Global, Regional, and National Prevalence of Overweight and Obesity in Children and Adults during 1980–2013: A Systematic Analysis for the Global Burden of Disease Study 2013

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Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013

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Summary

Background In 2010, overweight and obesity were estimated to cause 3·4 million deaths, 3·9% of years of life lost, and 3·8% of disability-adjusted life-years (DALYs) worldwide. The rise in obesity has led to widespread calls for regular monitoring of changes in overweight and obesity prevalence in all populations. Comparable, up-to-date information about levels and trends is essential to quantify population health effects and to prompt decision makers to prioritise action. We estimate the global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013.

Methods We systematically identified surveys, reports, and published studies (n=1769) that included data for height and weight, both through physical measurements and self-reports. We used mixed effects linear regression to correct for bias in self-reports. We obtained data for prevalence of obesity and overweight by age, sex, country, and year (n=19 244) with a spatiotemporal Gaussian process regression model to estimate prevalence with 95% uncertainty intervals (UIs).

Findings Worldwide, the proportion of adults with a body-mass index (BMI) of 25 kg/m² or greater increased between 1980 and 2013 from 28·8% (95% UI 28·4–29·3) to 36·9% (36·3–37·4) in men, and from 29·8% (29·3–30·2) to 38·0% (37·5–38·5) in women. Prevalence has increased substantially in children and adolescents in developed countries; 23·8% (22·9–24·7) of boys and 22·6% (21·7–23·6) of girls were overweight or obese in 2013. The prevalence of overweight and obesity has also increased in children and adolescents in developing countries, from 8·1% (7·7–8·6) to 12·9% (12·3–13·5) in 2013 for boys and from 8·4% (8·1–8·8) to 13·4% (13·0–13·9) in girls. In adults, estimated prevalence of obesity exceeded 50% in men in Tonga and in women in Kuwait, Kiribati, Federated States of Micronesia, Libya, Qatar, Tonga, and Samoa. Since 2006, the increase in adult obesity in developed countries has slowed down.

Interpretation Because of the established health risks and substantial increases in prevalence, obesity has become a major global health challenge. Not only is obesity increasing, but no national success stories have been reported in the past 33 years. Urgent global action and leadership is needed to help countries to more effectively intervene.

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Introduction

The rising prevalence of overweight and obesity in several countries[1–5] has been described as a global pandemic.[6–8] In 2010, overweight and obesity were estimated to cause 3·4 million deaths, 4% of years of life lost, and 4% of disability-adjusted life-years (DALYs) worldwide.[9] Data from studies in the USA have suggested that, unabated, the rise in obesity could lead to future falls in life

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expectancy.[10] Concern about the health risks associated with rising obesity has become nearly universal; member states of WHO introduced a voluntary target to stop the rise in obesity by 2025,[11] and widespread calls have been made for regular monitoring of changes in the prevalence of overweight and obesity in all populations.[12–15]

Monitoring of trends in the prevalence of overweight and obesity depends on household surveys. Many health interview surveys include questions on self-reported weight and height, which have been used to monitor trends over time;[16–18] however, estimates of body-mass index (BMI) from self-reported data are biased downwards.[19–21] Examination surveys provide direct measurements of weight and height, but few countries do repeated national examination surveys, and estimates from these surveys might be biased because of low participation rates.[19] Despite the paucity of complete and unbiased information about overweight and obesity, various systematic analyses have tried to assess levels and trends. Finucane and colleagues[2] used data from 369 national surveys and 591 subnational surveys to estimate country trends in mean BMI between 1980 and 2008. De Onis and colleagues[3] examined 450 national surveys to estimate trends in childhood obesity and overweight from 1990 to 2020. Investigators have used mean BMI estimates to predict levels of overweight and obesity during 1980–2008.[1] Data from these analyses suggest widespread increases in overweight and obesity in the past few decades, although data from recent country-specific analyses suggest that trends might have stabilised in some populations.[22–24]

Up-to-date information about levels and trends in overweight and obesity is essential both to quantify the health effects and to prompt decision makers to prioritise action and assess where progress is, or is not, being made. We aimed to analyse trends in overweight and obesity by country during 1980–2013 with data from surveys, reports, and scientific literature.

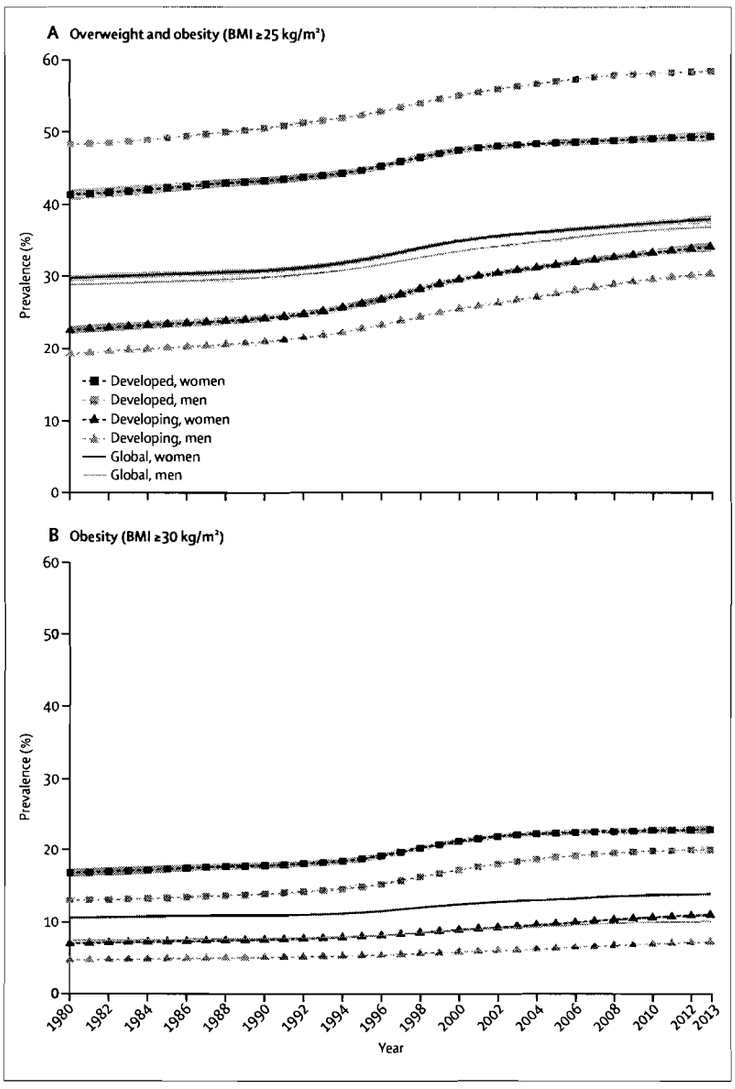

Figure 1: **Age-standardised prevalence of overweight and obesity and obesity alone, ages ≥20 years, by sex, 1980–2013**
BMI=body-mass index.

Methods

Definitions and data extraction

Following convention, we defined prevalence of overweight and obesity (in adults [aged >18 years] overweight categorised as BMI ≥25 to <30 kg/m² and obesity as BMI ≥30 kg/m²; in children, classification is based on the International Obesity Task Force [IOTF] definition; appendix). We reported estimates for 188 countries, 21 regions, and development status (developed or developing) as defined in the GBD study.[25] We report estimates of the prevalence of overweight and obesity for men and women separately and for 17 age groups (from age 2–4 years to ≥80 years).

We used several strategies to identify data sources. First, we included all major multicountry survey programmes that included information about height and weight, such as the Demographic and Health Surveys,[26] the WHO STEPwise approach to Surveillance programme,[27] the Eurobarometer Surveys,[28] the Multiple Indicator Cluster Surveys,[29] the World Health Surveys,[30] the Reproductive Health Surveys,[31] the Survey of Healthy Ageing and Retirement in Europe,[32] and the International Social Survey Programme.[33] Second, we searched three large databases (the WHO Global Infobase,[34] the International Association for the Study of Obesity Data Portal,[35] and the Global Health Data Exchange),[36] and national health ministry websites to identify national multiyear surveys, such as national health surveys and national longitudinal studies. Of 2270 sources identified, we excluded 501 because the samples were not representative.

Third, we did a systematic literature review with similar search criteria as those applied by Finucane and colleagues.[2] We identified all articles reporting prevalence of overweight and obesity based on BMI from 1980 to 2012. We included studies designed with a representative random sample of the population and both self-report and measured data (appendix). We compared data with the survey and report database and removed all duplicated data (with preference given to survey microdata). We excluded studies reporting prevalence of overweight and obesity based on alternative measurements, such as waist circumference and hip-waist ratio, because of insufficient reliable data for conversion of prevalence based on these alternative measurements to an equivalent prevalence estimate based on BMI.

These sources provided 1769 country-years of data and 19 244 datapoints for country, year, age, and sex from 183 countries. Five countries had no data (Antigua and Barbuda, Brunei, Grenada, Saint Vincent and the Grenadines, Venezuela). The appendix provides more details on the surveys included and excluded, specific search terms and inclusion and exclusion criteria for the systematic review, and a complete list of all the sources included in the analysis.

Data processing

Cross-walking different definitions

Self-reported weights for women in some countries tend to be under-reported and self-reported heights for men tend to be over-reported.[19–21] However, self-reported weights and heights are a major source of information for studies of obesity. We examined the association between self-reported and measured BMI with 538 country-years with both types of measurements available. We used a mixed effects linear regression to estimate bias correction factors for each GBD region, age, and sex. The uncertainty introduced from this adjustment was incorporated as the data variance and propagated into the Gaussian process regression. We did a sensitivity analysis excluding all self-reported data from the analysis (appendix).

Several reports have presented data for broader age groups than those selected for this analysis and sometimes for both sexes combined. We disaggregated these data into the required age and sex groups by applying an age–sex splitting model previously used in GBD 2010,[37] which used all surveys that provided information about multiple age–sex groupings as the reference standard to redistribute aggregated prevalence estimates into specific 5-year age bands and sex groups of interest (appendix).

Prevalence modelling

We often had many sources of data for the same year, which implied different levels of prevalence. In other cases, the data sequence had gaps. To deal with both issues and generate a complete time series based on all available data, we used a spatiotemporal regression model and Gaussian process regression to synthesise the data. Spatiotemporal Gaussian process regression has been used extensively to synthesise time series cross-sectional data,[38–42] and is a powerful method for interpolation and extrapolation of nonlinear trends. Specifically, it allows the borrowing of strength across space and time. Additionally, rather than treating every datapoint with equal weight, the relative uncertainty of data are taken into account in the estimation procedure with less uncertain data given a higher weight. The appendix provides details of each step of the estimation process. Briefly, we assumed that the trend of overweight and obesity prevalence followed a Gaussian process, which is defined by a mean function $m(\cdot)$ and a covariance

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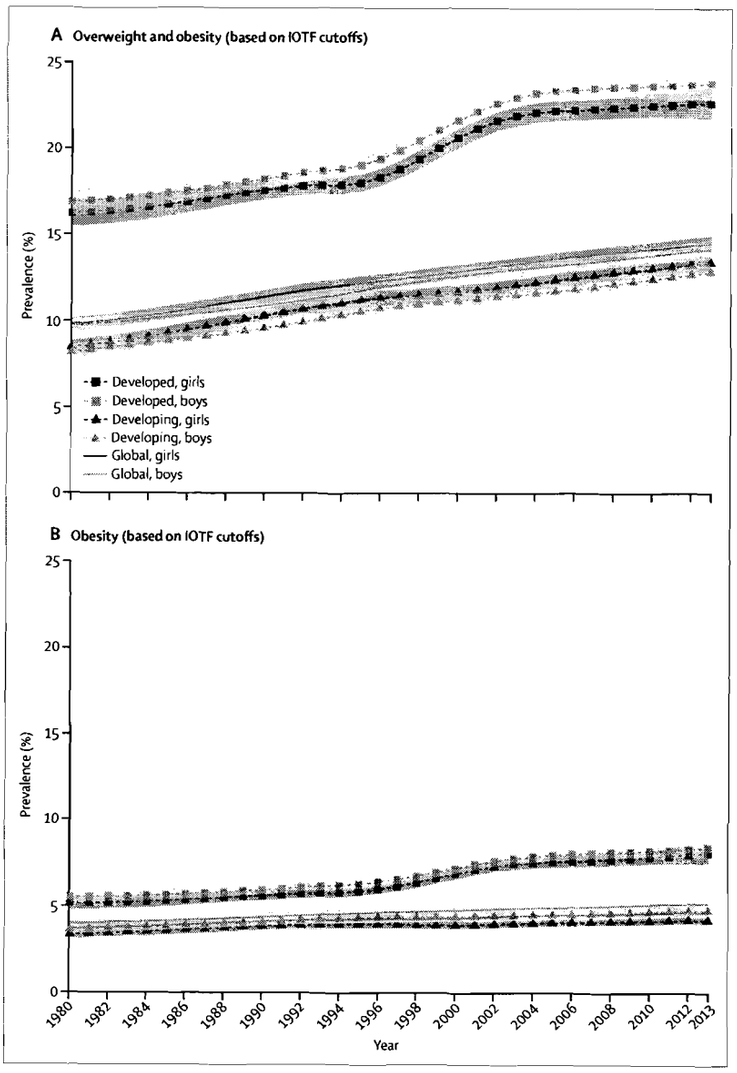

Figure 2: **Age-standardised prevalence of overweight and obesity, and obesity alone (based on IOTF cutoffs), ages 2–19 years, by sex, 1980–2013**
IOTF=International Obesity Task Force.

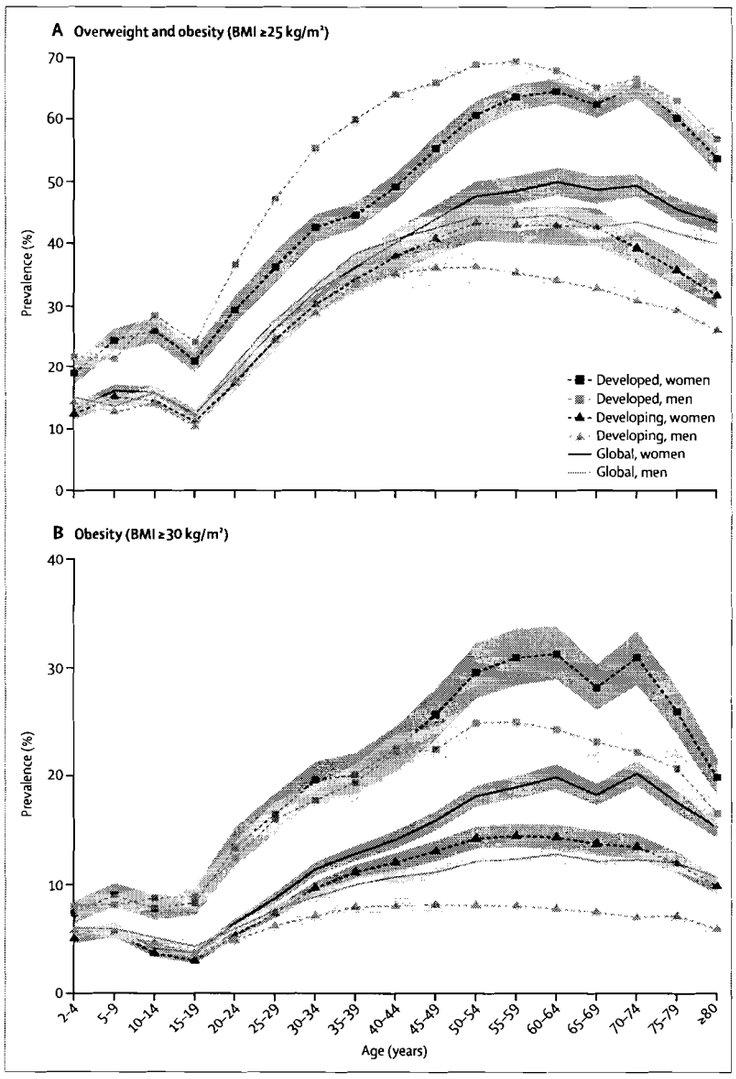

Figure 3: **Prevalence of overweight and obesity and obesity alone, by age and sex, 2013**
BMI=body-mass index.

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function $Cov(\cdot)$. To estimate the mean function, we applied a procedure with two stages. First, we fitted a linear model separately for each sex. Specifically for prevalence of overweight the following model is applied

$$logit\left(p^{ow}_{c,a,t}\right) = \beta_0 + \beta_1 \log\left(Kcal_{pc,t}\right) + \beta_2 Lat + \beta_3 Urban + \sum_{k=4}^{k+16} \beta_k I_{age} + \sum_{k=21}^{k+21} \beta_k I_{region}$$

where $p^{ow}_{c,a,t}$ is the prevalence of overweight and obesity for country (c), age (a), at time (t). In view of the association between food consumption and overweight,[43] we used total kilocalories consumed per year per person as a covariate obtained from the Food and Agriculture Organization food balance sheets ($Kcal_{pc,t}$).[43,44] Additionally, we included latitude (Lat) and urbanicity ($Urban$) as measured by the proportion of a country's land area having a population density of 1000 people/km² or greater, to measure the variation in overweight and obesity within and between countries. Finally, we included I_{age} as a dummy indicator to capture the age pattern and I_{region} to capture regional variation. To estimate the prevalence of obesity ($p^{ob}_{c,a,t}$), we applied a similar model:

$$logit\left(\frac{p^{ob}_{c,a,t}}{p^{ow}_{c,a,t}}\right) = \beta_0 + \beta_1 \log\left(Kcal_{c,t}\right) + \beta_2 Lat + \beta_3 Urban + \sum_{k=4}^{k+16} \beta_k I_{age} + \sum_{k=21}^{k+21} \beta_k I_{region}$$

We modelled the prevalence of obesity as a fraction of the joint category of overweight and obesity. We used this method to ensure that the prevalence of obesity did not exceed the joint category of overweight and obesity, which is bound between 0 and 1. We explored the use of other covariates to predict prevalence, including average income per person and various measures of diet composition. Our results were not sensitive to the choice of these covariates and we present estimates based on the most parsimonious model. The appendix shows details on the various model specifications that we included.

Although the linear component captured the general trend in prevalence, some of the data variability was still not adequately accounted for. Therefore, we applied a smoothing function that allowed for borrowing strength across time, age, and space patterns to the residuals from the linear model, as has been done repeatedly in the GBD analytical framework (appendix).

In addition to the definition of the mean function, another key component in Gaussian process regression is the covariance function, which defines the shape and distribution of trends. We applied the Matern covariance function, which offers flexibility to model a wide spectrum of trends with varying degrees of smoothness (appendix).

On the basis of the mean and covariance function, estimates of overweight and obesity prevalence $p^{ow}_{c,a,t,s}$ and $p^{ob}_{c,a,t,s}$ were derived for country (c), age (a), and sex (s) for time (t). We did the analysis with the PyMC package (version 3.3) in Python. We obtained random draws of 1000 samples from the marginal distributions of predicted prevalence of overweight and obesity for every country, age, and sex group. The final estimated prevalence for each country, age, and sex group was the mean of the draws. We obtained uncertainty intervals by taking the 2·5 and 97·5 percentiles of the distributions. These uncertainty intervals show many sources of uncertainty, including the unexplained variance in the Gaussian process regression mean function, sampling uncertainty, and uncertainty arising from the empirical adjustment of self-report data.

We did repeated cross-validation and estimated the root-mean squared error for the data held out in each cross-validation run and the percentage of the time that the 95% uncertainty interval for the data prediction included the data held-out. The appendix provides the detailed results of the cross-validation, which shows that the modelling strategy had reasonable error and 95% uncertainty intervals that included close to 95% of the data excluded.

We computed age-standardised prevalence rates for the population aged 20 years and older and for ages 2–19 years with the standard population distribution based on the average country-level population distribution by age from the World Population Prospects 2012 revision.[45]

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

Worldwide, prevalence of overweight and obesity combined rose by 27·5% for adults and 47·1% for children between 1980 and 2013. The number of overweight and obese individuals increased from 857 million in 1980, to 2·1 billion in 2013 (data not shown). Figure 1 shows age-standardised global prevalence of overweight and obesity combined and obesity alone in adults, for developing and developed countries between 1980 and 2013. Worldwide, the proportion of men who were overweight increased from 28·8% (UI 28·4–29·3) in 1980, to 36·9% (36·3–37·4) in 2013, and the proportion of women who were overweight increased from 29·8% (29·3–30·2) to 38·0% (37·5–38·5). Increases were recorded in developed and developing countries, but with different sex patterns. In developed countries, more men than women were overweight and obese, whereas in developing countries, overweight and obesity was more prevalent in women than in men, and this association persisted over time (figure 1). Rates of obesity seem to be increasing in both

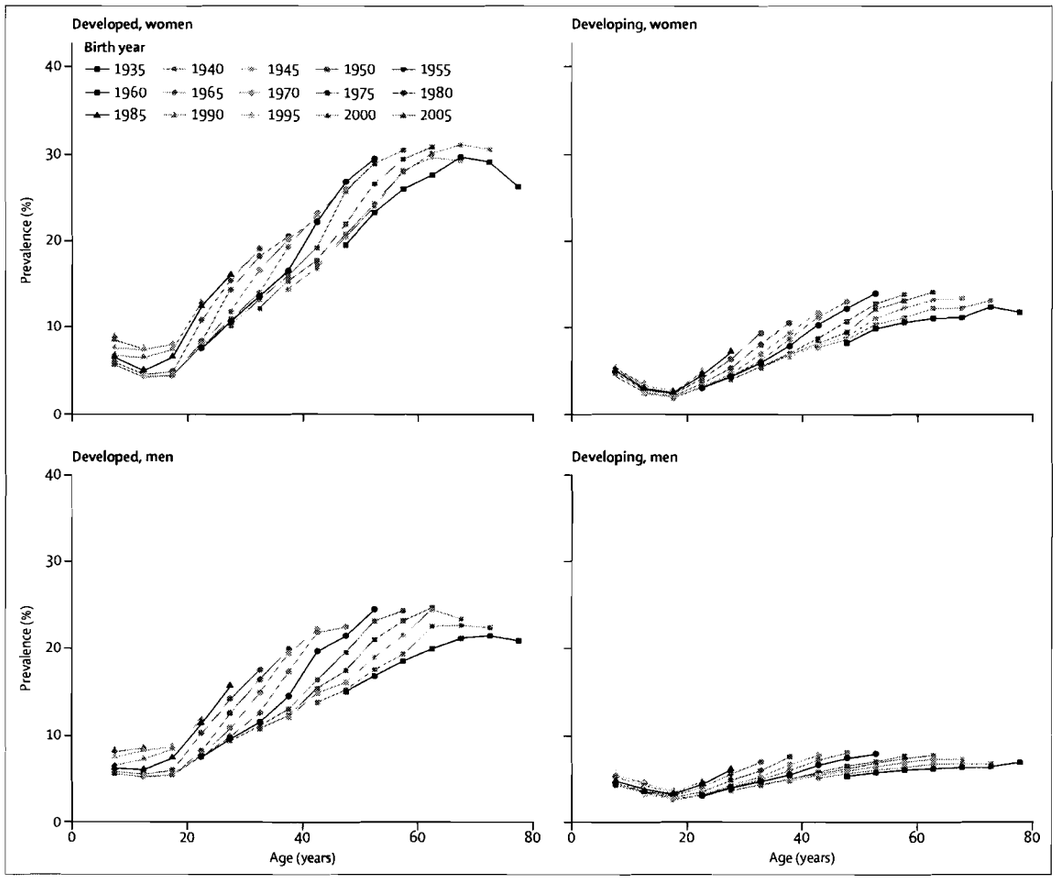

Figure 4: Prevalence of obesity by age across birth cohorts for men and women in developed and developing countries

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	Boys <20 years		Men ≥20 years		Girls <20 years		Women ≥20 years	
	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese
Andean Latin America	16·7 (15·1–18·3)	3·7 (3·3–4·2)	45·0 (43·2–46·8)	8·5 (7·8–9·1)	27·2 (24·9–29·5)	4·4 (3·8–4·9)	66·7 (65·6–67·7)	23·4 (22·2–24·6)
Bolivia	20·5 (17·4–24·0)	4·6 (3·7–5·5)	51·9 (49·1–54·5)	10·2 (9·1–11·4)	28·2 (24·4–32·4)	4·7 (3·7–5·7)	62·0 (59·7–64·4)	24·5 (22·4–26·8)
Ecuador	13·7 (11·4–16·2)	3·1 (2·4–3·7)	40·2 (37·5–42·9)	6·9 (6·1–7·7)	29·6 (25·4–34·2)	4·6 (3·7–5·8)	69·8 (67·2–72·1)	19·8 (17·6–22·0)
Peru	16·6 (14·2–19·4)	3·8 (3·1–4·5)	45·4 (42·7–48·2)	8·8 (7·7–9·8)	25·6 (22·3–29·2)	4·1 (3·3–4·9)	66·5 (65·1–67·9)	24·9 (23·1–26·6)
Australasia	25·3 (22·7–28·2)	7·5 (6·5–8·6)	68·6 (66·3–70·6)	27·6 (25·5–29·6)	24·0 (21·3–26·9)	7·6 (6·4–9·0)	56·7 (54·4–59·1)	29·8 (27·7–32·0)
Australia	24·4 (21·4–28·0)	7·0 (5·8–8·2)	68·2 (65·6–70·5)	27·5 (25·2–29·8)	23·0 (19·9–26·5)	7·3 (5·9–8·9)	56·1 (53·4–58·9)	29·8 (27·3–32·4)
New Zealand	29·6 (26·0–33·3)	9·7 (8·4–11·4)	71·4 (69·6–73·3)	28·1 (26·3–29·9)	28·7 (25·3–32·6)	9·0 (7·6–10·6)	60·0 (57·8–62·2)	30·0 (28·1–31·9)
Caribbean	13·4 (12·3–14·6)	4·5 (4·1–4·9)	37·8 (36·4–39·1)	12·3 (11·5–13·1)	19·9 (18·4–21·5)	6·6 (5·9–7·3)	50·4 (49·1–51·8)	24·5 (23·4–25·9)
Antigua and Barbuda	11·2 (9·4–13·4)	4·5 (3·6–5·6)	35·5 (32·7–38·4)	10·1 (8·9–11·4)	20·5 (17·3–24·2)	6·7 (5·3–8·2)	49·1 (46·3–52·0)	20·5 (18·4–22·7)
Barbados	25·3 (21·6–29·1)	8·7 (7·0–10·5)	57·5 (54·7–60·1)	18·1 (16·4–20·0)	32·4 (27·9–37·3)	14·9 (12·0–17·9)	69·9 (67·2–72·4)	33·0 (30·6–35·8)
Belize	18·4 (15·7–21·4)	7·9 (6·4–9·5)	58·6 (55·9–61·4)	23·0 (20·9–25·3)	27·1 (23·1–31·5)	11·6 (9·3–14·2)	75·3 (72·9–77·5)	42·7 (39·5–45·8)
Cuba	15·7 (13·1–18·4)	7·4 (6·1–9·0)	37·5 (34·5–40·4)	16·0 (14·4–17·8)	23·9 (20·3–28·1)	10·7 (8·5–13·0)	51·4 (48·5–54·3)	29·7 (26·9–32·6)
Dominica	15·2 (12·7–18·0)	4·6 (3·7–5·7)	36·6 (33·8–39·1)	10·7 (9·7–11·9)	29·2 (24·5–33·6)	12·2 (9·9–14·9)	74·0 (71·5–76·4)	39·4 (36·8–42·1)
Dominican Republic	17·8 (14·8–20·9)	4·3 (3·5–5·3)	50·7 (47·9–53·7)	10·3 (9·1–11·7)	25·2 (21·5–29·5)	7·3 (5·9–9·1)	54·8 (51·7–57·9)	20·9 (18·8–23·4)
Grenada	11·6 (9·7–13·9)	4·7 (3·8–5·9)	36·5 (33·9–39·0)	10·5 (9·4–11·8)	21·2 (17·8–25·1)	7·0 (5·5–8·7)	50·2 (47·2–53·2)	21·3 (19·0–23·6)
Guyana	11·5 (9·8–13·3)	4·5 (3·6–5·4)	40·9 (38·6–43·2)	11·5 (10·4–12·7)	22·2 (18·8–25·8)	8·6 (7·0–10·5)	62·3 (60·2–64·5)	30·4 (28·0–32·7)
Haiti	7·7 (6·5–9·1)	2·1 (1·7–2·6)	16·6 (15·1–18·4)	5·0 (4·4–5·6)	9·5 (7·9–11·5)	2·0 (1·6–2·5)	30·8 (28·7–33·0)	12·2 (11·2–13·4)
Jamaica	13·4 (11·1–15·7)	5·3 (4·2–6·6)	37·1 (34·3–39·9)	10·6 (9·4–11·8)	31·0 (26·5–36·0)	10·9 (8·6–13·3)	62·7 (59·7–65·2)	32·0 (29·2–34·8)
Saint Lucia	15·8 (13·2–18·7)	6·2 (5·0–7·4)	46·9 (44·0–49·6)	14·4 (12·9–16·2)	17·0 (13·9–20·2)	6·0 (4·7–7·5)	44·2 (41·4–47·2)	19·2 (17·3–21·5)
Saint Vincent and the Grenadines	15·3 (12·7–17·9)	6·0 (4·9–7·4)	43·5 (40·8–46·3)	13·3 (11·8–14·8)	26·0 (22·1–30·7)	8·8 (7·0–10·9)	56·5 (53·2–59·7)	25·4 (23·0–28·0)
Suriname	11·8 (9·8–14·0)	4·2 (3·3–5·4)	49·7 (46·9–52·5)	12·5 (11·2–13·9)	22·6 (19·0–26·3)	7·4 (5·8–9·2)	64·7 (61·8–67·5)	33·8 (30·7–36·8)
The Bahamas	19·1 (16·3–22·3)	15·9 (12·9–18·9)	49·9 (47·1–52·8)	30·9 (28·3–33·6)	33·3 (28·7–38·3)	20·2 (16·6–24·2)	64·3 (61·4–67·2)	47·7 (44·5–51·2)
Trinidad and Tobago	19·2 (16·3–22·1)	7·8 (6·3–9·4)	55·5 (53·2–57·7)	20·9 (19·3–22·5)	21·3 (18·0–25·0)	7·2 (5·7–8·9)	66·1 (64·1–68·1)	36·2 (34·2–38·3)
Central Asia	19·9 (18·6–21·4)	6·8 (6·2–7·6)	50·8 (49·5–52·0)	12·6 (12·0–13·2)	20·6 (19·0–22·1)	5·9 (5·3–6·7)	53·2 (52·0–54·4)	22·0 (21·1–22·9)
Armenia	23·3 (20·1–27·1)	7·3 (5·8–8·9)	44·7 (42·1–47·3)	11·4 (10·0–12·8)	24·1 (20·7–28·2)	6·6 (5·2–8·2)	60·4 (58·0–62·7)	26·4 (24·1–28·8)
Azerbaijan	24·9 (21·2–28·6)	8·3 (6·5–10·4)	59·0 (56·6–61·4)	9·0 (8·0–10·0)	23·1 (19·5–26·9)	7·9 (6·2–9·9)	67·3 (65·1–69·5)	30·4 (28·2–32·8)
Georgia	26·3 (22·5–30·1)	10·7 (8·9–12·7)	58·7 (56·0–61·4)	21·2 (19·7–22·8)	29·9 (25·7–34·3)	12·1 (9·9–14·5)	59·7 (57·1–62·5)	28·1 (26·1–30·1)
Kazakhstan	20·5 (17·6–23·8)	7·4 (6·0–8·9)	52·7 (49·9–55·4)	15·4 (13·8–17·0)	21·9 (18·6–25·8)	5·7 (4·6–7·0)	55·9 (53·1–58·7)	27·3 (24·8–29·7)
Kyrgyzstan	19·7 (16·6–23·1)	4·6 (3·7–5·6)	50·9 (47·9–53·6)	10·3 (9·1–11·5)	19·1 (15·8–22·6)	4·5 (3·5–5·6)	50·0 (47·2–52·8)	19·7 (17·8–22·0)
Mongolia	15·5 (13·1–18·2)	4·7 (3·7–5·8)	44·3 (42·0–46·7)	12·1 (10·9–13·4)	18·9 (15·9–22·2)	4·5 (3·6–5·5)	53·8 (51·3–56·2)	18·3 (16·8–20·2)
Tajikistan	13·0 (11·0–15·3)	5·9 (4·8–7·1)	39·6 (37·1–42·4)	13·0 (11·5–14·4)	13·3 (10·8–15·7)	4·3 (3·4–5·5)	41·8 (39·5–44·2)	13·4 (12·0–14·8)
Turkmenistan	21·5 (18·2–25·1)	6·5 (5·3–8·1)	53·2 (50·4–56·0)	14·1 (12·6–15·8)	24·2 (20·4–28·4)	2·6 (2·1–3·3)	53·7 (50·7–56·7)	22·0 (19·9–24·1)
Uzbekistan	20·2 (17·3–23·5)	7·0 (5·5–8·5)	49·2 (46·6–51·9)	11·3 (10·0–12·6)	20·6 (17·1–24·3)	6·6 (5·1–8·4)	46·6 (43·8–49·2)	15·8 (14·1–17·7)
Central Europe	21·3 (20·0–22·7)	7·5 (6·9–8·1)	62·2 (61·1–63·3)	18·0 (17·2–18·8)	20·3 (18·9–21·6)	6·3 (5·8–6·9)	50·4 (49·2–51·5)	20·7 (19·8–21·7)
Albania	32·8 (28·5–37·3)	11·5 (9·2–13·9)	56·2 (53·6–58·7)	9·2 (8·2–10·2)	26·7 (22·9–30·5)	12·8 (10·3–15·8)	45·8 (43·3–48·5)	11·1 (9·9–12·4)
Bosnia and Herzegovina	17·2 (14·7–20·1)	10·1 (8·3–12·1)	57·3 (54·5–60·2)	15·4 (13·8–17·0)	22·7 (19·2–26·3)	11·6 (9·6–14·1)	51·9 (49·2–54·7)	20·4 (18·4–22·4)
Bulgaria	26·7 (22·9–30·8)	6·9 (5·6–8·5)	59·7 (56·9–62·2)	16·6 (14·9–18·5)	25·7 (21·9–29·9)	6·7 (5·3–8·3)	48·8 (46·1–51·7)	20·3 (18·3–22·5)
Croatia	29·5 (25·3–33·8)	7·6 (6·1–9·3)	65·5 (62·9–68·2)	19·9 (17·9–22·2)	19·7 (16·5–23·1)	5·6 (4·4–7·1)	51·0 (48·3–53·7)	19·6 (17·5–21·7)
Czech Republic	22·3 (19·1–26·3)	6·4 (5·2–7·7)	65·5 (62·9–68·2)	17·8 (16·0–19·6)	18·0 (15·0–21·0)	4·8 (3·8–6·1)	50·0 (47·2–52·7)	20·8 (18·8–22·9)
Hungary	30·2 (26·3–34·4)	7·9 (6·5–9·6)	65·6 (63·0–68·1)	21·7 (19·6–24·0)	24·9 (21·3–28·6)	6·1 (4·9–7·5)	54·8 (52·0–57·5)	24·7 (22·4–27·2)
Macedonia	23·7 (20·5–27·2)	8·6 (7·2–10·4)	57·0 (54·2–59·9)	16·8 (15·1–18·6)	22·3 (19·1–25·9)	5·4 (4·4–6·7)	51·7 (49·0–54·3)	21·6 (19·6–23·6)
Montenegro	26·3 (22·7–30·2)	9·4 (7·6–11·3)	60·1 (57·1–62·9)	19·5 (17·5–21·5)	27·3 (23·1–31·4)	8·3 (6·8–10·2)	57·0 (54·1–60·1)	24·1 (21·7–26·6)
Poland	21·9 (18·6–25·7)	6·9 (5·6–8·4)	64·0 (61·4–66·7)	18·3 (16·5–20·3)	17·8 (14·7–21·3)	6·0 (4·7–7·4)	49·4 (46·8–52·1)	20·9 (18·9–23·2)
Romania	11·0 (9·2–13·2)	8·6 (7·0–10·4)	60·4 (57·6–63·0)	18·7 (16·9–20·6)	20·3 (17·1–24·2)	5·7 (4·5–6·9)	50·3 (47·6–53·0)	19·8 (17·8–22·1)
Serbia	19·2 (16·5–22·5)	6·7 (5·5–8·1)	55·7 (53·5–58·2)	16·0 (14·5–17·4)	23·1 (19·8–26·7)	6·9 (5·6–8·4)	50·4 (47·8–52·8)	19·5 (17·7–21·3)
Slovakia	20·6 (17·5–23·8)	5·5 (4·5–6·7)	64·4 (61·8–66·9)	17·6 (15·7–19·5)	13·5 (11·0–16·4)	5·5 (4·3–6·9)	51·5 (48·9–54·1)	21·5 (19·3–23·7)
Slovenia	33·1 (29·4–36·9)	7·2 (5·9–8·6)	65·1 (62·3–67·6)	19·9 (17·9–22·0)	24·0 (20·7–27·3)	5·3 (4·3–6·4)	52·1 (49·1–54·8)	22·4 (20·2–24·9)
Central Latin America	21·7 (20·1–23·3)	7·4 (6·5–8·4)	57·1 (56·0–58·2)	16·7 (15·7–17·6)	25·5 (23·7–27·3)	7·5 (6·6–8·3)	65·2 (64·1–66·2)	28·4 (27·3–29·8)
Colombia	15·4 (13·1–18·0)	4·1 (3·4–4·8)	52·7 (50·4–54·9)	14·6 (13·5–15·8)	18·3 (15·4–21·6)	3·6 (2·9–4·3)	57·0 (54·9–59·2)	22·6 (21·0–24·3)

(Table continues on next page)

	Boys <20 years		Men ≥20 years		Girls <20 years		Women ≥20 years	
	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese
(Continued from previous page)								
Costa Rica	20·8 (17·6–24·4)	6·7 (5·3–8·2)	55·2 (52·5–58·2)	15·4 (13·7–17·1)	37·7 (32·5–42·9)	12·4 (10·0–15·1)	66·5 (63·6–69·2)	28·8 (26·1–31·7)
El Salvador	11·2 (9·3–13·3)	2·7 (2·2–3·3)	35·7 (33·0–38·4)	6·2 (5·5–7·0)	25·4 (22·0–29·1)	6·3 (5·1–7·6)	71·0 (68·7–73·1)	33·0 (30·3–35·5)
Guatemala	13·6 (11·4–16·2)	3·4 (2·7–4·2)	41·4 (38·8–44·0)	9·4 (8·4–10·4)	19·4 (16·5–22·8)	3·8 (3·0–4·7)	54·5 (51·8–57·2)	19·1 (17·1–21·1)
Honduras	11·4 (9·5–13·5)	2·4 (2·0–3·0)	35·9 (33·3–38·6)	5·6 (4·9–6·3)	21·5 (18·2–24·8)	4·7 (3·8–5·7)	66·0 (64·0–67·9)	30·0 (27·9–32·0)
Mexico	28·4 (25·3–31·6)	10·5 (8·8–12·4)	66·8 (64·9–68·6)	20·6 (18·9–22·5)	29·3 (25·8–32·5)	9·8 (8·1–11·4)	71·4 (69·5–73·2)	32·7 (30·6–35·0)
Nicaragua	14·8 (12·4–17·5)	4·5 (3·7–5·5)	43·0 (40·3–45·8)	10·3 (9·2–11·6)	23·4 (19·9–27·1)	5·2 (4·1–6·5)	67·6 (65·3–69·9)	30·8 (28·3–33·4)
Panama	10·6 (8·9–12·6)	4·9 (3·9–6·0)	21·4 (19·5–23·5)	10·9 (9·7–12·2)	9·9 (8·1–12·0)	6·2 (5·0–7·6)	30·9 (28·4–33·5)	19·4 (17·4–21·4)
Venezuela	18·4 (15·5–21·6)	6·1 (4·9–7·4)	48·7 (45·7–51·5)	13·4 (12·0–14·9)	27·7 (23·7–31·9)	7·7 (6·2–9·5)	58·4 (55·6–61·4)	23·0 (20·8–25·4)
Central sub-Saharan Africa	10·3 (9·2–11·6)	5·1 (4·4–5·9)	24·8 (23·7–26·1)	7·0 (6·6–7·5)	14·6 (12·9–16·3)	4·7 (3·9–5·5)	25·7 (24·4–27·1)	8·5 (8·0–9·1)
Angola	15·5 (13·0–18·3)	5·7 (4·6–7·0)	42·9 (40·1–45·7)	12·0 (10·7–13·4)	20·9 (17·5–24·6)	6·0 (4·7–7·5)	49·1 (46·1–52·0)	18·7 (16·7–20·9)
Central African Republic	10·2 (8·5–12·0)	6·2 (5·0–7·6)	33·7 (31·2–36·3)	13·2 (11·8–14·7)	11·2 (9·1–13·6)	3·1 (2·4–4·0)	10·1 (9·0–11·3)	3·3 (2·9–3·8)
Congo	8·9 (7·4–10·7)	2·9 (2·4–3·6)	29·2 (27·0–31·6)	6·5 (5·7–7·4)	11·2 (9·3–13·2)	2·9 (2·3–3·7)	37·9 (35·7–40·2)	14·3 (13·0–15·8)
Democratic Republic of Congo	8·5 (7·0–10·2)	4·9 (4·0–6·0)	17·5 (15·9–19·2)	4·7 (4·1–5·3)	12·6 (10·5–15·0)	4·4 (3·4–5·5)	17·7 (16·1–19·5)	4·5 (4·0–5·2)
Equatorial Guinea	27·2 (23·3–31·3)	12·9 (10·6–15·6)	59·6 (56·8–62·4)	24·8 (22·4–27·1)	33·2 (28·9–38·0)	13·5 (10·9–16·6)	63·4 (60·6–66·2)	35·4 (32·3–38·3)
Gabon	13·3 (11·4–15·4)	3·3 (2·6–4·0)	42·1 (39·8–44·5)	11·6 (10·4–13·0)	20·1 (17·1–23·4)	3·9 (3·1–4·8)	59·6 (57·5–61·7)	27·9 (25·7–30·1)
East Asia	22·6 (19·8–25·6)	6·8 (5·6–8·1)	28·0 (26·2–29·7)	3·8 (3·5–4·2)	13·7 (11·8–15·8)	2·8 (2·2–3·4)	27·1 (25·5–28·7)	4·9 (4·5–5·4)
China	23·0 (20·1–26·1)	6·9 (5·7–8·2)	28·3 (26·4–30·0)	3·8 (3·5–4·3)	14·0 (12·0–16·1)	2·8 (2·2–3·4)	27·4 (25·8–29·0)	5·0 (4·5–5·5)
North Korea	1·0 (0·8–1·3)	1·0 (0·8–1·3)	4·1 (3·7–4·6)	2·1 (1·9–2·4)	1·0 (0·8–1·2)	0·9 (0·7–1·1)	4·7 (4·2–5·2)	2·8 (2·5–3·2)
Taiwan (Province of China)	25·9 (22·3–29·9)	7·7 (6·2–9·4)	33·8 (31·3–36·4)	4·3 (3·7–4·8)	17·4 (14·5–20·7)	4·2 (3·3–5·3)	30·9 (28·4–33·4)	6·4 (5·6–7·2)
Eastern Europe	19·0 (16·7–21·4)	7·1 (6·0–8·4)	55·0 (52·8–56·9)	14·8 (13·7–16·0)	18·8 (16·5–21·2)	6·4 (5·4–7·6)	57·8 (55·9–59·7)	27·0 (25·3–28·7)
Belarus	15·4 (12·9–18·5)	3·8 (3·0–4·7)	44·1 (41·2–46·8)	8·8 (7·8–9·9)	17·4 (14·4–20·5)	4·2 (3·4–5·2)	44·7 (41·9–47·6)	14·2 (12·5–16·0)
Estonia	24·0 (20·2–27·8)	7·3 (5·9–9·0)	59·3 (56·5–62·0)	19·0 (17·2–21·0)	21·4 (18·0–25·2)	7·6 (6·1–9·4)	54·3 (51·5–57·2)	25·6 (23·2–28·1)
Latvia	19·9 (16·8–23·2)	4·8 (3·9–5·8)	56·3 (53·6–59·1)	17·4 (15·7–19·1)	15·2 (12·6–18·1)	3·4 (2·8–4·3)	55·8 (53·2–58·6)	25·7 (23·3–28·2)
Lithuania	24·3 (20·8–28·1)	6·3 (5·1–7·8)	63·9 (61·1–66·6)	18·3 (16·4–20·2)	21·1 (17·8–24·6)	5·2 (4·2–6·5)	56·2 (53·3–59·0)	24·4 (22·2–26·9)
Moldova	15·8 (13·2–18·6)	5·6 (4·5–6·8)	44·7 (41·9–47·5)	12·7 (11·3–14·1)	15·2 (12·7–18·1)	5·3 (4·1–6·8)	58·8 (56·4–61·1)	28·8 (26·3–31·3)
Russia	21·7 (18·5–25·0)	7·3 (5·8–9·2)	54·3 (51·5–57·1)	15·3 (13·8–17·0)	18·6 (15·5–21·9)	6·6 (5·2–8·3)	58·9 (56·3–61·4)	28·5 (26·1–30·9)
Ukraine	10·6 (8·8–12·6)	7·3 (5·9–8·9)	59·1 (56·3–61·8)	14·6 (13·0–16·2)	20·1 (16·8–23·8)	6·5 (5·1–8·0)	57·4 (54·3–60·2)	25·2 (22·8–27·9)
Eastern sub-Saharan Africa	8·4 (7·9–8·9)	3·3 (3·1–3·5)	14·9 (14·4–15·4)	4·4 (4·2–4·6)	12·0 (11·3–12·7)	2·9 (2·7–3·1)	23·7 (23·2–24·3)	8·8 (8·4–9·1)
Burundi	7·0 (5·9–8·3)	1·8 (1·5–2·2)	23·0 (20·9–25·1)	3·7 (3·3–4·2)	9·3 (7·7–10·9)	1·4 (1·1–1·8)	10·3 (9·3–11·3)	2·4 (2·2–2·8)
Comoros	19·0 (16·2–22·2)	10·1 (8·1–12·4)	25·6 (23·5–27·9)	5·5 (5·0–5·9)	23·9 (20·4–27·9)	7·9 (6·1–9·9)	48·5 (45·9–51·1)	20·8 (19·1–22·4)
Djibouti	9·2 (7·6–10·9)	7·1 (5·8–8·7)	16·3 (14·7–17·8)	11·8 (10·4–13·1)	23·5 (20·0–27·4)	8·6 (6·9–10·7)	53·0 (50·0–55·9)	17·0 (15·1–19·0)
Eritrea	4·1 (3·4–5·1)	1·8 (1·4–2·2)	12·2 (11·0–13·6)	2·7 (2·4–3·1)	6·2 (5·0–7·5)	1·6 (1·2–2·0)	16·4 (14·8–18·1)	4·7 (4·1–5·4)
Ethiopia	4·6 (3·8–5·5)	1·9 (1·5–2·4)	4·0 (3·6–4·4)	4·0 (3·6–4·6)	6·3 (5·2–7·7)	1·9 (1·5–2·3)	8·0 (7·2–8·9)	1·8 (1·6–2·0)
Kenya	9·4 (7·8–11·3)	3·0 (2·4–3·6)	30·0 (27·5–32·5)	6·3 (5·6–7·2)	13·2 (11·0–15·8)	2·6 (2·0–3·2)	34·1 (31·6–36·7)	15·2 (13·7–16·8)
Madagascar	6·3 (5·2–7·6)	3·4 (2·7–4·3)	9·3 (8·4–10·4)	1·9 (1·6–2·1)	5·6 (4·5–7·0)	2·1 (1·6–2·7)	12·6 (11·4–14·0)	4·0 (3·5–4·6)
Malawi	12·7 (10·9–14·7)	6·3 (5·2–7·7)	15·6 (14·3–16·9)	2·0 (1·8–2·3)	24·3 (20·9–27·9)	6·1 (4·8–7·9)	25·7 (24·0–27·4)	7·2 (6·4–8·0)
Mauritius	22·9 (19·8–26·2)	5·4 (4·4–6·6)	39·4 (36·5–42·4)	7·4 (6·5–8·3)	21·9 (18·4–26·0)	6·6 (5·3–8·3)	49·3 (46·5–52·1)	18·4 (16·4–20·5)
Mozambique	12·3 (10·4–14·4)	3·5 (2·9–4·3)	14·1 (12·7–15·6)	3·5 (3·0–3·9)	14·4 (12·3–16·9)	3·0 (2·4–3·7)	26·5 (24·6–28·3)	9·2 (8·3–10·3)
Rwanda	11·3 (9·5–13·3)	4·2 (3·4–5·1)	5·4 (4·9–6·0)	2·4 (2·1–2·9)	18·4 (15·5–21·6)	3·4 (2·6–4·2)	19·3 (17·8–21·0)	3·4 (3·0–3·8)
Seychelles	12·7 (10·5–15·2)	4·3 (3·5–5·4)	45·8 (43·0–48·7)	11·0 (9·7–12·3)	17·6 (14·6–21·0)	5·7 (4·6–7·2)	64·6 (62·0–67·0)	30·3 (27·6–32·8)
Somalia	7·6 (6·2–9·1)	3·5 (2·8–4·3)	24·9 (22·8–27·1)	7·4 (6·6–8·3)	10·0 (8·0–12·2)	3·9 (3·1–5·0)	28·7 (26·3–31·2)	12·4 (11·0–13·9)
South Sudan	14·7 (12·3–17·4)	8·2 (6·7–10·1)	40·4 (37·7–43·4)	16·1 (14·3–18·0)	21·6 (18·0–25·6)	9·8 (7·8–12·1)	48·5 (45·4–51·4)	26·7 (24·2–29·6)
Tanzania	8·9 (7·4–10·5)	2·4 (1·9–3·0)	20·4 (18·7–22·1)	4·0 (3·6–4·5)	12·0 (10·0–14·2)	1·9 (1·5–2·3)	38·5 (36·5–40·5)	16·4 (15·1–17·8)
Uganda	5·7 (4·6–6·9)	2·4 (1·9–3·0)	6·9 (6·3–7·6)	1·7 (1·5–2·0)	14·6 (12·1–17·1)	2·1 (1·6–2·6)	24·6 (22·7–26·6)	6·8 (6·0–7·6)
Zambia	20·9 (18·1–24·1)	10·6 (8·9–12·5)	20·1 (18·4–22·2)	5·1 (4·5–5·7)	20·5 (17·4–23·8)	7·6 (6·0–9·5)	39·5 (37·1–41·7)	13·9 (12·5–15·5)
High-income Asia Pacific	17·2 (15·6–19·0)	4·0 (3·4–4·5)	31·7 (30·4–33·0)	5·3 (4·9–5·7)	12·6 (11·2–14·3)	2·7 (2·3–3·1)	20·6 (19·7–21·6)	4·2 (3·9–4·5)
Brunei	6·7 (5·5–8·0)	1·6 (1·3–2·0)	23·3 (21·2–25·2)	3·6 (3·1–4·0)	5·6 (4·5–6·8)	1·1 (0·8–1·4)	17·9 (16·2–19·8)	3·5 (3·1–4·1)
Japan	15·3 (13·2–17·6)	3·4 (2·8–4·0)	28·9 (27·1–30·7)	4·5 (4·0–5·0)	12·4 (10·2–14·6)	2·4 (2·0–3·0)	17·6 (16·5–18·9)	3·3 (3·0–3·7)

(Table continues on next page)

	Boys <20 years		Men ≥20 years		Girls <20 years		Women ≥20 years	
	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese
(Continued from previous page)								
Singapore	20·9 (17·5–24·3)	7·7 (6·3–9·4)	44·3 (41·4–47·1)	12·0 (10·7–13·4)	13·3 (10·9–16·0)	3·9 (3·1–5·0)	32·5 (30·0–35·1)	10·8 (9·6–12·0)
South Korea	21·2 (17·9–24·5)	4·8 (3·9–5·9)	36·9 (35·1–38·8)	6·8 (6·0–7·7)	13·2 (10·9–15·7)	3·1 (2·4–3·9)	27·2 (25·6–28·9)	5·8 (5·2–6·5)
High-income North America	28·5 (26·2–30·9)	12·1 (10·7–13·6)	70·3 (68·7–71·7)	30·6 (29·1–32·2)	29·1 (26·7–31·5)	13·0 (11·5–14·8)	60·5 (58·6–62·2)	32·5 (30·7–34·2)
Canada	25·5 (22·4–28·7)	10·0 (8·4–11·6)	64·5 (62·0–67·0)	21·9 (20·0–23·9)	22·0 (19·1–25·5)	8·8 (7·2–10·7)	48·5 (45·9–51·1)	20·5 (18·7–22·5)
USA	28·8 (26·4–31·4)	12·4 (10·8–14·0)	70·9 (69·2–72·5)	31·7 (30·0–33·4)	29·7 (27·2–32·5)	13·4 (11·7–15·3)	61·9 (59·8–63·8)	33·9 (31·8–35·7)
North Africa and Middle East	22·2 (21·0–23·3)	8·4 (7·9–8·9)	58·5 (57·8–59·2)	20·3 (19·9–20·8)	27·9 (26·6–29·2)	10·2 (9·5–10·8)	65·5 (64·7–66·2)	33·9 (33·2–34·7)
Algeria	21·7 (18·5–25·2)	7·7 (6·2–9·4)	42·0 (39·0–44·8)	11·1 (9·8–12·3)	30·0 (25·5–34·5)	15·3 (12·5–18·6)	57·8 (55·1–60·9)	24·9 (22·6–27·4)
Bahrain	22·4 (19·2–26·0)	9·3 (7·3–11·4)	67·7 (65·3–70·2)	31·0 (28·4–33·7)	26·7 (22·5–30·8)	10·7 (8·5–13·4)	75·2 (72·8–77·5)	42·9 (40·0–45·9)
Egypt	31·5 (27·5–35·7)	12·7 (10·7–15·2)	71·2 (68·9–73·7)	26·4 (25·0–27·8)	39·5 (34·7–44·3)	14·4 (11·9–17·6)	79·4 (77·6–81·3)	48·4 (46·1–50·9)
Iran	21·6 (18·6–25·4)	5·9 (4·8–7·2)	49·4 (47·2–51·6)	13·6 (12·5–14·8)	26·2 (22·3–30·4)	7·2 (5·7–8·9)	63·3 (61·0–65·4)	29·3 (27·2–31·6)
Iraq	19·5 (16·5–22·8)	8·2 (6·8–9·8)	62·4 (59·7–65·3)	25·7 (23·3–28·1)	25·0 (21·3–28·9)	8·2 (6·6–10·0)	68·1 (65·1–70·9)	37·5 (34·4–40·6)
Jordan	24·1 (20·6–28·0)	8·0 (6·4–9·9)	71·6 (69·3–74·1)	27·5 (25·3–29·7)	25·4 (21·8–29·3)	8·0 (6·2–10·0)	75·6 (74·0–77·3)	45·6 (43·4–47·9)
Kuwait	24·6 (21·1–28·5)	16·7 (13·9–20·1)	74·5 (72·4–76·6)	43·4 (40·9–46·1)	45·5 (40·1–50·9)	23·3 (19·5–27·8)	84·3 (82·6–86·1)	58·6 (55·7–61·4)
Lebanon	33·1 (28·9–37·9)	15·9 (13·0–19·1)	71·1 (68·9–73·4)	26·3 (24·2–28·4)	29·8 (25·6–34·0)	12·5 (10·2–15·4)	62·3 (59·9–64·8)	29·3 (27·0–31·7)
Libya	32·5 (28·5–36·9)	14·5 (12·0–17·0)	70·6 (68·1–73·1)	30·2 (27·6–32·9)	41·7 (36·3–46·8)	22·1 (18·1–26·4)	77·0 (74·6–79·3)	57·2 (54·0–60·4)
Morocco	22·5 (19·3–26·1)	7·9 (6·4–9·6)	54·7 (51·7–57·5)	18·1 (16·3–20·0)	25·9 (22·1–30·2)	9·1 (7·3–11·3)	52·8 (50·0–55·5)	20·9 (18·8–23·1)
Oman	24·5 (20·5–28·5)	8·4 (6·7–10·2)	53·7 (50·9–56·7)	20·6 (18·5–22·7)	42·3 (37·4–47·5)	15·4 (12·4–18·5)	73·4 (71·0–75·7)	36·9 (33·9–40·1)
Palestine	27·9 (23·8–31·9)	11·9 (9·8–14·3)	70·0 (67·4–72·4)	29·8 (28·0–31·5)	30·6 (26·4–35·5)	12·5 (10·1–15·2)	77·0 (74·8–79·2)	42·4 (40·5–44·4)
Qatar	33·5 (29·3–38·0)	18·8 (15·8–21·9)	75·7 (73·8–77·4)	44·0 (41·8–46·4)	22·1 (18·6–25·7)	15·5 (12·6–18·6)	78·5 (77·0–80·1)	54·7 (52·1–57·0)
Saudi Arabia	23·5 (20·2–26·8)	9·4 (7·8–11·2)	69·0 (67·1–70·7)	30·0 (28·4–31·8)	37·4 (32·8–42·5)	14·8 (12·2–17·7)	74·2 (72·3–76·0)	44·4 (42·4–46·5)
Sudan	11·2 (9·2–13·4)	5·7 (4·6–6·9)	35·8 (33·2–38·4)	12·7 (11·3–14·2)	14·4 (12·0–17·6)	5·8 (4·5–7·1)	39·9 (37·3–42·7)	18·3 (16·4–20·4)
Syria	32·9 (28·6–37·5)	13·9 (11·5–16·5)	72·0 (69·5–74·2)	24·2 (21·8–26·6)	33·3 (28·8–38·3)	15·4 (12·5–18·6)	72·7 (69·9–75·1)	39·9 (36·8–43·0)
Tunisia	17·7 (15·0–20·8)	4·2 (3·4–5·2)	51·7 (48·8–54·4)	15·3 (13·7–16·9)	23·4 (19·6–27·5)	4·2 (3·3–5·2)	57·5 (54·4–60·3)	12·8 (11·3–14·3)
Turkey	20·4 (17·5–23·6)	7·1 (5·7–8·7)	63·8 (62·1–65·5)	20·1 (18·7–21·3)	19·8 (16·6–23·0)	5·7 (4·5–7·0)	65·8 (64·2–67·5)	34·1 (32·4–35·8)
United Arab Emirates	30·8 (26·5–35·1)	12·2 (9·8–14·7)	66·1 (63·6–68·8)	27·1 (24·5–30·0)	31·6 (27·1–36·2)	12·6 (10·0–15·7)	60·6 (57·4–63·4)	33·2 (30·2–36·3)
Yemen	8·4 (6·9–10·0)	1·7 (1·4–2·1)	29·0 (26·8–31·2)	4·1 (3·7–4·7)	26·9 (22·9–31·4)	8·3 (6·5–10·3)	57·9 (55·1–60·8)	24·7 (22·2–27·2)
Oceania	17·8 (15·6–20·0)	4·3 (3·8–4·8)	43·7 (41·7–45·7)	11·4 (10·8–12·1)	22·9 (20·5–25·6)	6·4 (5·7–7·2)	51·5 (49·2–53·8)	20·0 (19·1–21·2)
Federated States of Micronesia	29·7 (25·7–33·9)	14·5 (11·9–17·5)	65·7 (63·1–68·3)	31·3 (28·9–33·9)	61·4 (56·2–66·4)	32·4 (27·6–37·7)	84·2 (82·3–85·8)	57·9 (54·9–61·3)
Fiji	12·8 (10·6–15·3)	3·3 (2·7–4·1)	41·9 (39·0–44·8)	14·8 (13·3–16·5)	24·9 (20·6–29·3)	6·9 (5·6–8·7)	60·4 (57·4–63·4)	35·4 (32·6–38·8)
Kiribati	47·7 (42·3–52·9)	22·9 (19·1–26·9)	76·5 (74·1–78·6)	39·3 (36·3–42·3)	66·1 (60·9–70·9)	36·0 (30·7–41·4)	81·8 (79·9–83·6)	55·5 (52·4–58·6)
Marshall Islands	29·2 (25·0–33·3)	7·6 (6·0–9·4)	72·7 (70·5–75·1)	31·9 (29·4–34·4)	36·1 (31·1–40·9)	11·4 (9·1–13·9)	80·8 (78·8–82·6)	49·1 (45·9–52·0)
Papua New Guinea	16·0 (13·2–18·9)	2·9 (2·3–3·6)	39·6 (37·0–42·2)	7·0 (6·3–7·9)	18·3 (15·3–21·6)	3·9 (3·1–4·9)	45·8 (42·6–48·8)	12·4 (11·1–13·8)
Samoa	42·2 (37·4–47·2)	23·7 (20·1–27·5)	83·0 (81·1–85·0)	45·9 (42·9–49·1)	50·0 (45·1–55·0)	29·6 (24·9–34·5)	85·0 (83·0–86·9)	69·1 (66·2–72·0)
Solomon Islands	28·3 (24·5–32·5)	9·6 (7·9–11·7)	60·2 (57·5–62·8)	24·7 (22·4–27·0)	49·2 (43·9–54·3)	18·0 (14·7–21·9)	69·4 (66·9–71·9)	38·4 (35·2–41·6)
Tonga	34·5 (30·2–39·3)	8·3 (6·6–10·2)	83·5 (81·8–85·2)	52·4 (49·7–55·2)	52·6 (47·1–58·2)	14·0 (11·3–16·9)	88·3 (86·7–89·7)	67·2 (64·5–69·9)
Vanuatu	14·5 (12·1–17·2)	5·2 (4·3–6·4)	46·4 (44·4–48·6)	13·4 (12·3–14·5)	23·2 (19·4–27·1)	5·6 (4·4–7·0)	54·8 (52·7–57·0)	22·0 (20·4–23·6)
South Asia	5·7 (5·0–6·5)	2·5 (2·2–2·9)	20·2 (18·8–21·5)	4·8 (4·5–5·2)	6·2 (5·4–7·1)	2·6 (2·2–3·0)	22·5 (21·1–23·9)	5·2 (4·8–5·7)
Afghanistan	18·5 (15·6–21·6)	6·8 (5·4–8·3)	49·2 (46·5–52·0)	14·8 (13·2–16·6)	19·5 (16·4–22·8)	4·4 (3·5–5·5)	42·6 (40·5–44·8)	13·8 (12·5–15·3)
Bangladesh	4·7 (3·8–5·8)	1·5 (1·2–1·8)	15·2 (13·8–16·5)	3·4 (3·1–3·8)	4·3 (3·6–5·3)	1·5 (1·1–1·9)	18·7 (17·3–20·3)	3·8 (3·4–4·2)
Bhutan	10·5 (8·8–12·3)	5·5 (4·5–6·8)	33·0 (30·5–35·6)	11·9 (10·6–13·4)	14·4 (11·9–17·0)	6·1 (4·9–7·6)	38·2 (35·3–41·2)	17·5 (15·7–19·5)
India	5·3 (4·3–6·4)	2·3 (1·8–2·8)	19·5 (17·8–21·2)	3·7 (3·3–4·1)	5·2 (4·2–6·4)	2·5 (1·9–3·1)	20·7 (18·9–22·5)	4·2 (3·8–4·8)
Nepal	4·6 (3·8–5·6)	1·7 (1·4–2·2)	13·1 (11·8–14·6)	2·2 (1·9–2·5)	4·0 (3·2–4·8)	1·8 (1·4–2·2)	13·0 (11·8–14·2)	2·7 (2·4–3·1)
Pakistan	6·2 (5·2–7·3)	4·1 (3·3–5·1)	27·9 (25·8–30·1)	14·4 (12·9–16·0)	10·4 (8·7–12·3)	3·8 (3·1–4·6)	38·4 (36·4–40·6)	14·3 (13·0–15·7)
Southeast Asia	6·8 (6·3–7·5)	4·6 (4·0–5·3)	22·1 (21·2–23·0)	4·8 (4·6–5·1)	9·0 (8·1–9·9)	4·3 (3·7–5·0)	28·3 (27·2–29·3)	7·6 (7·2–8·0)
Cambodia	3·8 (3·1–4·5)	1·7 (1·4–2·1)	11·9 (11·1–12·7)	1·3 (1·1–1·4)	3·8 (3·1–4·7)	1·7 (1·3–2·1)	18·3 (17·0–19·7)	2·9 (2·6–3·2)
Indonesia	6·0 (5·0–7·3)	6·0 (5·3–8·2)	21·4 (19·5–23·3)	5·4 (4·9–6·1)	10·0 (8·3–12·1)	6·0 (4·8–7·6)	30·6 (28·4–33·1)	8·3 (7·4–9·4)
Laos	4·1 (3·4–4·9)	1·8 (1·4–2·2)	22·1 (20·3–23·8)	5·4 (4·7–6·1)	5·8 (4·7–7·1)	1·7 (1·4–2·2)	27·0 (25·0–29·1)	5·9 (5·2–6·7)
Malaysia	22·5 (19·1–26·1)	8·8 (7·1–10·7)	43·8 (41·1–46·5)	11·4 (10·2–12·8)	19·1 (16·1–22·6)	7·2 (5·8–9·0)	48·6 (45·6–51·5)	16·7 (15·0–18·6)

(Table continues on next page)

	Boys <20 years		Men ≥20 years		Girls <20 years		Women ≥20 years	
	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese
(Continued from previous page)								
Maldives	7·9 (6·5–9·5)	3·8 (3·1–4·7)	26·8 (24·6–28·9)	8·1 (7·2–9·1)	18·0 (15·0–21·3)	4·2 (3·3–5·1)	54·0 (51·7–56·3)	17·0 (15·3–18·8)
Myanmar	4·6 (3·7–5·5)	1·9 (1·5–2·4)	13·8 (12·7–15·1)	4·5 (4·0–5·0)	7·4 (6·1–8·9)	2·8 (2·2–3·5)	22·1 (20·6–23·8)	8·4 (7·6–9·2)
Philippines	5·5 (4·5–6·6)	2·6 (2·1–3·2)	22·9 (21·0–24·8)	4·1 (3·6–4·7)	5·4 (4·4–6·6)	2·1 (1·6–2·7)	25·9 (23·8–28·2)	6·2 (5·5–7·0)
Sri Lanka	5·0 (4·1–6·0)	1·9 (1·5–2·4)	19·3 (17·5–21·1)	3·3 (2·9–3·8)	8·9 (7·4–10·8)	2·2 (1·8–2·7)	32·4 (29·9–35·1)	7·0 (6·2–7·8)
Thailand	13·3 (11·4–15·9)	4·9 (4·0–6·0)	32·1 (30·1–34·2)	6·5 (5·8–7·2)	15·4 (12·7–18·2)	5·6 (4·3–6·9)	39·7 (37·1–42·4)	11·2 (10·0–12·4)
Timor-Leste	7·0 (5·8–8·3)	3·8 (3·1–4·6)	3·2 (2·9–3·6)	3·2 (7·2–9·1)	5·7 (4·6–7·0)	3·8 (3·1–4·8)	6·6 (5·9–7·2)	1·5 (1·3–1·7)
Vietnam	5·2 (4·3–6·3)	2·5 (2·0–3·1)	13·6 (12·5–15·0)	1·5 (1·3–1·7)	6·1 (5·0–7·4)	2·5 (2·0–3·2)	12·3 (11·2–13·4)	1·7 (1·4–1·9)
Southern Latin America	31·3 (28·0–34·4)	10·1 (8·6–11·7)	60·0 (58·0–61·9)	21·6 (20·0–23·1)	26·4 (23·7–29·6)	8·8 (7·6–10·2)	53·0 (50·9–55·2)	23·6 (22·1–25·3)
Argentina	29·1 (24·9–33·1)	9·4 (7·5–11·6)	56·4 (53·5–59·2)	21·2 (19·1–23·3)	23·6 (19·8–27·8)	6·8 (5·3–8·5)	48·1 (45·0–51·1)	20·4 (18·3–22·6)
Chile	37·0 (32·6–41·6)	11·9 (9·6–14·3)	67·9 (65·5–70·3)	22·0 (20·1–24·1)	31·6 (27·3–36·3)	12·4 (10·0–15·1)	63·9 (61·3–66·4)	30·3 (27·9–32·9)
Uruguay	31·2 (26·7–35·8)	9·7 (7·8–11·8)	59·6 (56·7–62·4)	23·3 (21·1–25·6)	37·7 (32·8–43·1)	18·1 (14·9–21·9)	53·1 (49·9–56·1)	25·4 (23·0–27·9)
Southern sub-Saharan Africa	14·9 (13·7–16·1)	5·6 (4·9–6·4)	34·2 (33·0–35·3)	11·7 (10·9–12·4)	23·1 (21·6–24·6)	7·4 (6·7–8·1)	63·7 (62·7–64·7)	37·0 (35·9–38·1)
Botswana	6·6 (5·5–7·9)	1·8 (1·4–2·2)	21·5 (19·7–23·5)	5·8 (5·2–6·4)	22·4 (18·8–26·4)	7·2 (5·8–8·9)	52·6 (50·0–55·1)	24·1 (22·0–26·3)
Lesotho	9·1 (7·5–11·0)	4·0 (3·2–4·9)	21·6 (19·9–23·3)	6·9 (6·2–7·6)	21·9 (18·8–25·8)	5·7 (4·6–7·0)	60·2 (57·9–62·5)	31·3 (29·7–32·8)
Namibia	6·0 (4·9–7·2)	2·6 (2·1–3·2)	21·2 (19·2–23·1)	6·0 (5·3–6·7)	8·8 (7·3–10·7)	2·3 (1·8–3·0)	42·4 (39·8–45·1)	19·8 (17·9–21·9)
South Africa	18·8 (17·0–20·6)	7·0 (6·0–8·2)	38·8 (37·4–40·3)	13·5 (12·6–14·5)	26·3 (24·3–28·5)	9·6 (8·5–10·7)	69·3 (68·1–70·4)	42·0 (40·6–43·3)
Swaziland	11·6 (9·9–13·9)	3·3 (2·7–4·1)	33·5 (31·1–35·9)	10·9 (9·8–12·2)	26·2 (22·6–30·4)	5·8 (4·7–7·2)	68·6 (66·2–71·0)	33·5 (31·0–35·9)
Zimbabwe	7·5 (6·2–9·0)	3·0 (2·4–3·7)	16·5 (15·2–17·8)	4·2 (3·7–4·7)	16·1 (13·6–18·9)	2·6 (2·0–3·2)	41·9 (39·7–44·1)	17·4 (15·8–19·2)
Tropical Latin America	22·0 (18·9–25·6)	6·8 (5·4–8·3)	52·7 (50·0–55·3)	11·9 (10·8–13·3)	24·3 (20·7–28·0)	7·5 (6·0–9·3)	58·8 (56·0–61·6)	20·9 (18·9–22·9)
Brazil	22·1 (18·8–25·8)	6·8 (5·4–8·4)	52·5 (49·6–55·2)	11·7 (10·4–13·0)	24·3 (20·6–28·1)	7·6 (6·1–9·4)	58·4 (55·6–61·3)	20·6 (18·6–22·8)
Paraguay	21·3 (18·1–24·5)	6·8 (5·4–8·3)	62·9 (60·0–65·7)	21·2 (19·2–23·3)	24·3 (20·6–28·5)	6·3 (4·9–7·9)	73·0 (70·6–75·3)	30·5 (28·2–33·2)
Western Europe	24·2 (23·1–25·2)	7·2 (6·7–7·6)	61·3 (60·5–62·2)	20·5 (19·9–21·1)	22·0 (21·0–23·0)	6·4 (6·0–6·8)	47·6 (46·8–48·4)	21·0 (20·4–21·7)
Andorra	15·9 (13·3–19·0)	9·3 (7·5–11·4)	34·4 (32·0–37·1)	10·6 (9·6–11·9)	18·4 (14·9–21·8)	9·5 (7·3–12·0)	36·1 (33·5–38·7)	7·2 (6·3–8·1)
Austria	18·9 (15·9–22·1)	10·3 (8·4–12·5)	59·7 (57·0–62·3)	18·4 (16·6–20·3)	16·3 (13·5–19·4)	7·8 (6·3–9·7)	42·8 (40·1–45·4)	17·4 (15·6–19·4)
Belgium	20·5 (17·7–23·6)	4·6 (3·7–5·5)	58·0 (55·2–60·8)	20·1 (18·0–22·1)	18·8 (16·0–21·8)	4·2 (3·3–5·1)	47·1 (44·3–49·9)	21·7 (19·5–24·1)
Cyprus	25·7 (21·9–29·6)	8·0 (6·5–9·9)	67·8 (65·0–70·6)	24·0 (21·8–26·5)	22·5 (18·9–26·2)	7·4 (5·9–9·2)	52·1 (49·1–55·1)	24·1 (21·7–26·6)
Denmark	19·7 (16·8–23·1)	8·7 (7·1–10·7)	59·2 (56·5–61·9)	19·6 (17·7–21·9)	19·4 (15·8–23·2)	5·9 (4·7–7·5)	44·7 (41·7–47·7)	19·9 (17·7–22·0)
Finland	26·0 (22·3–29·8)	9·2 (7·5–11·2)	62·2 (59·5–64·9)	20·9 (18·9–23·2)	21·1 (17·7–25·0)	6·6 (5·2–8·1)	50·4 (47·5–53·2)	22·3 (20·3–24·6)
France	19·9 (16·8–23·3)	5·8 (4·7–7·0)	55·9 (53·2–58·7)	19·3 (17·4–21·4)	16·0 (13·3–18·7)	4·7 (3·8–5·9)	42·8 (40·0–45·7)	19·7 (17·7–21·7)
Germany	20·5 (17·4–23·8)	5·5 (4·5–6·7)	64·3 (61·9–66·8)	21·9 (20·2–23·8)	19·4 (16·3–22·5)	5·3 (4·2–6·5)	49·0 (46·5–51·4)	22·5 (20·5–24·7)
Greece	33·7 (29·6–37·7)	10·5 (8·7–12·3)	71·4 (68·9–73·7)	19·1 (17·4–21·1)	29·1 (25·3–33·1)	7·9 (6·5–9·6)	51·1 (48·2–54·0)	19·4 (17·6–21·4)
Iceland	26·4 (22·7–30·2)	9·6 (7·9–11·6)	73·6 (71·3–75·8)	26·9 (24·4–29·7)	23·0 (19·7–26·6)	7·6 (6·1–9·4)	60·9 (58·0–63·8)	28·8 (26·0–31·5)
Ireland	26·6 (23·2–30·8)	6·9 (5·7–8·3)	66·4 (63·9–68·8)	22·9 (20·8–25·0)	26·5 (22·9–30·5)	7·2 (5·8–8·8)	50·9 (48·3–53·6)	22·5 (20·4–24·7)
Israel	31·0 (27·0–35·6)	13·9 (11·4–16·7)	60·4 (57·6–63·2)	21·4 (19·4–23·5)	26·6 (22·6–31·1)	11·3 (9·1–13·8)	52·7 (49·6–55·6)	24·8 (22·5–27·0)
Italy	29·9 (26·4–33·9)	8·4 (7·0–10·0)	58·3 (55·5–61·1)	18·6 (16·9–20·4)	24·3 (21·0–27·9)	6·2 (5·0–7·6)	41·4 (38·9–44·2)	17·7 (15·9–19·5)
Luxembourg	29·3 (25·3–33·4)	11·1 (9·2–13·5)	58·0 (55·1–60·8)	23·7 (21·3–26·3)	17·7 (14·5–21·1)	13·5 (10·9–16·4)	44·4 (41·6–47·2)	26·0 (23·6–28·7)
Malta	33·6 (29·3–38·0)	12·5 (10·3–14·9)	74·0 (71·6–76·4)	29·0 (26·4–31·6)	25·3 (21·6–29·3)	7·9 (6·3–9·6)	57·8 (55·0–60·6)	27·5 (24·9–30·1)
Netherlands	18·3 (15·7–21·3)	4·1 (3·4–5·0)	53·2 (51·1–55·4)	12·7 (11·6–14·0)	16·1 (13·4–18·9)	3·8 (3·0–4·7)	44·9 (42·3–47·5)	15·9 (14·4–17·4)
Norway	20·1 (17·2–23·0)	5·1 (4·1–6·3)	58·4 (55·7–61·0)	19·1 (17·1–21·4)	16·0 (13·4–18·7)	4·0 (3·1–5·0)	47·3 (44·4–50·2)	18·0 (16·1–20·0)
Portugal	28·7 (24·9–32·8)	8·9 (7·4–10·9)	63·8 (61·2–66·4)	20·9 (19·0–23·1)	27·1 (23·4–31·4)	10·6 (8·5–12·9)	54·6 (51·7–57·6)	23·4 (21·0–25·9)
Spain	27·6 (23·9–31·2)	8·4 (6·7–10·2)	62·3 (60·0–64·9)	20·2 (18·5–22·1)	23·8 (20·2–27·4)	7·6 (6·0–9·3)	46·5 (43·7–48·9)	20·9 (19·0–23·1)
Sweden	20·4 (17·5–23·4)	4·3 (3·6–5·3)	58·2 (55·6–61·0)	18·9 (17·0–21·0)	19·3 (16·5–22·5)	4·0 (3·2–5·0)	45·8 (43·2–48·5)	19·8 (17·7–21·9)
Switzerland	20·7 (17·4–24·4)	6·6 (5·4–7·9)	56·6 (53·7–59·4)	18·4 (16·5–20·1)	16·2 (13·4–19·4)	5·5 (4·3–6·8)	39·9 (37·0–42·9)	17·0 (15·3–18·8)
UK	26·1 (23·8–28·5)	7·4 (6·5–8·5)	66·6 (65·3–68·0)	24·5 (23·4–25·7)	29·2 (26·8–31·9)	8·1 (7·0–9·3)	57·2 (55·7–58·6)	25·4 (24·2–26·6)
Western sub-Saharan Africa	11·0 (9·9–12·1)	4·3 (3·8–5·0)	32·6 (31·1–34·0)	9·4 (8·8–10·1)	12·3 (11·3–13·5)	3·2 (2·8–3·6)	34·5 (33·3–35·6)	11·9 (11·3–12·5)
Benin	6·9 (5·6–8·4)	4·7 (3·8–5·8)	9·4 (8·4–10·4)	9·4 (9·0–11·4)	13·1 (10·7–15·7)	3·2 (2·5–4·1)	29·9 (27·6–32·4)	10·0 (8·9–11·2)
Burkina Faso	9·1 (7·6–10·9)	3·7 (2·9–4·5)	31·3 (28·8–33·8)	8·2 (7·3–9·2)	8·7 (7·3–10·6)	3·0 (2·4–3·8)	15·4 (14·1–16·9)	4·6 (4·1–5·2)
Cameroon	16·4 (14·1–19·0)	4·8 (3·9–5·8)	40·4 (37·8–43·1)	8·5 (7·5–9·5)	19·8 (16·8–23·1)	3·6 (2·9–4·5)	50·7 (48·4–53·0)	20·1 (18·2–22·0)
Cape Verde	11·5 (9·6–13·7)	3·3 (2·6–4·0)	31·8 (29·4–34·3)	7·0 (6·2–7·8)	18·3 (15·0–21·7)	5·2 (4·1–6·5)	44·0 (41·3–47·0)	15·4 (13·9–17·1)

(Table continues on next page)

	Boys <20 years		Men ≥20 years		Girls <20 years		Women ≥20 years	
	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese	Overweight and obese	Obese
(Continued from previous page)								
Chad	8·3 (6·9–9·9)	2·9 (2·3–3·5)	28·2 (25·8–30·5)	6·4 (5·6–7·2)	8·3 (6·7–10·1)	2·6 (2·0–3·3)	12·4 (11·1–13·8)	2·8 (2·4–3·2)
Côte d'Ivoire	8·8 (7·3–10·4)	2·7 (2·2–3·3)	26·6 (24·3–29·0)	6·2 (5·4–7·0)	13·3 (11·1–15·8)	2·8 (2·2–3·4)	35·4 (33·1–37·8)	11·4 (10·1–12·7)
Ghana	5·3 (4·4–6·4)	2·6 (2·1–3·2)	27·9 (25·7–30·1)	8·1 (7·2–9·2)	11·5 (9·6–13·8)	2·3 (1·9–2·9)	38·4 (36·0–41·1)	14·0 (12·6–15·7)
Guinea	8·2 (6·8–9·9)	2·8 (2·2–3·5)	15·4 (13·8–16·9)	2·5 (2·2–2·7)	11·7 (9·6–14·3)	3·5 (2·7–4·3)	29·1 (26·9–31·6)	9·8 (8·9–10·9)
Guinea-Bissau	15·8 (13·3–18·5)	8·1 (6·6–9·8)	44·0 (41·1–46·9)	16·8 (15·1–18·6)	20·4 (17·2–23·8)	8·3 (6·7–10·3)	47·8 (44·8–50·8)	24·2 (21·8–26·7)
Liberia	13·4 (11·1–16·0)	4·8 (3·9–5·9)	40·6 (37·9–43·4)	14·9 (13·7–16·1)	13·7 (11·3–16·5)	3·0 (2·4–3·8)	49·4 (46·8–52·1)	22·1 (20·0–24·0)
Mali	10·4 (8·6–12·3)	3·6 (2·9–4·5)	29·1 (26·8–31·6)	7·4 (6·6–8·4)	12·8 (10·7–15·4)	4·1 (3·2–5·1)	46·8 (44·4–49·2)	18·2 (16·5–20·0)
Mauritania	5·7 (4·7–6·8)	2·8 (2·3–3·5)	21·4 (19·5–23·4)	6·4 (5·7–7·3)	14·2 (11·5–17·1)	3·8 (3·0–4·7)	55·7 (52·9–58·8)	27·6 (25·3–30·4)
Niger	11·8 (9·8–14·2)	2·9 (2·3–3·5)	23·7 (21·5–25·8)	3·4 (3·0–3·9)	7·9 (6·4–9·5)	2·5 (2·0–3·1)	27·8 (25·8–29·7)	5·9 (5·3–6·5)
Nigeria	12·8 (10·7–15·1)	5·4 (4·4–6·7)	39·5 (36·7–42·3)	11·8 (10·5–13·3)	12·3 (10·1–14·7)	3·2 (2·4–4·2)	33·6 (31·3–35·9)	10·4 (9·3–11·6)
São Tomé and Príncipe	12·3 (10·3–14·4)	4·4 (3·6–5·5)	30·6 (28·4–33·0)	7·1 (6·4–7·9)	18·9 (16·0–22·0)	5·8 (4·5–7·3)	45·7 (43·1–48·3)	17·6 (16·0–19·2)
Senegal	3·8 (3·1–4·6)	1·6 (1·3–1·9)	16·8 (15·5–18·2)	10·3 (9·4–11·3)	8·3 (6·8–10·0)	2·1 (1·6–2·6)	37·4 (35·3–39·6)	21·1 (19·7–22·6)
Sierra Leone	13·8 (11·8–15·8)	6·4 (5·3–7·7)	16·4 (15·1–17·8)	5·2 (4·7–5·9)	23·3 (19·7–26·7)	7·2 (5·9–8·7)	32·9 (30·7–35·2)	11·9 (10·8–13·1)
The Gambia	10·1 (8·3–12·1)	3·8 (3·0–4·6)	34·3 (31·7–36·9)	8·4 (7·6–9·3)	14·8 (12·2–17·9)	6·1 (4·9–7·6)	48·7 (45·9–51·6)	18·1 (16·8–19·5)
Togo	5·7 (4·7–6·7)	2·2 (1·8–2·8)	18·8 (17·3–20·3)	3·4 (3·0–3·8)	8·8 (7·3–10·6)	1·8 (1·4–2·2)	32·2 (30·1–34·5)	11·3 (10·0–12·5)

Table: **Age-standardised regional and national estimates of the prevalence of overweight and obesity combined and obesity alone for girls, boys, men, and women for 2013, for 188 countries and 21 GBD regions**

developed and developing countries, and in 2013, the prevalence of obesity was higher in women in developed and developing countries than in men (figure 1). The rate of increase of overweight and obesity was greatest between 1992 and 2002, but has slowed down in the past decade, especially in developed countries (figure 1).

Figure 2 shows age-standardised prevalence of overweight and obesity in children and adolescents for developing and developed countries. Since 1980, the prevalence of overweight and obesity has increased remarkably in developed countries; 23·8% (22·9–24·7) of boys and 22·6% (21·7–23·6) of girls were overweight or obese in 2013, compared with 16·9% (16·1–17·7) of boys and 16·2% (15·5–17·1) of girls in 1980. The prevalence of overweight and obesity is also rising in children and adolescents in developing countries, increasing from 8·1% (7·7–8·6) in 1980, to 12·9% (12·3–13·5) in 2013 for boys and 8·4% (8·1–8·8) to 13·4% (13·0–13·9) in girls. In both developed and developing countries, sex differences in the levels and trends of overweight and obesity are small (figure 2).

Figure 3 shows the age pattern of overweight and obesity in 2013. At all ages, prevalence was higher in developed than in developing countries (figure 3). Age patterns differed in men and women and between developing and developed countries. In developed countries, men older than 10 years showed higher rates of overweight and obesity than did women; in developing countries, women have higher rates than men older than 25 years (figure 3). In developed countries, overweight and obesity peaked in men at about 55 years of age, with two of three men overweight and one in four obese; for women, the peak age was closer to 60 years with 31·3% (95% UI 28·9–33·8) obese and 64·5% (62·5–66·5) overweight or obese (figure 3). In developing countries, the age pattern of overweight and obesity was similar to that in developed countries, although prevalence was much lower. The highest level of obesity was at about age 55 years for women with a rate of 14·4% (13·5–15·5), and about 45 years for men with a rate of 8·1% (7·5–8·8; figure 3).

Trends in prevalence of adult age-standardised obesity over successive cohorts in developed and developing countries showed that successive cohorts seemed to be gaining weight at all ages, including childhood and adolescence, with most rapid gains between the ages of 20 and 40 years (figure 4). In developed countries, peak prevalence of obesity is moving to younger ages (figure 4). Of note, in women living in developed countries, the 1965 birth cohort seemed to have lower prevalence at the same age than did the 1960 birth cohort, and the 1970 birth cohort also crossed the 1965 cohort. However, in view of uncertainty about the estimates (appendix), this cohort crossover should not be overinterpreted. Prevalence in men and women decreases as cohorts get older, possibly because of selective mortality effects or higher rates of chronic disease at old age and associated weight loss.

The table and the appendix provide age-standardised regional and national estimates of the prevalence of overweight and obesity combined and obesity alone for

Figure 5: **Age-standardised prevalence of obesity, by age, sex, and year**
(A) Ages ≥20 years, men, 2013. (B) Ages ≥20 years, women, 2013. ATG=Antigua and Barbuda. VCT=Saint Vincent and the Grenadines. FSM=Federated States of Micronesia. LCA=Saint Lucia. TTO=Trinidad and Tobago. TLS=Timor-Leste.

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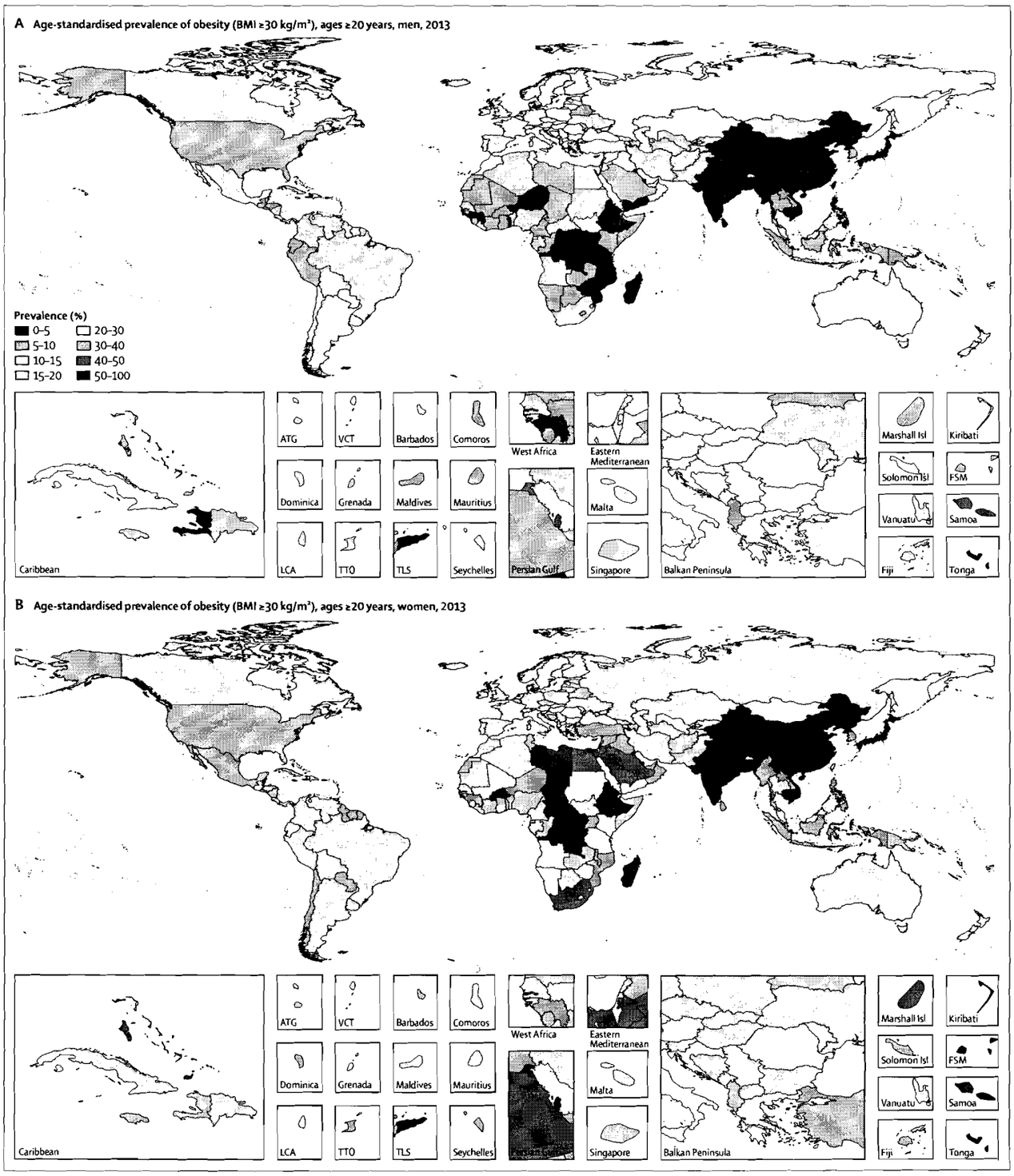
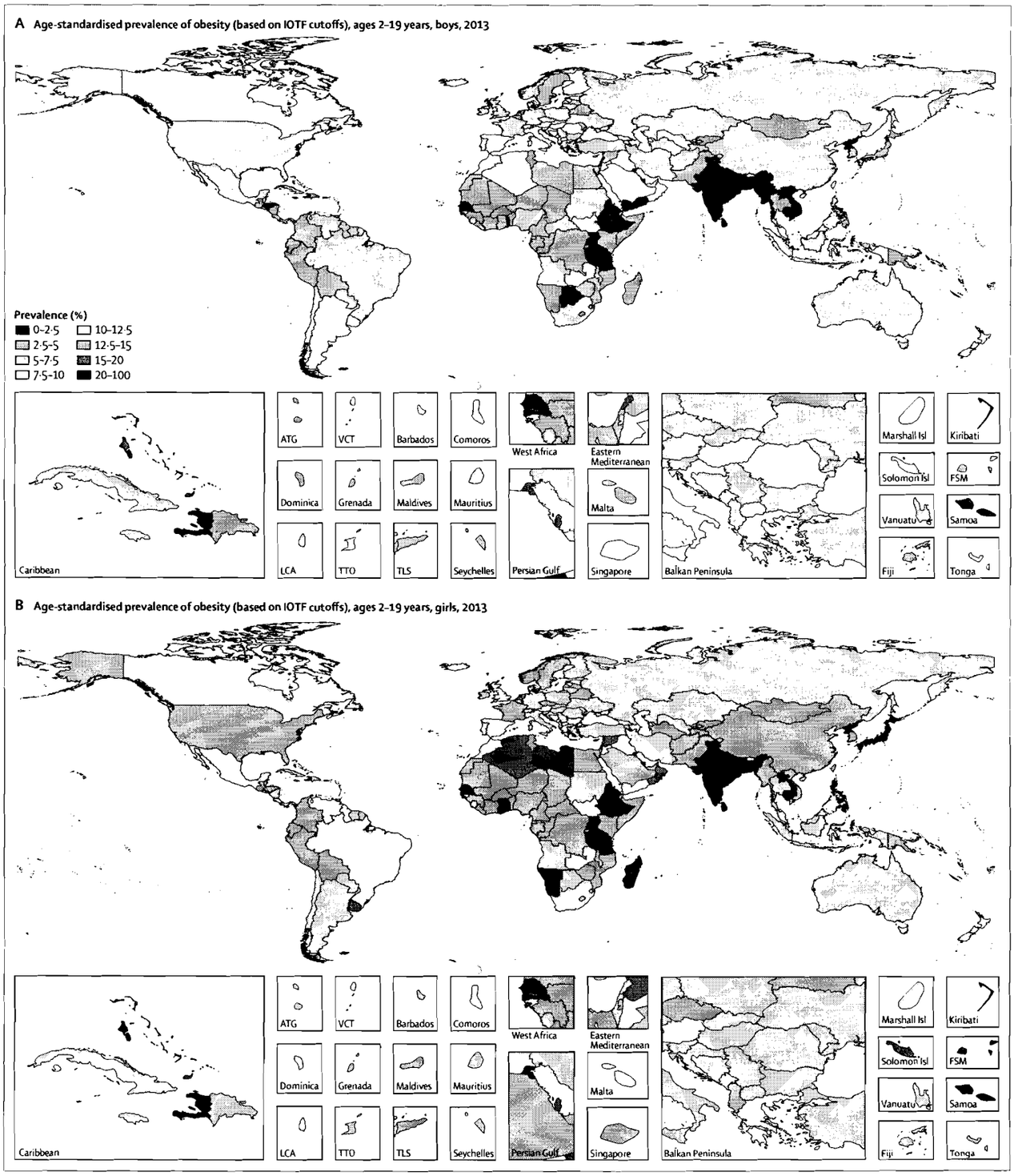

A Age-standardised prevalence of obesity (BMI ≥30 kg/m²), ages ≥20 years, men, 2013
Prevalence (%)
0–5
5–10
10–15
15–20
20–30
30–40
40–50
50–100
Caribbean
ATG
VCT
Barbados
Comoros
West Africa
Eastern Mediterranean
Dominica
Grenada
Maldives
Mauritius
Malta
LCA
TTO
TLS
Seychelles
Persian Gulf
Singapore
Balkan Peninsula
Marshall Isl
Kiribati
Solomon Isl
FSM
Vanuatu
Samoa
Fiji
Tonga
B Age-standardised prevalence of obesity (BMI ≥30 kg/m²), ages ≥20 years, women, 2013
Caribbean
ATG
VCT
Barbados
Comoros
West Africa
Eastern Mediterranean
Dominica
Grenada
Maldives
Mauritius
Malta
LCA
TTO
TLS
Seychelles
Singapore
Balkan Peninsula
Marshall Isl
Kiribati
Solomon Isl
FSM
Vanuatu
Samoa
Fiji
Tonga


A Age-standardised prevalence of obesity (based on IOTF cutoffs), ages 2-19 years, boys, 2013
Prevalence (%)
0-2·5
2·5-5
5-7·5
7·5-10
10-12·5
12·5-15
15-20
20-100
Caribbean
ATG
VCT
Barbados
Comoros
West Africa
Eastern Mediterranean
Dominica
Grenada
Maldives
Mauritius
Malta
LCA
TTO
TLS
Seychelles
Persian Gulf
Singapore
Balkan Peninsula
Marshall Isl
Kiribati
Solomon Isl
FSM
Vanuatu
Samoa
Fiji
Tonga
B Age-standardised prevalence of obesity (based on IOTF cutoffs), ages 2-19 years, girls, 2013
Caribbean
ATG
VCT
Barbados
Comoros
West Africa
Eastern Mediterranean
Dominica
Grenada
Maldives
Mauritius
Malta
LCA
TTO
TLS
Seychelles
Persian Gulf
Singapore
Balkan Peninsula
Marshall Isl
Kiribati
Solomon Isl
FSM
Vanuatu
Samoa
Fiji
Tonga

boys, girls, men, and women for 1980, 1990, 2000, and 2013, for 188 countries and 21 GBD regions. Figure 5 and Figure 6 show maps of prevalence of obesity in 2013, for boys, girls, men, and women. Age-standardised prevalence of obesity in children and adolescents ranged from more than 30% for girls in Kiribati and the Federated States of Micronesia to less than 2% in Bangladesh, Brunei, Burundi, Cambodia, Eritrea, Ethiopia, Laos, Nepal, North Korea, Tanzania, and Togo (figure 5). We noted distinct geographical patterns for child and adolescent obesity, with high rates in many countries in the Middle East and north Africa, especially for girls, and in several Pacific Island and Caribbean nations for both girls and boys (figure 5). Within western Europe, rates of obesity in boys varied from 13·9% (95% UI 11·9–16·7) in Israel to 4·1% (3·4–5·0) in the Netherlands (figure 5). For Latin America, we recorded the highest prevalence of obesity in Chile (11·9%, 9·6–14·3) and Mexico (10·5%, 8·8–12·4) in boys, and in Uruguay (18·1%, 14·9–21·9) and Costa Rica (12·4%, 10·0–15·1) in girls.

In adults, estimated prevalence of obesity exceeded 50% in men in Tonga and women in Kuwait, Kiribati, the Federated States of Micronesia, Libya, Qatar, Tonga, and Samoa (figure 5). In North America, the USA stood out for its high prevalence of obesity; in 2013, roughly a third of men (31·6% [30·0–33·4]) and women (33·9% [31·8–35·7]) were obese. 14 countries in Central America and Latin America had female age-standardised prevalence greater than 20% (figure 5). In sub-Saharan Africa, we recorded the highest prevalence of obesity in South African women (42·0% [40·6–43·3] in 2013). Although obesity prevalence increased over time (data not shown), China and India had low rates of obesity in 2013. In China, 3·8% (3·5–4·3) of men and 5·0% (4·5–5·5) of women were obese in 2013, compared with 3·7% (3·3–4·1) of men and 4·2% (3·8–4·8) of women in India.

More than 50% of the 671 million obese individuals in the world live in ten countries (listed in order of number of obese individuals): USA, China, India, Russia, Brazil, Mexico, Egypt, Germany, Pakistan, and Indonesia. The USA accounted for 13% of obese people worldwide in 2013, with China and India jointly accounting for 15%. Although age-standardised rates were lower in developing than in developed countries overall, 62% of the world's obese individuals live in developing countries (data not shown).

The correlation across countries between the level of obesity in 1980, and the change since then is 0·29 for women and 0·38 for men. This finding suggests that the long-term (three decades) increases in obesity have not been smaller for countries that already had high rates of obesity in 1980. During the 33 year period of this study, the largest increases in the rate of obesity were in Egypt, Saudi Arabia, Oman, Honduras, and Bahrain for women, and in New Zealand, Bahrain, Kuwait, Saudi Arabia, and the USA for men (data not shown). The USA was among the top 15 countries in terms of increases in obesity for both men and women (data not shown). Other high-income countries with large gains during this time period include Australia and the UK.

Figure 6: **Age-standardised prevalence of obesity, by age, sex, and year**
(A) Based on IOTF cutoffs, ages 2–19 years, boys, 2013. (B) Based on IOTF cutoffs, ages 2–19 years, girls, 2013. IOTF=International Obesity Task Force. ATG=Antigua and Barbuda. VCT=Saint Vincent and the Grenadines. FSM=Federated States of Micronesia. LCA=Saint Lucia. TTO=Trinidad and Tobago. TLS=Timor-Leste.

Discussion

Prevalence of obesity and overweight has risen substantially in the past three decades, with marked variations across countries in the levels and trends in overweight and obesity with distinct regional patterns. In developed countries, increases in obesity that began in the 1980s have attenuated in the past 8 years or so. Conversely, our data suggest that there are likely to be continued increases in the developing world, where almost two in three of the world's obese people live. Island nations in the Pacific and the Caribbean and countries in the Middle East and Central America have already reached especially high rates of overweight and obesity.

Attempts to explain the large increases in obesity in the past 33 years have focused on several potential contributors including increases in calorie intake, changes in the composition of diet, decreasing levels of physical activity, and changes in the gut microbiome.[43,46–56] The relative contribution of changes in energy intake versus energy expenditure has been vigorously debated.[52–55] Experimental evidence of the importance of the microbiome for metabolism of energy[57,58] has led to alternative theories on the role of the changing microbiome in the global obesity epidemic.[59,60] Our descriptive analysis does not attempt to measure the relative contribution of these, or other factors. However, our findings show that increases in the prevalence of overweight and obesity have been substantial, widespread, and have arisen over a short time. Theories of change need to encompass this temporal dimension and dispersion.

Our analysis has drawn attention to countries where most adult women and more than a third of adult men are obese. No countries had significant decreases in obesity in the past 33 years. This raises the question as to whether many or most countries are on a trajectory to reach the high rates of obesity seen in countries such as Tonga or Kuwait. Evidence of a slowdown in the rate of increase of overweight and obesity in the developed world, and suggestions that obesity in more recent birth cohorts is lower than in previous birth cohorts at the same age, provides some hope that the epidemic might have peaked in developed countries and that populations in other countries might not reach the very high rates of more than 40% reported in some developing countries.

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See Online for appendix

Wide variation in rates of increase in obesity and overweight between countries that started at the same initial level also suggests substantial scope to modulate weight gain in populations. However, data from our analysis do not suggest why some countries have had slower rates of increase than did others, only that smaller increases are possible.

The health effects of overweight and obesity have been extensively debated.[61-65] However, findings of large pooling studies used for the GBD 2013 show consistent risks as BMI reached more than 23 kg/m^2,[66-69] especially for cardiovascular disease, cancer, diabetes, osteoarthritis, and chronic kidney disease. Most deaths attributable to overweight and obesity are cardiovascular deaths.[9] Data from systematic reviews suggest that only 31% of the coronary heart disease risk and 8% of the stroke mortality risk associated with obesity is mediated through raised blood pressure and cholesterol collectively.[70] Therefore, drugs targeting blood pressure and cholesterol can be expected to attenuate some, but not most of, the cardiovascular risk attributable to overweight and obesity. Therefore, even with aggressive drug therapy, increased rates of overweight and obesity can be expected to have substantial health effects and increase prevalence of diabetes, osteoarthrisits, cancers, and major vascular disease.

Our study has important limitations. First, we included surveys that collected self-reported weights and heights. In our analysis, we recorded a systematic bias, but this bias is greater in some regions than in others (eg, high-income countries and the Middle East *vs* low-income countries). We corrected the self-reported data with associations reported in data from country-years with both self-reported and measured weights and heights. Findings of the sensitivity analysis showed that our overall global results were robust to the exclusion of these data (correlation coefficient 0·96; appendix). Second, we excluded subnational studies from some sites—eg, MONICA datapoints because they pertained to one city.[71] By examination of national surveys with individual records and information about location, we noted a marked variation between urban and rural areas and heterogeneity across urban sites (data not shown). We were unable to generalise the bias for selected cities to national figures. Moreover, reporting national-level rates of overweight and obesity obscures important subnational variations, especially in ethnic groups, low socioeconomic categories, and important subpopulations (eg, slum dwellers) in large cities. Third, data were very sparse in the earlier years, especially in the 1980s (appendix). The estimation of prevalence for the earlier time period in this study was based on extrapolation from the model, which is strongly affected by the kcal per person covariate, which we reported through food balance sheets from the Food and Agriculture Organization. To the extent that these balance sheets are inaccurate, our trends will be biased. Of note, we did not include time as a covariate in our model because this inappropriately imposes a similar time trend on all countries. Nevertheless, we tried to capture temporal associations in data with spatiotemporal smoothing. Fourth, our uncertainty intervals might have been underestimated because we did not include uncertainty from the selection of Gaussian process regression hyperparameters in our final results. However, data from our cross-validation analysis suggest that this underestimation is unlikely to be a major problem (appendix). Fifth, definitions of childhood obesity vary between the International Obesity Task Force and WHO. We applied a consistent definition of obesity and overweight across sources; therefore, we excluded several published studies from our analysis that were reported with non-standard definitions. When possible, we estimated overweight and obesity rates from individual-level records in household surveys. Sixth, although BMI is a convenient measure for adiposity, it does not adequately take into account variations in body structure across ethnic groups.[72] Moreover, the use of the universal cutoff could have underestimated the actual prevalence of overweight and obesity in certain countries.

Unlike other major global risks such as tobacco[42] and childhood malnutrition,[73,74] obesity is not decreasing worldwide. Obesity is already a major public health challenge in many middle-income countries, and tracking this important risk to health with increased precision and disaggregation in both developing and developed countries is a key global health priority. Options for population-level surveillance of the epidemic need to take into account more complex measurement strategies than needed for other major hazards, such as tobacco. In particular, countries will need to carefully weigh the choice between fielding physical examination surveys that are expensive but can provide robust measurements, and use of routine survey platforms to collect self-reported weights and heights. A combination of both approaches allows for periodic assessment of self-report bias, such as used in the USA, UK, and Japan, might provide a reasonable approach.

Strengthened surveillance is not only good public health practice, but should increase public, including government, awareness of the extent of the problem in countries.[75] Member States of WHO in 2013 introduced a target to stop the rise in obesity by 2025.[11] Although this resolution is commendable and the global public health community is taking the rise in obesity seriously, no countries have well documented downward trends in the past three decades. Moreover, our analysis suggests that this target is very ambitious and unlikely to be attained without concerted action and further research to assess the effect of population-wide interventions, and how to effectively translate that knowledge into national obesity control programmes.

To counter the impending health effects on populations, especially in low-income and middle-income countries, urgent global leadership is needed to help countries to more effectively intervene against major determinants

such as excessive caloric intake, physical inactivity, and active promotion of food consumption by industry, all of which exacerbate an already problematic obesogenic environment.

Contributors

MN, EG, ADL, and CJLM prepared the first draft. MN, EG, CJLM, TF, MR, BT, EM, and NG finalised the draft based on comments from other authors and reviewer feedback. EG, MN, ADL, and CJLM conceived of the study and provided overall guidance. TF, BT, MR, and NG performed the statistical analysis. All other authors provided data, developed models, reviewed results, provided guidance on the selection of key covariates, and reviewed the manuscript.

Declaration of interests

AG has received a lecture fee from Boehringer Ingelheim, outside the submitted work. GAM is required to include the following statement: The views expressed in this article are those of the authors and do not necessarily represent the views of the National Heart, Lung, and Blood Institute, National Institutes of Health, Department of Health and Human Services, or any other government entity. JAS has received research grants from Takeda and Savient and consultant fees from Savient, Takeda, Regeneron, and Allergan. He is a member of the executive of OMERACT, an organisation that develops outcome measures in rheumatology and receives arms-length funding from 36 companies; a member of the American College of Rheumatology's Guidelines subcommittee of the Quality of Care Committee; and a member of the Veterans Affairs Rheumatology Field Advisory Committee. YCW is assistant professor of health policy and management at the Columbia University, Mailman School of Public Health. She codirects the Obesity Prevention Initiative and is a member of The Obesity Society. She receives grant funding from the National Institute of Health, Robert Wood Johnson Foundation, and the JPB Foundation. KS and NI were funded by a Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science (grant number 25253051). All other authors declare no competing interests.

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