



To News Editor  
For Immediate Release

3 September 2008

### **CUHK Designs a User-friendly Obesity Measuring Tape for Children Aged 6 to 18**

The prevalence of obesity has increased rapidly in the past two decades in both industrialized and developing countries. For the evaluation and management of obesity, a simple and clear definition of obesity is indispensable. So far, the most widely used definition of obesity is based on Body Mass Index (BMI) [weight (kg) /height<sup>2</sup> (m<sup>2</sup>)]. If an adult's BMI is  $\geq 25$ , he/she will be classified as overweight, while a BMI  $\geq 30$  is classified as obese. For children, no simple magic figures can be used. This is because a child's BMI changes substantially with age, rising steeply in infancy, falling during the preschool years and rising again during childhood and adolescence. Hence, a child's BMI needs to be assessed using age-related reference curves or tables.

Obesity is associated with clustering of cardiovascular (CV) risk factors – insulin resistance, dyslipidaemia and hypertension - empirically recognized as the “Metabolic Syndrome”. Metabolic syndrome occurs in obese children and tends to track into adult life. It appears to be related specifically to intra-abdominal fat (visceral adipose tissue) of which waist circumference (WC) provides a good and clinically useful measure. Growing evidence has shown that both BMI and WC correlate well ( $r = 0.93$  for boys and  $0.91$  for girls) with CV factors.

The Department of Paediatrics at The Chinese University of Hong Kong (CUHK) has been conducting research in childhood obesity over the past decade and had established reference standards for WC and BMI in Hong Kong Chinese children. It was confirmed that high WC and BMI levels are associated with clusters of CV risk factors and the cut-off values of WC and BMI for predicting high risk patients have been worked out. In practice, however, it is highly inconvenient for health practitioners to use the cut-off values for WC and BMI as additional tables or curves are needed to be referred to.

In 2005/06 academic year, a team of 8 trained research staff from the Department of Paediatrics of CUHK collected the anthropometric data from 14,842 children aged 6 to 18 selected randomly from all the primary and secondary schools in Hong Kong. Descriptive statistics for each whole-year age group were calculated separately for each gender (see the table). Smoothed sex- and age-specific WC percentiles for the 3<sup>rd</sup>, 5<sup>th</sup>, 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, 90<sup>th</sup>, 95<sup>th</sup> and 97<sup>th</sup> percentiles were developed. Boys had larger WC values than girls at every age-specific percentile and the differences became wider with increasing age (from 2cm at 6 years old to 6cm at 18 years old). The WC cut-off values for predicting high CV risk in Hong Kong Chinese children aged 6 – 18 years old were set at the 95<sup>th</sup> percentiles of the present WC standards. This WC threshold is likely to identify children at significant risk for obesity-related co-morbidities.

With these research findings, the Department of Paediatrics of CUHK designed a measuring tape for WC with clear marks on the cut-off values for each different age (6-18 years) for boys and girls. WC is measured midway between the lowest rib and the superior border of the iliac crest. This user friendly tape can also be used by schools or at homes for better understanding of the child obesity. This will save the trouble of painstaking BMI calculations and the use of extra reference tables.

The Hong Kong Professional Teachers' Union (HKPTU) will organize seminars for teachers of primary and secondary schools to educate them on childhood obesity, and how to use the specially designed tape for measuring children's waists. The measuring tapes will be made available for all schools at HKPTU's service centres. The public will be able to participate in the programme by buying measuring tapes at \$12 each from October 15 at the CUHK Souvenir Counter, located on the Ground Floor, John Fulton Centre, CUHK main campus, Shatin. (Enquiries: 2609-7886)

Sample sizes and mean and standard deviations (s.d.) for weight, height, BMI and waist circumference for Hong Kong Chinese children aged 6-18 y

<b>Sex</b>	<b>Age</b>	<b>N</b>	<b>Weight (kg)</b>	<b>Height (cm)</b>	<b>BMI</b>	<b>W C (cm)</b>	
<b>Boys</b>	6	402	23.9 (4.7)	120.4 (5.5)	16.2 (2.4)	53.7 (5.4)	
	7	520	26.4 (6.1)	125.7 (5.9)	16.6 (2.7)	55.4 (6.6)	
	8	572	29.3 (6.7)	130.7 (5.9)	17.0 (2.9)	56.9 (6.8)	
	9	629	32.7 (7.8)	135.6 (6.0)	17.6 (3.2)	59.5 (7.8)	
	10	627	37.5 (9.6)	141.2 (6.9)	18.7 (3.7)	62.4 (9.1)	
	11	644	41.8 (10.6)	147.3 (7.9)	19.1 (3.7)	64.0 (9.2)	
	12	729	46.6 (11.9)	154.1 (8.6)	19.4 (3.7)	64.6 (9.1)	
	13	657	51.1 (11.3)	161.2 (7.9)	19.6 (3.5)	65.2 (8.2)	
	14	632	54.9 (10.9)	166.3 (6.9)	19.8 (3.4)	66.0 (7.7)	
	15	558	59.1 (12.0)	169.8 (5.4)	20.4 (3.8)	68.1 (8.7)	
	16	579	60.6 (11.1)	170.9 (5.8)	20.7 (3.4)	68.8 (8.2)	
	17	553	61.5 (11.0)	171.9 (5.7)	20.8 (3.4)	69.4 (7.8)	
	18	370	62.3 (11.0)	171.7 (5.6)	21.1 (3.3)	70.1 (7.6)	
	<b>Girls</b>	6	377	21.8 (3.8)	118.7 (5.1)	15.4 (1.9)	51.3 (4.2)
		7	479	24.9 (5.1)	124.2 (5.5)	16.0 (2.5)	53.3 (5.4)
		8	504	27.8 (6.0)	129.9 (6.3)	16.3 (2.5)	54.6 (5.8)
		9	590	30.8 (6.4)	135.1 (6.3)	16.8 (2.6)	56.7 (6.0)
		10	584	35.3 (8.5)	141.7 (7.0)	17.4 (3.1)	58.5 (7.0)
11		599	40.1 (9.3)	148.9 (7.0)	19.0 (3.2)	60.2 (6.9)	
12		750	44.1 (9.4)	153.1 (6.2)	18.7 (3.3)	61.2 (7.0)	
13		637	47.8 (8.5)	156.2 (5.4)	19.6 (3.1)	62.2 (6.5)	
14		656	49.0 (8.6)	157.6 (5.4)	19.7 (3.0)	62.3 (6.2)	
15		600	50.5 (9.1)	158.3 (5.3)	20.1 (3.3)	63.0 (6.7)	
16		640	50.7 (8.9)	158.3 (5.3)	20.2 (3.3)	63.2 (6.4)	
17		568	51.4 (9.2)	158.9 (6.7)	20.3 (3.3)	63.5 (6.3)	
18	386	51.3 (8.1)	158.6 (5.6)	20.4 (2.9)	63.8 (5.6)		

Age: complete age, e.g. 6y = 6.00-6.99y; WC: waist circumference



致新聞編輯  
請即發放

### 中大設計兒童腰圍測量軟尺 協助學童評估肥胖

過去 20 年，肥胖症問題在工業發達及發展中國家日益嚴重，社會需要一套簡明清晰的準則來評估及管理肥胖問題。一般人普遍利用體重指標（BMI）來衡量肥胖狀況（體重/身高<sup>2</sup>）。成年人的體重指標如超過或等於 25，則會被界定為過重；如體重指標超過或等於 30，就會被界定為肥胖。然而，這種既簡單又清晰的指引不能套用於兒童身上。兒童的體重指標會隨著年齡不斷改變：嬰兒的體重指標顯著上升，至學前時期兒童的體重指標下降，進而在孩童及青少年時期的體重指標再次上升。因此，兒童的體重指標必須參考與年齡相關的圖表和曲線圖才能量度。

肥胖症與心血管疾病風險（如胰島素抗阻、血脂代謝紊亂及高血壓，或統稱為「代謝綜合症」）有著莫大關連。肥胖兒童常患有代謝綜合症，情況往往會延續至成年階段。代謝綜合症又與內腹脂肪息息相關，因此腰圍是一個理想而合乎臨床應用的標準，以量度兒童是否有肥胖的問題。研究證據亦顯示，體重指標及腰圍都與心血管疾病有關。

香港中文大學（中大）醫學院兒科學系在過去 10 年進行了多項關於兒童肥胖的研究，並對本港兒童的腰圍及體重指標制訂了一套參考標準。系內研究團隊亦證實腰圍及體重指標與患上心血管疾病的風險有密切關係。訂定腰圍及體重指標的臨界值可有助評估兒童罹患心血管疾病的風險。但是，醫護人員每次都需依賴圖表及曲線圖去查核學童是否超標，在執行上實在帶來諸多不便。

在 2005/06 學年，中大兒科學系 8 名研究人員在全港中、小學校，抽樣調查了 14,842 名年齡介乎 6 至 18 歲學童的人體測量數據，並分析男女不同年歲組別的詳盡統計數據（見圖表）。根據此等數據，計算出每一歲數組別的腰圍第 3、5、10、25、50、75、90、95 及 97 個百分位數。男童的腰圍比相同歲數的女童為大，而且隨著年齡增加，差別亦愈來愈大（差別由 6 歲的 2cm 至 18 歲的 6cm）。學童腰圍在第 95 個百分位數被定為臨界值，超過臨界值指該學童有較高的心血管疾病風險。這腰圍的指標可有效識別學童患上肥胖及相關病症的風險程度。

根據以上的研究結果，兒科學系設計了兒童腰圍測量軟尺，尺上清楚印上不同性別、不同年齡（6 至 18 歲）及相對的腰圍刻度，只需要把腰圍尺沿水平面圍繞在肋骨下緣與髂嵴（即盤骨頂）中間的腰部，則可量度出學童的腰圍有否超標。兒童腰圍測量軟尺有助中、小學校老師及家長了解學童及青少年的健康狀況，並省卻用者為學童計算體重指標及翻查參考圖表的不便。

「香港教育專業人員協會」（教協）將會聯絡各中、小學校的老師參加「兒童腰圍測量」講座，並經由教協的服務點索取兒童腰圍測量軟尺。至於公眾人士則可由 10 月 15 日起，前往沙田香港中文大學校園本部富爾敦樓地下「禮品銷售處」購買兒童腰圍測量軟尺，每套軟尺之售價為港幣 12 元正（查詢電話：2609-7886）。

參與研究的 6 至 18 歲本港學童的數目及在該年齡組別之體重、高度、體重指標及腰圍的平均值及標準差

性別	年齡*	人數	體重 (kg)	高度 (cm)	體重指標	腰圍 (cm)	
男	6	402	23.9 (4.7)	120.4 (5.5)	16.2 (2.4)	53.7 (5.4)	
	7	520	26.4 (6.1)	125.7 (5.9)	16.6 (2.7)	55.4 (6.6)	
	8	572	29.3 (6.7)	130.7 (5.9)	17.0 (2.9)	56.9 (6.8)	
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	17	553	61.5 (11.0)	171.9 (5.7)	20.8 (3.4)	69.4 (7.8)	
	18	370	62.3 (11.0)	171.7 (5.6)	21.1 (3.3)	70.1 (7.6)	
	女	6	377	21.8 (3.8)	118.7 (5.1)	15.4 (1.9)	51.3 (4.2)
		7	479	24.9 (5.1)	124.2 (5.5)	16.0 (2.5)	53.3 (5.4)
		8	504	27.8 (6.0)	129.9 (6.3)	16.3 (2.5)	54.6 (5.8)
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18	386	51.3 (8.1)	158.6 (5.6)	20.4 (2.9)	63.8 (5.6)		

\*年齡: 取完整年齡，如 6 歲= 6.00-6.99 歲

2008 年 9 月 3 日