Supplementary appendix 3

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Guthold R, Stevens GA, Riley LM, Bull FC. Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1·6 million participants. Lancet Child Adolesc Health 2019; published online Nov 21. https://doi.org/10.1016/S2352-4642(19)30323-2.
**List of countries, territories and areas included in the analysis, by region**

| Region (number of countries, territories and areas included in analysis) | Countries, territories and areas |
|---|---|
| Central and Eastern Europe (16) | Albania; Bulgaria; Croatia; Czech Republic; Estonia; Hungary; Latvia; Lithuania; Moldova; North Macedonia; Poland; Romania; Russia; Slovakia; Slovenia; Ukraine |
| Central Asia, Middle East and North Africa (19) | Algeria; Armenia; Bahrain; Egypt; Iraq; Jordan; Kuwait; Lebanon; Libya; Mongolia; Morocco; Occupied Palestinian territory, including east Jerusalem; Oman; Qatar; Syria; Tunisia; Turkey; United Arab Emirates; Yemen |
| East and South East Asia (14) | Brunei; Cambodia; China; Taiwan; Indonesia; Laos; Malaysia; Maldives; Myanmar; Philippines; Sri Lanka; Thailand; Timor-Leste; Viet Nam |
| High-income Asia Pacific (2) | Singapore; South Korea |
| High-income Western countries (25) | Australia; Austria; Belgium; Canada; Denmark; Greenland; Finland; France; Germany; Greece; Iceland; Ireland; Israel; Italy; Luxembourg; Malta; Netherlands; New Zealand; Norway; Portugal; Spain; Sweden; Switzerland; UK; USA |
| Latin America and Caribbean (32) | Anguilla; Antigua and Barbuda; Argentina; Bahamas; Barbados; Belize; Bolivia; Brazil; British Virgin Islands; Cayman Islands; Chile; Colombia; Costa Rica; Dominica; Ecuador; El Salvador; Grenada; Guatemala; Guyana; Honduras; Mexico; Montserrat; Netherlands Antilles; Paraguay; Peru; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Suriname; Trinidad and Tobago; Uruguay; Venezuela |
| Oceania (16) | American Samoa; Cook Islands; Fiji; French Polynesia; Guam; Kiribati; Nauru; Niue; Palau; Samoa; Solomon Islands; Tokelau; Tonga; Tuvalu; Vanuatu; Wallis and Futuna |
| South Asia (6) | Afghanistan; Bangladesh; Bhutan; India; Nepal; Pakistan |
| Sub-Saharan Africa (16) | Benin; Botswana; Djibouti; Ghana; Kenya; Mauritania; Mauritius; Mozambique; Namibia; Senegal; Seychelles; Sudan; Tanzania; Uganda; Zambia; Zimbabwe |
### Data sources used in the analysis, by country, territory and area

| Country, territory and area | Year | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|------|-------------|--------------|-----------|---------------------|-------------------------------|
| Afghanistan                 | 2014 | 2155        | GSHS         | 11-17     |                     |                               |
| Albania                     | 2014 | 4924        | HBSC         | 11-15     |                     |                               |
| Algeria                     | 2011 | 4405        | GSHS         | 11-16     |                     |                               |
| American Samoa              | 2011 | 2841        | YRBS         | 14-17     |                     |                               |
| Anguilla                    | 2016 | 767         | GSHS         | 12-17     |                     |                               |
| Antigua and Barbuda         | 2009 | 1178        | GSHS         | 12-16     |                     |                               |
| Argentina                   | 2007 | 1877        | GSHS         | 12-16     |                     |                               |
| Argentina                   | 2012 | 27034       | GSHS         | 11-16     |                     |                               |
| Armenia                     | 2010 | 2833        | HBSC         | 11-15     |                     |                               |
| Armenia                     | 2014 | 3680        | HBSC         | 11-15     |                     |                               |
| Australia                   | 2009 | 12064       | NaSSDA       | 14-17     |                     |                               |
| Australia                   | 2011 | 1686        | NHS          | 12-17     |                     |                               |
| Australia                   | 2012 | 2800        | NNPAS        | 11-17     |                     |                               |
| Austria                     | 2001 | 4366        | HBSC         | 11-15     |                     |                               |
| Austria                     | 2005 | 4775        | HBSC         | 11-15     |                     |                               |
| Austria                     | 2010 | 5003        | HBSC         | 11-15     |                     |                               |
| Austria                     | 2014 | 3420        | HBSC         | 11-15     |                     |                               |
| Bahamas                     | 2013 | 1298        | GSHS         | 12-16     |                     |                               |
| Bahrain                     | 2016 | 7017        | GSHS         | 11-17     |                     |                               |
| Bangladesh                  | 2014 | 2881        | GSHS         | 12-17     |                     |                               |
| Barbados                    | 2011 | 1550        | GSHS         | 12-16     |                     |                               |
| Belgium                     | 2001 | 10612       | HBSC         | 11-15     |                     | Flemish part                 |
| Belgium                     | 2005 | 8787        | HBSC         | 11-15     |                     |                               |
| Belgium                     | 2010 | 8192        | HBSC         | 11-15     |                     |                               |
| Belgium                     | 2014 | 10240       | HBSC         | 11-15     |                     |                               |
| Belize                      | 2011 | 2001        | GSHS         | 11-16     |                     |                               |
| Benin                       | 2009 | 2650        | GSHS         | 11-16     |                     |                               |
| Benin                       | 2015 | 1562        | GSHS         | 12-17     |                     |                               |
| Bhutan                      | 2016 | 6043        | GSHS         | 11-17     |                     |                               |
| Bolivia                     | 2012 | 3425        | GSHS         | 11-16     |                     |                               |
| Botswana                    | 2005 | 2087        | GSHS         | 12-16     |                     |                               |
| Brazil                      | 2012 | 109104      | PeNSE        | 13-16     |                     |                               |
| Brazil                      | 2015 | 16600       | PeNSE        | 13-17     |                     |                               |
| British Virgin Islands      | 2009 | 1627        | GSHS         | 11-16     |                     |                               |
| Brunei                      | 2014 | 2490        | GSHS         | 12-17     |                     |                               |
| Bulgaria                    | 2005 | 4854        | HBSC         | 11-15     |                     |                               |
| Bulgaria                    | 2014 | 4796        | HBSC         | 11-15     |                     |                               |
| Cambodia                    | 2013 | 2892        | GSHS         | 12-17     |                     |                               |
| Canada                      | 2001 | 4361        | HBSC         | 11-15     |                     |                               |
| Canada                      | 2005 | 5787        | HBSC         | 11-15     |                     |                               |
| Country, territory and area | Year | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|------|-------------|--------------|-----------|---------------------|-------------------------------|
| Canada                      | 2010 | 15710       | HBSC         | 11-15     |                     |                               |
| Cayman Islands              | 2007 | 1218        | GSHS         | 12-16     |                     |                               |
| Chile                       | 2004 | 8002        | GSHS         | 12-16     | Metropolitan Region, Region I, Region V, Region VIII |                               |
| Chile                       | 2005 | 3577        | GSHS         | 12-16     | Metropolitan Region, Region VIII |                               |
| Chile                       | 2013 | 1871        | GSHS         | 12-17     |                     |                               |
| China                       | 2003 | 8791        | GSHS         | 11-16     | urban               | Beijing, Hangzhou, Wuhan, Wurumqi |
| Taiwan                      | 2012 | 6753        | GSHS         | 12-16     |                     |                               |
| Colombia                    | 2005 | 7490        | ENSIN        | 13-17     |                     |                               |
| Colombia                    | 2007 | 9524        | GSHS         | 12-16     | urban               | Bogota, Valledupar, Manizales, Cali, Bucaramanga |
| Cook Islands                | 2011 | 1247        | GSHS         | 12-16     |                     |                               |
| Cook Islands                | 2015 | 642         | GSHS         | 13-17     |                     |                               |
| Costa Rica                  | 2009 | 2637        | GSHS         | 12-16     |                     |                               |
| Croatia                     | 2001 | 4366        | HBSC         | 11-15     |                     |                               |
| Croatia                     | 2005 | 4965        | HBSC         | 11-15     |                     |                               |
| Croatia                     | 2010 | 6252        | HBSC         | 11-15     |                     |                               |
| Croatia                     | 2014 | 5740        | HBSC         | 11-15     |                     |                               |
| Czechia                     | 2001 | 5012        | HBSC         | 11-15     |                     |                               |
| Czechia                     | 2005 | 4775        | HBSC         | 11-15     |                     |                               |
| Czechia                     | 2010 | 4404        | HBSC         | 11-15     |                     |                               |
| Czechia                     | 2014 | 5056        | HBSC         | 11-15     |                     |                               |
| Denmark                     | 2001 | 4587        | HBSC         | 11-15     |                     |                               |
| Denmark                     | 2005 | 5682        | HBSC         | 11-15     |                     |                               |
| Denmark                     | 2010 | 4046        | HBSC         | 11-15     |                     |                               |
| Denmark                     | 2014 | 3846        | HBSC         | 11-15     |                     |                               |
| Greenland                   | 2001 | 873         | HBSC         | 11-15     |                     |                               |
| Greenland                   | 2005 | 1358        | HBSC         | 11-15     |                     |                               |
| Greenland                   | 2010 | 1205        | HBSC         | 11-15     |                     |                               |
| Djibouti                    | 2007 | 1706        | GSHS         | 11-16     |                     |                               |
| Dominica                    | 2009 | 1523        | GSHS         | 11-16     |                     |                               |
| Ecuador                     | 2007 | 5264        | GSHS         | 11-16     | urban               | Guayaquil, Quito, Zamora      |
| Egypt                       | 2006 | 5112        | GSHS         | 11-16     |                     |                               |
| Egypt                       | 2011 | 2445        | GSHS         | 11-16     |                     |                               |
| El Salvador                 | 2013 | 1845        | GSHS         | 12-16     |                     |                               |
| Estonia                     | 2001 | 3976        | HBSC         | 11-15     |                     |                               |
| Country, territory and area | Year | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|------|-------------|--------------|-----------|--------------------|------------------------------|
| Estonia                     | 2005 | 4477        | HBSC         | 11-15     |                    |                              |
| Estonia                     | 2010 | 4224        | HBSC         | 11-15     |                    |                              |
| Estonia                     | 2014 | 4052        | HBSC         | 11-15     |                    |                              |
| Fiji                        | 2010 | 2784        | GSHS         | 11-16     |                    |                              |
| Fiji                        | 2015 | 2916        | GSHS         | 13-17     |                    |                              |
| Finland                     | 2001 | 5348        | HBSC         | 11-15     |                    |                              |
| Finland                     | 2005 | 5193        | HBSC         | 11-15     |                    |                              |
| Finland                     | 2010 | 6607        | HBSC         | 11-15     |                    |                              |
| Finland                     | 2014 | 5838        | HBSC         | 11-15     |                    |                              |
| France                      | 2001 | 8185        | HBSC         | 11-15     |                    |                              |
| France                      | 2005 | 7141        | HBSC         | 11-15     |                    |                              |
| France                      | 2010 | 6128        | HBSC         | 11-15     |                    |                              |
| France                      | 2014 | 5636        | HBSC         | 11-15     |                    |                              |
| French Polynesia            | 2016 | 2787        | GSHS         | 12-17     |                    |                              |
| Germany                     | 2001 | 5635        | HBSC         | 11-15     |                    |                              |
| Germany                     | 2005 | 7224        | HBSC         | 11-15     |                    |                              |
| Germany                     | 2010 | 4955        | HBSC         | 11-15     |                    |                              |
| Germany                     | 2014 | 5910        | HBSC         | 11-15     |                    |                              |
| Ghana                       | 2007 | 5949        | GSHS         | 11-16     |                    |                              |
| Ghana                       | 2012 | 2378        | GSHS         | 11-17     |                    |                              |
| Greece                      | 2001 | 3807        | HBSC         | 11-15     |                    |                              |
| Greece                      | 2005 | 3690        | HBSC         | 11-15     |                    |                              |
| Greece                      | 2010 | 4899        | HBSC         | 11-15     |                    |                              |
| Greece                      | 2014 | 4114        | HBSC         | 11-15     |                    |                              |
| Grenada                     | 2008 | 1431        | GSHS         | 12-16     |                    |                              |
| Guam                        | 2013 | 1303        | YRBS         | 14-17     |                    |                              |
| Guatemala                   | 2009 | 5323        | GSHS         | 11-16     |                    |                              |
| Guatemala                   | 2015 | 4070        | GSHS         | 12-17     |                    |                              |
| Guyana                      | 2004 | 1170        | GSHS         | 12-16     |                    |                              |
| Guyana                      | 2010 | 2278        | GSHS         | 13-16     |                    |                              |
| Honduras                    | 2012 | 1695        | GSHS         | 11-16     |                    |                              |
| Hungary                     | 2001 | 4057        | HBSC         | 11-15     |                    |                              |
| Hungary                     | 2005 | 3498        | HBSC         | 11-15     |                    |                              |
| Hungary                     | 2010 | 4787        | HBSC         | 11-15     |                    |                              |
| Hungary                     | 2014 | 3876        | HBSC         | 11-15     |                    |                              |
| Iceland                     | 2005 | 9476        | HBSC         | 11-15     |                    |                              |
| Iceland                     | 2010 | 11049       | HBSC         | 11-15     |                    |                              |
| Iceland                     | 2014 | 10440       | HBSC         | 11-15     |                    |                              |
| India                       | 2007 | 7744        | GSHS         | 11-16     |                    |                              |
| Indonesia                   | 2007 | 3074        | GSHS         | 12-16     |                    |                              |
| Indonesia                   | 2015 | 10706       | GSHS         | 11-17     |                    |                              |
| Iraq                        | 2012 | 1962        | GSHS         | 11-16     |                    |                              |
| Country, territory and area | Year  | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|-------|-------------|--------------|-----------|-------------------|-----------------------------|
| Ireland                     | 2001  | 2875        | HBSC         | 11-15     |                   |                             |
| Ireland                     | 2005  | 4840        | HBSC         | 11-15     |                   |                             |
| Ireland                     | 2010  | 4724        | HBSC         | 11-15     |                   |                             |
| Ireland                     | 2014  | 4078        | HBSC         | 11-15     |                   |                             |
| Israel                      | 2001  | 5341        | HBSC         | 11-15     |                   |                             |
| Israel                      | 2005  | 5350        | HBSC         | 11-15     |                   |                             |
| Israel                      | 2014  | 6194        | HBSC         | 11-15     |                   |                             |
| Italy                       | 2001  | 4357        | HBSC         | 11-15     |                   |                             |
| Italy                       | 2005  | 3920        | HBSC         | 11-15     |                   |                             |
| Italy                       | 2010  | 4811        | HBSC         | 11-15     |                   |                             |
| Italy                       | 2014  | 4010        | HBSC         | 11-15     |                   |                             |
| Jordan                      | 2004  | 2361        | GSHS         | 13-16     |                   |                             |
| Jordan                      | 2007  | 2133        | GSHS         | 12-16     |                   |                             |
| Kenya                       | 2003  | 3428        | GSHS         | 11-16     |                   |                             |
| Kiribati                     | 2011  | 1551        | GSHS         | 12-16     |                   |                             |
| Kuwait                       | 2011  | 2633        | GSHS         | 12-16     |                   |                             |
| Kuwait                       | 2015  | 3053        | GSHS         | 12-17     |                   |                             |
| Laos                        | 2015  | 3585        | GSHS         | 13-17     |                   |                             |
| Latvia                      | 2001  | 3455        | HBSC         | 11-15     |                   |                             |
| Latvia                      | 2005  | 4221        | HBSC         | 11-15     |                   |                             |
| Latvia                      | 2010  | 4264        | HBSC         | 11-15     |                   |                             |
| Latvia                      | 2014  | 5536        | HBSC         | 11-15     |                   |                             |
| Lebanon                     | 2011  | 2189        | GSHS         | 11-16     |                   |                             |
| Lebanon                     | 2016  | 4954        | GSHS         | 11-17     |                   |                             |
| Libya                       | 2007  | 2128        | GSHS         | 11-16     |                   |                             |
| Lithuania                   | 2001  | 5644        | HBSC         | 11-15     |                   |                             |
| Lithuania                   | 2005  | 5632        | HBSC         | 11-15     |                   |                             |
| Lithuania                   | 2010  | 5323        | HBSC         | 11-15     |                   |                             |
| Lithuania                   | 2014  | 5732        | HBSC         | 11-15     |                   |                             |
| Luxembourg                  | 2005  | 4300        | HBSC         | 11-15     |                   |                             |
| Luxembourg                  | 2010  | 4072        | HBSC         | 11-15     |                   |                             |
| Luxembourg                  | 2014  | 3112        | HBSC         | 11-15     |                   |                             |
| Malaysia                    | 2012  | 25081       | GSHS         | 11-17     |                   |                             |
| Maldives                    | 2009  | 2980        | GSHS         | 11-16     |                   |                             |
| Malta                       | 2001  | 1945        | HBSC         | 11-15     |                   |                             |
| Malta                       | 2005  | 1389        | HBSC         | 11-15     |                   |                             |
| Malta                       | 2014  | 2258        | HBSC         | 11-15     |                   |                             |
| Mauritania                  | 2010  | 1951        | GSHS         | 11-16     |                   |                             |
| Mauritius                   | 2007  | 2246        | GSHS         | 12-16     |                   |                             |
| Mauritius                   | 2011  | 2147        | GSHS         | 12-16     |                   |                             |
| Mexico                      | 2016  | 1472        | ENSANUT      | 11-14     |                   |                             |
| Mongolia                    | 2010  | 5137        | GSHS         | 11-16     |                   |                             |
| Country, territory and area | Year | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|------|-------------|--------------|-----------|---------------------|-------------------------------|
| Moldova                     | 2014 | 4650        | HBSC         | 11-15     |                     |                               |
| Mongolia                    | 2013 | 5121        | GSHS         | 11-17     |                     |                               |
| Montserrat                  | 2008 | 197         | GSHS         | 13-16     |                     |                               |
| Morocco                     | 2006 | 2499        | GSHS         | 12-16     |                     |                               |
| Morocco                     | 2010 | 2784        | GSHS         | 11-16     |                     |                               |
| Morocco                     | 2016 | 5727        | GSHS         | 11-17     |                     |                               |
| Mozambique                  | 2015 | 1325        | GSHS         | 11-17     |                     |                               |
| Myanmar                     | 2007 | 2773        | GSHS         | 12-16     |                     |                               |
| Myanmar                     | 2016 | 2752        | GSHS         | 11-17     |                     |                               |
| Namibia                     | 2004 | 5925        | GSHS         | 11-16     |                     |                               |
| Namibia                     | 2014 | 3304        | GSHS         | 11-17     |                     |                               |
| Nauru                       | 2011 | 485         | GSHS         | 12-16     |                     |                               |
| Nepal                       | 2015 | 6167        | GSHS         | 11-17     |                     |                               |
| Netherlands                 | 2001 | 4268        | HBSC         | 11-15     |                     |                               |
| Netherlands                 | 2005 | 4228        | HBSC         | 11-15     |                     |                               |
| Netherlands                 | 2010 | 4520        | HBSC         | 11-15     |                     |                               |
| Netherlands                 | 2014 | 4236        | HBSC         | 11-15     |                     |                               |
| Netherlands Antilles        | 2015 | 2087        | GSHS         | 11-17     |                     |                               |
| New Zealand                 | 2007 | 9098        | The Youth07 survey | 11-15          |                     |                               |
| New Zealand                 | 2012 | 8202        | The Youth12 survey | 11-15          |                     |                               |
| Niue                        | 2010 | 106         | GSHS         | 12-16     |                     |                               |
| North Macedonia             | 2001 | 4030        | HBSC         | 11-15     |                     |                               |
| North Macedonia             | 2005 | 5271        | HBSC         | 11-15     |                     |                               |
| North Macedonia             | 2007 | 1978        | GSHS         | 12-17     |                     |                               |
| North Macedonia             | 2010 | 3897        | HBSC         | 11-15     |                     |                               |
| North Macedonia             | 2014 | 4162        | HBSC         | 11-15     |                     |                               |
| Norway                      | 2001 | 5015        | HBSC         | 11-15     |                     |                               |
| Norway                      | 2005 | 4697        | HBSC         | 11-15     |                     |                               |
| Norway                      | 2010 | 4338        | HBSC         | 11-15     |                     |                               |
| Norway                      | 2014 | 3050        | HBSC         | 11-15     |                     |                               |
| Occupied Palestinian territory, including east Jerusalem | 2010 | 4302 | GSHS | 11-16 | | |
| Oman                        | 2005 | 2862        | GSHS         | 12-16     |                     |                               |
| Oman                        | 2010 | 1500        | GSHS         | 13-16     |                     |                               |
| Oman                        | 2015 | 3090        | GSHS         | 11-17     |                     |                               |
| Pakistan                    | 2009 | 5112        | GSHS         | 11-16     |                     |                               |
| Palau                       | 2011 | 304         | YRBS         | 15-17     |                     |                               |
| Paraguay                    | 2016 | 3150        | GSHS         | 11-17     |                     |                               |
| Peru                        | 2010 | 2827        | GSHS         | 12-16     |                     |                               |
| Philippines                 | 2003 | 6840        | GSHS         | 11-16     |                     |                               |
| Philippines                 | 2007 | 5539        | GSHS         | 12-16     |                     |                               |
| Philippines                 | 2011 | 5074        | GSHS         | 12-16     |                     |                               |
| Country, territory and area | Year | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|------|-------------|--------------|-----------|---------------------|-------------------------------|
| Philippines                 | 2015 | 8263        | GSHS         | 11-17     |                     |                               |
| Poland                      | 2001 | 6310        | HBSC         | 11-15     |                     |                               |
| Poland                      | 2005 | 5489        | HBSC         | 11-15     |                     |                               |
| Poland                      | 2010 | 4241        | HBSC         | 11-15     |                     |                               |
| Poland                      | 2014 | 4518        | HBSC         | 11-15     |                     |                               |
| Portugal                    | 2001 | 2928        | HBSC         | 11-15     |                     |                               |
| Portugal                    | 2005 | 3919        | HBSC         | 11-15     |                     |                               |
| Portugal                    | 2010 | 4036        | HBSC         | 11-15     |                     |                               |
| Portugal                    | 2014 | 4990        | HBSC         | 11-15     |                     |                               |
| Qatar                       | 2011 | 1829        | GSHS         | 11-16     |                     |                               |
| Romania                     | 2005 | 4684        | HBSC         | 11-15     |                     |                               |
| Romania                     | 2010 | 5352        | HBSC         | 11-15     |                     |                               |
| Romania                     | 2014 | 3942        | HBSC         | 11-15     |                     |                               |
| Russia                      | 2001 | 8032        | HBSC         | 11-15     |                     |                               |
| Russia                      | 2005 | 8231        | HBSC         | 11-15     |                     |                               |
| Russia                      | 2010 | 5174        | HBSC         | 11-15     |                     |                               |
| Russia                      | 2014 | 4576        | HBSC         | 11-15     |                     |                               |
| Saint Kitts and Nevis       | 2011 | 1674        | GSHS         | 13-16     |                     |                               |
| Saint Lucia                 | 2007 | 1246        | GSHS         | 12-16     |                     |                               |
| Saint Vincent and the Grenadines | 2007 | 1225        | GSHS         | 12-16     |                     |                               |
| Samoa                       | 2011 | 2114        | GSHS         | 11-16     |                     |                               |
| Senegal                     | 2005 | 3059        | GSHS         | 11-16     |                     |                               |
| Seychelles                  | 2007 | 1350        | GSHS         | 11-17     |                     |                               |
| Seychelles                  | 2015 | 2439        | GSHS         | 11-17     |                     |                               |
| Singapore                   | 2015 | 9151        | Students’ Health Survey | 13-17     |                     |                               |
| Slovakia                    | 2005 | 3877        | HBSC         | 11-15     |                     |                               |
| Slovakia                    | 2010 | 5281        | HBSC         | 11-15     |                     |                               |
| Slovakia                    | 2014 | 6016        | HBSC         | 11-15     |                     |                               |
| Slovenia                    | 2001 | 3915        | HBSC         | 11-15     |                     |                               |
| Slovenia                    | 2005 | 5119        | HBSC         | 11-15     |                     |                               |
| Slovenia                    | 2010 | 5429        | HBSC         | 11-15     |                     |                               |
| Slovenia                    | 2014 | 4984        | HBSC         | 11-15     |                     |                               |
| Solomon Islands             | 2011 | 1296        | GSHS         | 11-16     |                     |                               |
| South Korea                 | 2012 | 62063       | KYRBS        | 13-17     |                     |                               |
| South Korea                 | 2013 | 60423       | KYRBS        | 13-17     |                     |                               |
| Spain                       | 2001 | 5823        | HBSC         | 11-15     |                     |                               |
| Spain                       | 2005 | 8891        | HBSC         | 11-15     |                     |                               |
| Spain                       | 2010 | 5040        | HBSC         | 11-15     |                     |                               |
| Spain                       | 2014 | 11138       | HBSC         | 11-15     |                     |                               |
| Sri Lanka                   | 2008 | 2552        | GSHS         | 12-16     |                     |                               |
| Sri Lanka                   | 2016 | 3192        | GSHS         | 12-17     |                     |                               |
| Country, territory and area | Year | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|------|-------------|--------------|-----------|---------------------|-----------------------------|
| Sudan                       | 2012 | 2063        | GSHS         | 12-16     |                     |                             |
| Suriname                    | 2009 | 1632        | GSHS         | 12-16     |                     |                             |
| Suriname                    | 2016 | 1867        | GSHS         | 12-17     |                     |                             |
| Sweden                      | 2001 | 3896        | HBSC         | 11-15     |                     |                             |
| Sweden                      | 2005 | 4392        | HBSC         | 11-15     |                     |                             |
| Sweden                      | 2010 | 6645        | HBSC         | 11-15     |                     |                             |
| Sweden                      | 2014 | 7656        | HBSC         | 11-15     |                     |                             |
| Switzerland                 | 2001 | 4528        | HBSC         | 11-15     |                     |                             |
| Switzerland                 | 2005 | 4579        | HBSC         | 11-15     |                     |                             |
| Switzerland                 | 2010 | 6611        | HBSC         | 11-15     |                     |                             |
| Switzerland                 | 2014 | 6530        | HBSC         | 11-15     |                     |                             |
| Syria                       | 2010 | 3045        | GSHS         | 11-16     |                     |                             |
| Tanzania                    | 2006 | 2094        | GSHS         | 11-16     | urban Dar-Es-Salaam |                             |
| Tanzania                    | 2014 | 3561        | GSHS         | 11-17     |                     |                             |
| Thailand                    | 2008 | 2726        | GSHS         | 12-16     |                     |                             |
| Thailand                    | 2012 | 1160        | Physical Activity Surveillance System | 11-17 |                     |                             |
| Thailand                    | 2013 | 1160        | Physical Activity Surveillance System | 11-17 |                     |                             |
| Thailand                    | 2014 | 1160        | Physical Activity Surveillance System | 11-17 |                     |                             |
| Thailand                    | 2015 | 1160        | Physical Activity Surveillance System | 11-17 |                     |                             |
| Thailand                    | 2015 | 5575        | GSHS         | 11-17     |                     |                             |
| Thailand                    | 2016 | 1160        | Physical Activity Surveillance System | 11-17 |                     |                             |
| Timor-Leste                 | 2015 | 2965        | GSHS         | 11-17     |                     |                             |
| Tonga                       | 2010 | 2157        | GSHS         | 12-16     |                     |                             |
| Trinidad and Tobago         | 2007 | 1144        | GSHS         | 12-16     |                     |                             |
| Trinidad and Tobago         | 2011 | 956         | GSHS         | 11-16     |                     |                             |
| Tunisia                     | 2008 | 2783        | GSHS         | 11-16     |                     |                             |
| Turkey                      | 2005 | 5552        | HBSC         | 11-15     |                     |                             |
| Turkey                      | 2010 | 5574        | HBSC         | 11-15     |                     |                             |
| Tuvalu                      | 2012 | 870         | GSHS         | 12-16     |                     |                             |
| Uganda                      | 2003 | 2986        | GSHS         | 11-16     |                     |                             |
| UK                          | 2001 | 14314       | HBSC         | 11-15     |                     | England, Scotland, Wales   |
| UK                          | 2005 | 15309       | HBSC         | 11-15     |                     | England, Scotland, Wales   |
| UK                          | 2010 | 15652       | HBSC         | 11-15     |                     | England, Scotland, Wales   |
| UK                          | 2014 | 16244       | HBSC         | 11-15     |                     | England, Scotland, Wales   |
| Ukraine                     | 2001 | 4090        | HBSC         | 11-15     |                     |                             |
| Ukraine                     | 2005 | 5069        | HBSC         | 11-15     |                     |                             |
| Country, territory and area | Year | Sample size | Survey/Study | Age range | Urban only coverage | Coverage (where non national) |
|-----------------------------|------|-------------|--------------|-----------|---------------------|-----------------------------|
| Ukraine                     | 2010 | 5890        | HBSC         | 11-15     |                     |                             |
| Ukraine                     | 2014 | 4552        | HBSC         | 11-15     |                     |                             |
| United Arab Emirates        | 2005 | 15189       | GSHS         | 11-16     |                     |                             |
| United Arab Emirates        | 2010 | 2484        | GSHS         | 12-16     |                     |                             |
| United Arab Emirates        | 2016 | 5329        | GSHS         | 11-17     |                     |                             |
| USA                         | 2001 | 5025        | HBSC         | 11-15     |                     |                             |
| USA                         | 2005 | 3892        | HBSC         | 11-15     |                     |                             |
| USA                         | 2010 | 6274        | HBSC         | 11-15     |                     |                             |
| USA                         | 2011 | 14915       | YRBSS        | 14-17     |                     |                             |
| USA                         | 2013 | 10910       | YRBSS        | 14-17     |                     |                             |
| USA                         | 2015 | 15046       | YRBSS        | 14-17     |                     |                             |
| Uruguay                     | 2006 | 3336        | GSHS         | 12-16     |                     |                             |
| Uruguay                     | 2012 | 3420        | GSHS         | 13-16     |                     |                             |
| Vanuatu                     | 2011 | 1084        | GSHS         | 11-16     |                     |                             |
| Venezuela                   | 2003 | 4276        | GSHS         | 11-16     | urban               | Barinas, Lara               |
| Viet Nam                    | 2013 | 3038        | GSHS         | 13-17     |                     |                             |
| Wallis and Futuna           | 2015 | 991         | GSHS         | 11-17     |                     |                             |
| Yemen                       | 2008 | 1058        | GSHS         | 11-16     |                     |                             |
| Yemen                       | 2014 | 2219        | GSHS         | 11-17     |                     |                             |
| Zambia                      | 2004 | 1871        | GSHS         | 11-16     |                     |                             |
| Zimbabwe                    | 2003 | 5368        | GSHS         | 11-16     |                     | Bulawayo, Harare, Manicaland |
List of countries, territories and areas with trend data
Argentina; Armenia; Australia; Austria; Belgium; Benin; Brazil; Bulgaria; Canada; Chile; Colombia; Cook Islands; Croatia; Czech Republic; Denmark; Greenland; Egypt; Estonia; Fiji; Finland; France; Germany; Ghana; Greece; Guatemala; Guyana; Hungary; Iceland; Indonesia; Ireland; Israel; Italy; Jordan; Kuwait; Latvia; Lebanon; Lithuania; Luxembourg; Malta; Mauritius; Mongolia; Morocco; Myanmar; Namibia; Netherlands; New Zealand; North Macedonia; Norway; Oman; Philippines; Poland; Portugal; Romania; Russia; Seychelles; Slovakia; Slovenia; South Korea; Spain; Sri Lanka; Suriname; Sweden; Switzerland; Tanzania; Thailand; Trinidad and Tobago; Turkey; Ukraine; United Arab Emirates; UK; USA; Uruguay; Yemen.
Detailed methods description

Objective
To produce comparable country estimates for adolescent boys and girls, and both sexes combined, for the prevalence of insufficient physical activity, defined as not meeting current WHO recommendations on physical activity for health, which is, doing less than 60 minutes of moderate to vigorous physical activity per day (1).

We documented these estimates as recommended by the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER) (2).

Inclusion criteria
The criteria for data to be included in the comparable country estimates on insufficient physical activity for adolescents were as follows:

- The definition of insufficient physical activity had to be:
  - Less than 60 minutes of moderate to vigorous-intensity physical activity per day, OR
  - Less than 60 minutes of moderate to vigorous-intensity physical activity per day on less than 5 days per week;
- Data had to be collected from the general adolescent population or the school going population through random sampling, and be representative of a national or defined subnational population;
- Data had to be based on self-report, rather than objectively measured physical activity;
- Data had to capture adolescent ages of 10-19 years, or at least 3 years of this age group (such as 13-15 year olds);
- Prevalence values had to be presented along with sample size, as well as clear description of survey methodology;
- Survey sample size had to be at least n=100.

Note: since all surveys that met the inclusion criteria were conducted in the school setting, the estimates were produced and labelled for “school going adolescents”.

Data search
Data were searched through:

- Existing WHO databases at Headquarters and Regional Offices;
- Communication with WHO Regional focal points, researchers and experts;
- Verification of the results of the 2017 NCD Country Capacity Survey (CCS) (3) [Survey question: Have surveys of risk factors (may be a single risk factor or multiple) been conducted in your country for any of the following: [...] Physical Inactivity. Was there a survey on adolescents? [...] When was the last survey conducted? [...]];
- A non-systematic literature search in PubMed up to December, 2016, focused on countries with no data, using the search terms (“Physical activity” OR “exercise” OR “inactivity”) AND (“adolescents” OR “adolescence” OR “young people” OR “youth”) AND (“Global School-based Student Health Survey” OR “GSHS” OR “Health Behaviour in School-aged Children” OR “HBSC” OR “Youth Risk Behavior Survey” OR “YRBS” OR “school survey” OR “school-based survey”) [AND “individual country name”];
- Communication through personal networks;
- An on-line country consultation from 31 July – 8 Sept 2017.
**Data sources**

Two main data sources met the inclusion criteria, as well as additional national surveys: the Global School-based Student Health Survey (GSHS), the Health Behaviour among School-aged Children (HBSC) that’s conducted in many European countries, the USA and Canada, the Youth Risk Behaviour Surveys (YRBS) undertaken in the USA and its territories American Samoa and Guam, as well as in Palau, South Korea’s KYRBS, the Australian NaSSDA, the Brazilian PeNSE, the Colombian ENSIN, the Mexican ENSANUT, the Thai Physical Activity Surveillance System, and Singapore’s Students’ Health Survey. Overall, 298 surveys were included in the estimation process, representing data from 146 countries (table 1).

To assess physical activity behaviour, most of the included sources, including the GSHS and the HBSC, used a question that was originally developed by Prochaska et al (4) and further adapted, reading “During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?”, with answer options ranging from 0 to 7 days. Students were typically asked to add up all the time they spent in any kind of physical activity each day, and were provided examples on what activities to include.

| All countries | World Bank income group | Low income | Lower middle income | Upper middle income | High income |
|---------------|-------------------------|------------|---------------------|---------------------|-------------|
| Total         | 231                     | 215        | 31                  | 51                  | 58          | 75          |
| With data     | 146                     | 141        | 8                   | 37                  | 40          | 56          |
| % with data   | 63.2                    | 65.6       | 25.8                | 72.5                | 69.0        | 74.7        |

**Definition adjustment**

For surveys where only the definition of “Less than 60 minutes of moderate to vigorous-intensity physical activity per day on less than 5 days per week” was available, an adjustment was made in order to derive the target definition of “Less than 60 minutes of moderate to vigorous-intensity physical activity per day”. This was done using results from surveys providing both definitions, with the following regression model:

\[ Y (\text{Prevalence of “Less than 60 minutes of moderate to vigorous-intensity physical activity per day”}) = \alpha + \beta_1 (\text{Prevalence of “Less than 60 minutes of moderate to vigorous-intensity physical activity per day on less than 5 days per week”}) + \beta_2 (\text{sex_code}) + \beta_3 (\text{age}) + \beta_4 (\text{edu_years}) + \epsilon \]

where sex_code was a code for male and female, age was the age in years of each of the observations, edu_years was the mean years of education, and \(\epsilon\) was the error term assumed normally distributed.
Adjustment for coverage

141 out of the 146 countries reporting sex- and age-specific prevalence of insufficient physical activity had nationally representative data. Only subnational data including urban and rural areas were available from two countries, and urban data only were available for China, Ecuador, and Venezuela (Bolivarian Republic of). In addition to national data, Colombia and the United Republic of Tanzania also had urban-only surveys. To derive a national estimate for surveys that covered urban areas only, the relationship between insufficient physical activity in urban versus rural areas was explored using information from surveys where estimates for both urban and rural areas existed, and by applying the following regression model:

\[ Y (\text{Prevalence of “Less than 60 minutes of moderate to vigorous-intensity physical activity per day” (rural)}) = \alpha + \beta_1 (\text{“Less than 60 minutes of moderate to vigorous-intensity physical activity per day” (urban)}) + \beta_2 (\text{sex code}) + \beta_3 (\text{age}) + \beta_4 (\text{edu_years}) + \varepsilon \]

where sex_code was a code for male and female, age was the age in years of each of the observations, edu_years was the mean years of education, and \(\varepsilon\) was the error term assumed normally distributed.

After deriving an estimate for rural areas for surveys with urban data only, the urban and rural estimates were combined using estimated population data for the year of estimation of the United Nations Population Division (6).
Age range
The available data sources included the minimum age of 11, and the maximum age of 17 years. The two main data sources GSHS and HBSC covered the following age groups: the HBSC 11, 13 and 15 year olds, and the GSHS focused on 13-15 year olds until 2012, and then expanded the focus age range to 13-17 years. However, since GHS sampling includes entire classes, some students that were outside the focus age range were also included in each survey. Appendix 2 provides the age range for each survey included.

For each country and survey, the available single year age groups were aggregated into one final estimate, representing 11-17 year olds, by using country population figures as estimated by the United Nations Population Division (Revision 2016) (6) for the respective survey year.

Time trends
Data included in the estimation process were from the years 2001 – 2016, with 73 of the 146 countries having two or more surveys from different years. Using these trend data, time trends were estimated for all countries with data.

To estimate prevalence values for missing years, the following multilevel mixed-effects linear regression model was applied for both sexes separately:

\[ Y (\text{Logit of the prevalence of not meeting “WHO PA recs”})_{ij} = \beta_0 + \beta_1 (\text{year})_{ij} + \beta_2 (\text{super-region})_{ij} + \beta_3 (\text{perc\_urban})_{ij} + u_0j + u_1j (\text{year})_{ij} + \varepsilon_{ij} \]

Where \( j \) = countries, \( i \) = years, super-region was a variable combining countries into nine regions, as previously used in other, similar analysis (6), perc\_urban was the percentage of urban population in each country at the respective years, \( u_{ij} \) was the random effect occurring at the country level, allowing for a random slope on year, and \( \varepsilon_{ij} \) was the error term.
. mixed logit_fail_meet_recs year i.super-region perc_urban ||
whoname:year, covariance(unstructured)

Mixed-effects ML regression  Number of obs = 297
Group variable: whoname                         Number of groups = 146

Obs per group:
  min = 1
  avg = 2.0
  max = 6

Wald chi2(10) = 46.93
Log likelihood = -91.787237                     Prob > chi2       = 0.0000

------------------------------------------------------------------------------------------------
logit_fail_meet_recs |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------------+----------------------------------------------------------------
year |  -.0039424   .0038264    -1.03   0.303     -.011442    .0035572

BMI_superregion |
Central and Eastern Europe  |  -.2817129   .1118425    -2.52   0.012    -.5009201   -.0625056
East and South East Asia  |   .2503451   .1345874     1.86   0.063    -.0134414    .5141315
High-income Asia Pacific |  -.1241418   .1025785    -1.21   0.226    -.3251919    .0769083
High-income Western countries | .1041452   .1051597     0.96   0.335     -.104694    .3075245
Latin America and Caribbean |   .3120924   .1279402     2.44   0.015     .0613342    .5628507
Oceania |   .2019561   .1324277     1.53   0.127    -.0575974    .4615095
South Asia |   .0388946   .1935987     0.20   0.841    -.3405519    .4183412
Sub-Saharan Africa |   .3120924   .1279402     2.44   0.015     .0613342    .5628507

perc_urban |  -.0007001   .0015555    -0.45   0.653    -.0037488    .0023486

_cons |   9.310902   7.678912     1.21   0.226    -.5739489    24.36129

------------------------------------------------------------------------------------------------
Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
whoname: Unstructured        |
  var(year) |   .0001501   .0002325      7.20e-06    .0031253
  var(_cons) |   593.4568   936.4356      26.93081    13077.63
  cov(year,_cons) |  -.2984048   .4665575     -1.212841    .6160312

  var(Residual) |   .0550837   .0082325      .0410967     .073831

LR test vs. linear model: chi2(3) = 96.80                 Prob > chi2 = 0.0000

Final country estimates
For countries with data, estimates were produced for all years 2001 – 2016. For countries with no survey, no estimate was produced.

Estimates for World Bank Income groups and regions
To produce estimates for World Bank income groups, we used groupings for the year 2016 (5), and for regional estimates, we used previously defined country groupings used in similar analyses (7, 8). For all different groupings, country estimates were weighted by population size of each country, using country population figures as estimated by the United Nations Population Division (Revision 2016) (6). Countries with no estimate were not taken into account.

Uncertainty
Uncertainty around the country estimates was computed by using the predicted values and standard errors (combining standard errors of fixed and random effects) of the hierarchical trend models.

For the estimates for World Bank Income groups, regions, and the world, confidence intervals were produced using the bootstrap methodology: for men and women separately, we ran the hierarchical trend model 1000 times, using a random 80% of all survey data each time. We then produced World Bank Income group, regional, and global prevalence estimates for each of the 1000 datasets. Of these 1000 results for each subgroup, gender and year, we took the 2.5th and the 97.5th percentile to form the confidence interval around the estimate. To test for significance of trends and sex
differences in those subgroups and globally, based on a previously described approach (8, 9), we calculated the difference in prevalence between 2001 and 2016 and between sexes for each draw and considered a change in prevalence over time or between sexes to be statistically significant if at least 97.5% of draws showed a changing trend or a sex difference in the same direction.

Consultation with WHO Member States
A consultation with WHO Member States was carried out from 31 July to 8 September 2017. Data submitted by Member States during that period that met inclusion criteria were included in a re-run of the model during October 2017.
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Figure 5. Sex difference in prevalence of insufficient physical activity among school going adolescents, 11-17 years, 2016. Female prevalence greater than male prevalence in all countries except Afghanistan, Samoa, Tonga and Zambia.