underestimation varied with age.