

## **Appendix chapter 6 - Health policy performance in 16 Caribbean states, 2010-2015**

### **Systematic assessment of death registration data of Caribbean states**

#### *Death registration and population data*

We obtained nationally representative mortality data from 26 Caribbean states from the World Health Organization (WHO) mortality database.<sup>1</sup> We included up to five of the most recent data years available during the period 2010-2015 in order to average out annual fluctuations caused by relatively small populations. Data included number of deaths obtained from national registration systems and coded according to the 10<sup>th</sup> revision of the International Classification of Disease,<sup>2</sup> by gender and 5-year age categories, with deaths from age 0 to 5 listed annually.

Population data by gender and age were extracted from the World Population Prospects 2017 database of the United Nations<sup>3</sup> or, when not available in this dataset, from the International database of the U.S. Census Bureau.<sup>4</sup>

#### *Procedure for inclusion of country specific data*

Table A1 shows an overview of the results for the 26 Caribbean states and the data years for which death registration data were available. We concluded that the death registration data of a Caribbean state was suitable for inclusion in our analysis when:

A. The total number of deaths was 500 or more during the 4- or 5-year period

This cut-off point is based on a consideration of random error reduction in order to foster the statistical reliability of the results. Five states with very small populations, Anguilla, Cayman Islands, Montserrat, Turks and Caicos Islands and U.K. Virgin Islands were excluded based on this criterion.

B. The completeness assessment was found sufficient

For the remaining 17 states, we determined the completeness of death registration data by comparing the total number of deaths to independent estimates. We first looked at the quality of civil registration as reported in the Demographic Yearbook of the United Nations.<sup>5</sup> When quality was judged high (at least 90% complete), we calculated completeness based on the number of deaths reported in the Demographic Yearbook. When quality was judged less than 90% complete (in Belize, the Dominican Republic and Jamaica), completeness was calculated based on the independent crude number of death estimates of the United Nations Population

Division.<sup>3</sup> When at least 70% of all deaths in the population statistics were registered in the mortality data, we concluded that the completeness of the data was sufficient. One state, the Dominican Republic, was excluded based on this criterion.

C. The quality assessment with ANACoD was found sufficient

For the 21 remaining states, quality of death registration data was examined in ANACoD (version 2.0), an Excel-based application that is provided by the WHO.<sup>6</sup> ANACoD facilitates a comprehensive quality analysis of death registration data on mortality levels and causes of death.

We concluded the quality of data to be sufficient when: 1. No irregular or implausible observations were noted in patterns of gender- and age-specific mortality, 2. The number of invalid cause-of-death codes, for example implausible causes-of death in a certain age-group, were 5% or less of the total number of deaths, and 3. The number of ill-defined causes of death (R00-R99) were 10% or less of the total number of deaths. This cut-off point was set relatively high because this category is strongly related to deaths abroad<sup>7</sup> and could therefore indicate a high mobility of a population, for example due to political affiliation with a former colonizer or due to travel for specialized healthcare not available in the home state. Five states were excluded based on these criteria, all due to irregular age- and gender-distributions.

**Table A1** Overview results death registration data assessment, by Caribbean state

Caribbean state	Data years available	Number of deaths	Age- and gender-distribution <sup>1</sup>	Invalid codes <sup>2</sup> (%)	Ill-defined conditions <sup>3</sup> (%)	Completeness (%)
Anguilla	2011-2015	331	N.A.	N.A.	N.A.	N.A.
Antigua and Barbuda	2012-2015	2,072	Irregular	0.19	0.68	90.5
Aruba	2011-2015	3,151	Normal	0.06	4.73	73.0
Bahamas, the	2011-2013	6,175	Normal	0.15	1.39	92.1
Barbados	2011-2013	7,249	Normal	0.04	1.20	82.2
Belize	2011-2015	8,061	Normal	0.14	0.88	85.6
Cayman Islands	2010, 2013	321	N.A.	N.A.	N.A.	N.A.
Cuba	2011-2015	464,710	Normal	0.10	0.74	100
Dominica	2011-2015	3,115	Normal	1.64	3.24	100
Dominican Republic	2011-2013	105,751	Normal	0.10	4.32	57.6
French Guyana	2011-2014	3,023	Irregular	0.10	16.94	97.3
Grenada	2011-2015	4,312	Normal	0.21	1.69	100
Guadeloupe	2011-2014	11,932	Normal	0.18	12.39	87.6
Guyana	2011-2013	16,317	Normal	0.12	0.85	89.9
Jamaica	2010-2011	32,366	Normal	0.12	0.51	83.7
Martinique	2011, 2013, 2014	8,940	Normal	0.20	8.19	94.3
Montserrat	2011-2015	225	N.A.	N.A.	N.A.	N.A.
Puerto Rico	2011-2015	146,668	Normal	0.07	1.14	100
St. Kitts & Nevis	2011, 2012, 2014, 2015	1,498	Irregular	0.07	1.07	100
St. Lucia	2011-2014	4,515	Normal	0.11	2.83	89.1
St. Vincent and the Grenadines	2011-2015	4,514	Normal	0.13	2.57	100
Suriname	2011-2014	12,101	Normal	0.12	9.87	78.4
Trinidad and Tobago	2010-2011	19,657	Normal	0.06	0.79	81.2
Turks and Caicos Islands	2013, 2014	252	N.A.	N.A.	N.A.	N.A.
Virgin Islands (U.K.)	2010	104	N.A.	N.A.	N.A.	N.A.
Virgin Islands (U.S.)	2010-2012, 2015	3,457	Normal	0.12	4.14	100

<sup>1</sup> This indicator shows patterns of age- and gender specific mortality rates on plausibility. It reveals whether certain age-groups are under- or over-reported and whether the number of total deaths is insufficiently robust for further analysis.

<sup>2</sup> This indicator shows the use of invalid codes for underlying causes of death. Invalid codes include ICD-10 codes that are unlikely to cause death or causes-of-death that are implausible to cause death in a certain gender or age-group. It reveals potential quality problems in certification practices and/or coding causes-of-death in a certain Caribbean state.

<sup>3</sup> This indicator shows the use of ill-defined causes of death (R00-R99), which may bias the cause-of-death distribution and lead to unreliable estimates. It reveals potential quality problems in certification practices and/or coding causes of death in a certain Caribbean state but is also related to deaths abroad.<sup>7</sup>

***Analysis of mortality data***

Table A2 states the causes of death included in our analysis, with ICD-10 codes and age limits based on the list of the Office of National Statistics (ONS), United Kingdom.<sup>8</sup> This list includes causes of death that are considered preventable in the presence of timely and effective public health interventions in the broadest sense. We added cerebrovascular diseases (I60-I69) because of its strong association to average systolic blood pressure on the population level.<sup>9</sup>

**Table A2** Selected causes of death preventable by population-based interventions

<b>Cause(s) of death</b>	<b>ICD-10 code</b>	<b>Included ages</b>
HIV/AIDS	B20-B24	All
Communicable disease among children (excluding HIV/AIDS)	A00-B99 (excl. B20-B24), G00, G03, J02, L03	0-14
Communicable disease among adults (excluding HIV/AIDS)	A00-B99 (excl. B20-B24), G00, G03, J02, L03	15-74
Breast cancer	C50	0-74
Cervix cancer	C53	0-74
Lung cancer	C33-C34	0-74
Maternal mortality	O00-O99	All
Accidental injury among children	W00-X59	0-14
Diabetes mellitus	E10-E14	0-49
Cerebrovascular diseases (stroke)	I60-I69	0-74
Alcohol-related diseases (excluding external causes)	F10, G31.2, G62.1, I42.6, K29.2, K70, K73, K74 (excl. K74.3-K74.5), K86.0	0-74
Road traffic accidents	V01-V89	All
Homicide/assault	X85-Y09	All

In order to reduce sensitivity to small number fluctuations, we totalled number of deaths and population data over a 4- or 5-year period depending on data availability. For example, the mortality rates for Aruba used mortality and population data from 2011 to 2015. For simplicity, we refer to the data years of all mortality rates as ca. 2013. Deaths were corrected for unclassified age and gender, for deaths attributed to ill-defined causes (R00-R99, non-external causes only) and for under registration (as determined during step 3 of the inclusion procedure). For each of the 16 selected Caribbean states, age-standardized mortality rates were calculated per 100,000 population by gender (subject to age limits when applicable), using the direct standardization method to the World standard population.<sup>10</sup>

Table A3 Health policy performance indicators, by country

Indicator	1. HIV/AIDS			2. Communicable disease					3. Cancer screening		
	ART coverage	HIV incidence	HIV/AIDS mortality	IHR core capacity surveillance	IHR core capacity response	TB incidence	Communicable disease mortality (excl. HIV/AIDS)	Communicable disease mortality (excl. HIV/AIDS)	Sumscore breast and cervix cancer interventions	Breast cancer mortality	Cervix cancer mortality
Unit	%	d/ 100,000 population	d/ 100,000 population	%	%	d/ 100,000 population	d/ 100,000 children aged 0-14.	d/100,000 adults aged 15 and older	0 (worst) -4 (best)	d/ 100,000 women	d/ 100,000 women
Year	2009	ca. 2007	ca. 2013	2011/2012	2011/2012	ca. 2009	ca. 2013	ca. 2013	2013	ca. 2013	ca. 2013
Aruba		2	3.0			5.7	0.0	12.9		23.7	3.6
Bahamas	52	111.7	32.0	90	71	12.7	11.0	14.1	2	26.1	7.2
Barbados	89	37.9	3.0	90	93	0.7	3.2	34.4	4	30.0	6.1
Belize	40	47.8	45.2	65	78	29.2	9.7	16.3	0	11.2	11.4
Cuba	95	5.5	2.7	100	100	6.3	3.6	4.8	4	12.7	5.1
Grenada	91	20	6.8	90	78	4.7	2.8	15.0	2	27.3	10.2
Guadeloupe		57	2.7				1.3	12.4		14.7	2.2
Guyana	52	71.7	27.6	75	93	97.7	11.5	43.8	3	10.6	10.6
Jamaica	46	54.7	23.3	100	100	5.1	2.2	9.1	4	21.4	14.2
Martinique	94	17	1.6				1.6	6.9		15.5	1.6
Puerto Rico		0.3	6.1			1.7	4.1	14.7	2	12.1	1.9
St. Lucia	28	27	2.5	80	71	6.2	6.0	17.1	3	20.0	8.8
St. Vincent and the Grenadines	89	60.1	17.5	75	60	8.6	11.3	34.9	0	19.2	14.5
Suriname	53	89.8	24.8	25	57	34.2	10.5	28.9	2	14.4	13.7
Trinidad and Tobago	41	14.4	19.0	80	76	20.6	7.7	14.5	4	22.0	10.7
U.S. Virgin Islands			6.2				0.0	8.2		11.2	1.5

Sources:

- ART (Antiretroviral Therapy) coverage (UNAIDS (<http://unaids.org>))
- HIV incidence (PAHO basic indicator database (PAHO basic indicator database (<http://ais.paho.org/phis/viz/basicindicatorbrowser.asp>)))
- HIV/AIDS mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- IHR core capacity surveillance (<http://apps.who.int/gho/data/node.main.IHR00ALLN?lang=en>)
- TB incidence (PAHO basic indicator database (PAHO basic indicator database (<http://ais.paho.org/phis/viz/basicindicatorbrowser.asp>)))
- Communicable disease mortality children (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Communicable disease mortality adults (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Sumscore breast and cervix cancer interventions (calculated from data in reference <sup>11</sup>)
- Breast cancer mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Cervix cancer mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))

Table A3 (continued) Health policy performance indicators, by country

Indicator	4. Tobacco						5. Fertility, pregnancy and child birth			
	Policies on smoke-free environments	Mpower sumscore	Male age-standardised prevalence daily smoking	Female age-standardised prevalence daily smoking	Male lung cancer mortality	Female lung cancer mortality	Proportion of deliveries attended by trained personnel	Adolescent fertility	Perinatal mortality	Maternal mortality
Unit	0 (worst) -4 (best)	4 (worst) -16 (best)	%	%	d/ 100,000 population	d/ 100,000 population	%	d/ 1,000 women aged 15-19	d/ 1,000 lb	d /100,000 lb
Year	2010	2010	2006	2006	ca. 2013	ca. 2013	ca. 2009	2009	ca. 2013	ca. 2013
Aruba					18.1	6.8	100	49.9	4.6	36.1
Bahamas	1	7	15.7	4.6	8.4	4.1	99	30.5	4.9	64.1
Barbados	4	10	10.8	2.1	9.6	3.8	100	23.5	7.3	28.7
Belize	1	6	17.3	1.7	14.2	4.0	93.5	75.8	10.2	31.4
Cuba	2		21.7	12.5	28.8	16.1	99.9	44.4	1.9	48.8
Grenada	1	7	15.6	4.6	17.9	4.4	100	44.4	5.6	19.7
Guadeloupe					11.3	3.8	99.9	18.3	2.5	11.9
Guyana	2	8	26.5	3.4	3.2	1.7	95.8	96	7.7	109.0
Jamaica	1	10	26.9	4	19.8	5.3	95.7	74.4	9.7	39.6
Martinique					9.1	4.7	99.9	21.8	4.4	35.2
Puerto Rico					10.2	4.4	100	48.9	4.0	12.2
St. Lucia	1	7	16.1	4.8	11.6	3.5	100	34.8	10.3	41.7
St. Vincent and the Grenadines	1	6	15.9	2.2		8.2	98.9	26.9	11.7	53.6
Suriname	1	7	10.1	2.3	16.7	7.1	90	37.8	11.1	70.3
Trinidad and Tobago	4	10	27.2	7.1		14.8	99.7	36.8	6.2	46.1
U.S. Virgin Islands					11.4	5.2	99.3	6.5	4.1	0.0

Sources:

- Policies on smoke-free environments<sup>12</sup>
- Mpower sumscore (calculated from data in reference <sup>12</sup>)
- Male age-standardised prevalence daily smoking<sup>13</sup>
- Female age-standardised prevalence daily smoking<sup>13</sup>
- Male lung cancer mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Female lung cancer mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Proportion of deliveries attended by trained personnel (PAHO basic indicator database (<http://ais.paho.org/phis/viz/basicindicatorbrowser.asp>))
- Adolescent fertility, (PAHO basic indicator database (<http://ais.paho.org/phis/viz/basicindicatorbrowser.asp>))
- Perinatal mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Maternal mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))

Table A3 (continued) Health policy performance indicators, by country

Indicator	6. Child health				7. Diabetes					
	Low birthweight proportion	Measles immunization	Postneonatal mortality	Accidental injury mortality among children	Male age-standardized raised blood glucose	Female age-standardized raised blood glucose	Male age-standardized obesity prevalence	Female age-standardized obesity prevalence	Male diabetes mortality	Female diabetes mortality
Unit	%	%	d/ 1,000 lb	d/ 100,000 children aged 0-14	%	%	% of population aged 18 and older	% of population aged 18 and older	d/ 100,000 population	d/ 100,000 population
Year	2006-2009	ca. 2008	ca. 2013	ca. 2013	2009-2010	2009-2010	2009-2010	2008	ca. 2013	ca. 2013
Aruba	7.7	95.0	1.2	15.2	4.6	6			1.9	0.9
Bahamas	12.9	90.0	3.3	9.6	11.6	12.1	26.4	40.2	5.9	4.9
Barbados	12.4	94.0	4.5	1.7	12.3	14.2	20.7	35.9	2.7	2.3
Belize	8.4	96.0	5.1	8.5	9.9	12.7	14.4	27.2	8.1	9.5
Cuba	5.1	100.0	1.9	4.4	7.7	8.9	16.1	28.9	1.2	1.2
Grenada	7.5	100.0	2.6	9.1	9.3	11.9	15.4	31.8	7.5	7.1
Guadeloupe	9.4	84.0	2.7	4.9	7	9.1			2.3	1.0
Guyana	10.2	95.0	5.4	13.2	9.2	11.5	12.1	29.3	6.1	8.5
Jamaica	12.1	87.0	2.1	1.4	8.8	11.9	15.7	33	4.4	7.1
Martinique	12.9		1.7	5.4	6.2	8.2			0.9	0.3
Puerto Rico	12.4	93.2	3.0	1.1	11.1	13.2			6.3	3.6
St. Lucia	11.0	100.0	3.6	4.2	12.1	12.9			2.6	7.0
St. Vincent and the Grenadines	7.9	100.0	5.2	7.4	9.3	10.5	15.1	28.6	4.8	8.4
Suriname	10.9	86.0	4.2	11.9	10.4	11.5	16.5	30.2	6.9	7.8
Trinidad and Tobago	10.2	91.0	4.8	7.9	13	14.5	19.1	34.6	11.3	9.8
U.S. Virgin Islands	9.5	100.0	1.3	9.2					4.2	1.3

Sources:

- Low birthweight proportion (PAHO basic indicator database (<http://ais.paho.org/phis/viz/basicindicatorbrowser.asp>))
- Measles immunization (PAHO basic indicator database (<http://ais.paho.org/phis/viz/basicindicatorbrowser.asp>), Guadeloupe: ([file:///C:/Users/user1/Downloads/ORSaG\\_vaccinationRRO\\_FT2011.pdf](file:///C:/Users/user1/Downloads/ORSaG_vaccinationRRO_FT2011.pdf)), Puerto Rico: (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6433a1.htm>))
- Postneonatal mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Accidental injury mortality among children (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Male age-standardized raised blood glucose<sup>14</sup>, Aruba: STEPS Survey 2006 ([http://www.who.int/chp/steps/Aruba\\_2006\\_STEPS\\_FactSheet.pdf](http://www.who.int/chp/steps/Aruba_2006_STEPS_FactSheet.pdf)), Martinique and Guadeloupe<sup>15</sup>, Puerto Rico: Centers of Disease Control and Prevention (<http://www.cdc.gov/diabetes/statistics/prev/national/fighispanichsex.htm>)
- Female age-standardized raised blood glucose<sup>14</sup>, Aruba: STEPS Survey 2006 ([http://www.who.int/chp/steps/Aruba\\_2006\\_STEPS\\_FactSheet.pdf](http://www.who.int/chp/steps/Aruba_2006_STEPS_FactSheet.pdf)), Martinique and Guadeloupe<sup>15</sup>, Puerto Rico: Centers of Disease Control and Prevention (<http://www.cdc.gov/diabetes/statistics/prev/national/fighispanichsex.htm>)
- Male age-standardized obesity prevalence (Global Health Observatory Data Repository (<http://apps.who.int/gho/data/node.main.A900A?lang=en>), Martinique and Guadeloupe: PODIUM Survey 2009)
- Female age-standardized obesity prevalence (<http://apps.who.int/gho/data/node.main.A900A?lang=en>), Martinique and Guadeloupe: PODIUM Survey 2009)
- Male diabetes mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Female diabetes mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))

Table A3 (continued) Health policy performance indicators, by country

Indicator	8. Hypertension				9. Alcohol					
	Male age-standardized mean systolic blood pressure 18+	Female age-standardized mean systolic blood pressure 18+	Male stroke mortality	Female stroke mortality	Sumscore alcohol policy	Total male consumption (drinkers only)	Total female consumption (drinkers only)	Patterns of drinking score	Male alcohol mortality	Female alcohol mortality
Unit	mmHg	mmHg	d/ 100,000 population	d/ 100,000 population	0 (worst)-4 (best)	liters of pure alcohol	liters of pure alcohol	1 (least)-5 (most) risky behaviour	d/ 100,000 population	d/ 100,000 population
Year	2010	2010	ca. 2013	ca. 2013	2010	2010	2010	2010	ca. 2013	ca. 2013
<b>Aruba</b>			30.9	19.0					16.6	3.7
<b>Bahamas</b>	129.8	122.3	26.8	19.9	4	14.9	9	2	10.2	3.1
<b>Barbados</b>	127.9	123.5	37.7	19.4	1	13.1	6.3	2	12.6	1.8
<b>Belize</b>	125.4	118.9	33.3	24.5	1	32.1	21.2	4	34.0	14.5
<b>Cuba</b>	126.7	121.7	25.8	17.6	4	12.3	3	2	17.5	3.1
<b>Grenada</b>	131.6	125.9	52.2	37.0	2	29.9	19.6	4	17.4	2.5
<b>Guadeloupe</b>			22.2	9.6					22.7	3.5
<b>Guyana</b>	126.8	123.5	67.0	50.2	2	16.7	9.5	3	30.7	8.9
<b>Jamaica</b>	126.5	123.4	40.1	31.4	2	12.5	7.8	2	3.8	1.2
<b>Martinique</b>			15.0	7.3	1				16.2	1.7
<b>Puerto Rico</b>			12.6	6.8		-	-		10.6	1.7
<b>St. Lucia</b>	130.5	125.6	39.6	25.0	1	24	14	3	19.4	5.8
<b>St. Vincent and the Grenadines</b>	128.6	123.4	53.6	29.0	0	13.6	8.9	2	13.7	3.4
<b>Suriname</b>	127.9	123.9	74.4	41.2	1	15.1	9.3	3	20.0	4.2
<b>Trinidad and Tobago</b>	127.6	120.4	43.2	24.5	1	15.6	9.6	2	15.5	4.4
<b>U.S. Virgin Islands</b>			11.0	8.7					16.6	3.8

Sources:

- Male age-standardized mean systolic blood pressure 18+ (Global Health Observatory data repository (<http://apps.who.int/gho/data/view.main.12467>))
- Female age-standardized mean systolic blood pressure 18+ (Global Health Observatory data repository (<http://apps.who.int/gho/data/view.main.12467>))
- Male stroke mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Female stroke mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Sumscore alcohol control policies (Global Information System on Alcohol and Health (<http://www.who.int/gho/alcohol/en/>))
- Total male consumption (drinkers only) (Global Information System on Alcohol and Health (<http://www.who.int/gho/alcohol/en/>))
- Total female consumption (drinkers only) (Global Information System on Alcohol and Health (<http://www.who.int/gho/alcohol/en/>))
- Patterns of drinking score (Global Information System on Alcohol and Health (<http://www.who.int/gho/alcohol/en/>))
- Male alcohol mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Female alcohol mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))



Table A3 (continued) Health policy performance indicators, by country

Indicator	10. Road safety				11. Violence				
	Speed laws: effectiveness of enforcement	Road traffic deaths	Male road traffic mortality	Female road traffic mortality	Gun policy score	Number of firearms	Adolescents aged 13-15 who were bullied on one or more days during the past 30 days	Male homicide mortality	Female homicide mortality
Unit	0 (worst) -10 (best)	d/ 10,000 registered vehicles	d/ 100,000 population	d/ 100,000 population	0 (worst) -10 (best)	d/ 100 population	%	d/ 100,000 population	d/ 100,000 population
Year	2013	ca. 2010	ca. 2013	ca. 2013	2016	2009	2002-2011 (latest available)	ca. 2013	ca. 2013
Aruba		19.7	27.4	8.4	5			8.8	0.8
Bahamas	6	17.3	22.4	6.2	4	5	23.6	63.9	7.3
Barbados	4	5.8	11.4	4.8	5	8	13.3	3.5	0.3
Belize	2	58.5	47.3	8.7	6	10	30.7	80.0	8.0
Cuba	8	80.3	11.7	3.0	7	5		7.6	2.5
Grenada			11.7	3.4	3		27.2	7.1	1.4
Guadeloupe		12.8	28.0	4.8	9			8.9	1.0
Guyana	4	554.1	28.3	4.0	4	15	38.4	22.9	5.7
Jamaica	6	23.8	14.7	4.3	5	8	40.2	37.9	5.1
Martinique		7.8	13.8	0.8	9			4.6	0.1
Puerto Rico		7.9	15.6	3.3	9			44.2	3.3
St. Lucia	0	12.9	26.3	5.5	5		25.1	40.4	5.3
St. Vincent and the Grenadines	8	12.1	16.5	4.3	6		29.9	35.7	6.9
Suriname	6	26.7	28.0	7.1	6	13	26.3	12.4	4.3
Trinidad and Tobago	0	29.7	27.5	7.5	8	2	15.4	65.5	7.3
U.S. Virgin Islands			19.1	3.8	5			115.2	7.6

Sources:

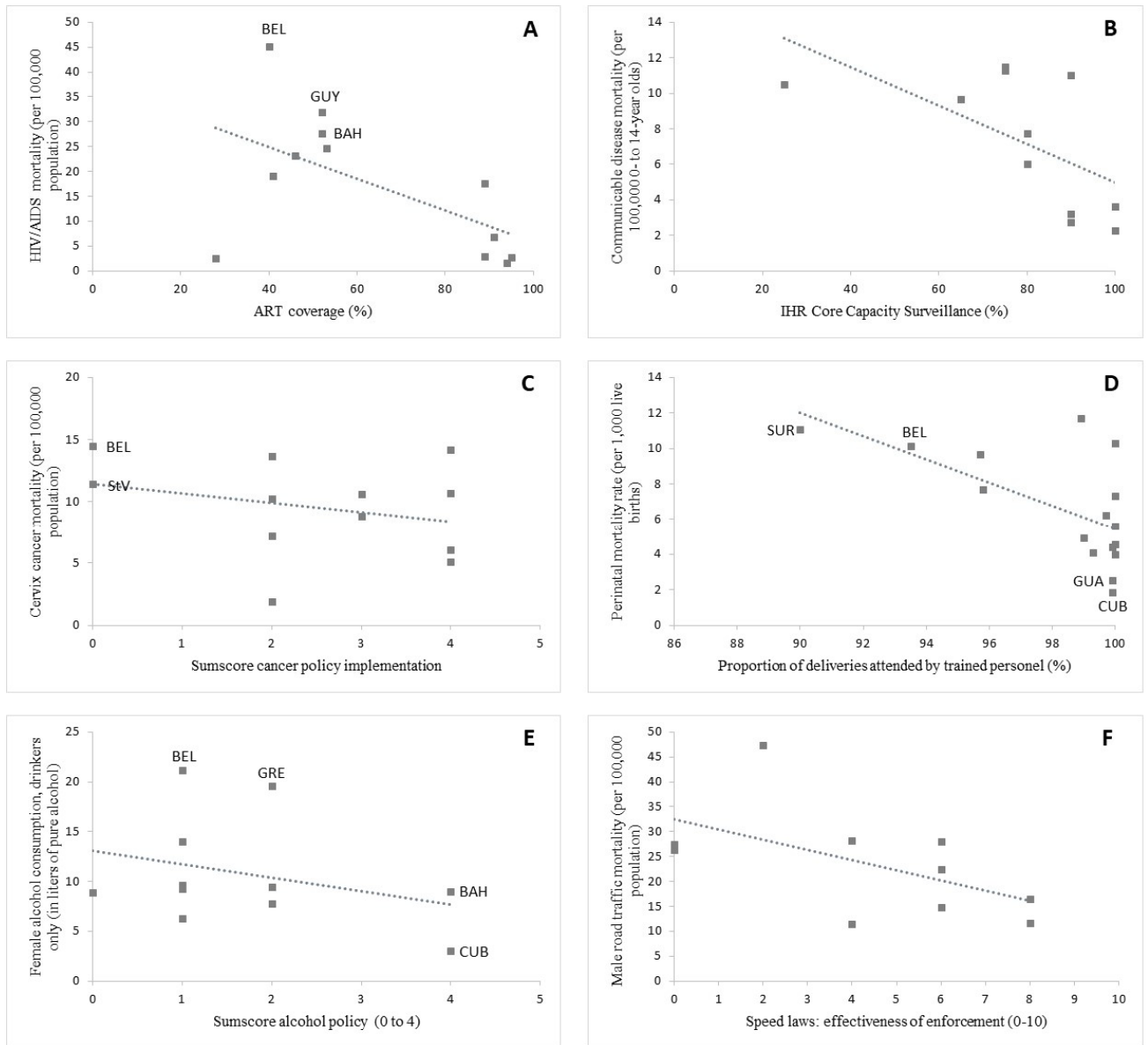
- Speed laws: effectiveness of enforcement <sup>16</sup>
- Composite score on effectiveness of enforcement (calculated from data in reference <sup>16</sup>)
- Road traffic deaths per 10,000 registered vehicles (calculated from data in reference <sup>16</sup>)
- Male road traffic mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Female road traffic mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Gun policy score (calculated from data in: Alpers, Philip and Amélie Rossetti. 2016. Gun Facts, Figures and the Law ([www.gunpolicy.org/firearms/region/caribbean](http://www.gunpolicy.org/firearms/region/caribbean)))
- Number of firearms (Small arms survey 2007 (<http://www.smallarmssurvey.org/>))
- Adolescents aged 13-15 who were bullied on one or more days during the past 30 days (Global Student Health Survey ([www.who.int/chp/gshs/en/](http://www.who.int/chp/gshs/en/)))
- Male homicide mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))
- Female homicide mortality (WHO Mortality Database ([www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)))

**Table A4** Calculation health policy performance summary score

Unit	Total number of available indicators		Upper tertile (best)		Lower tertile (worst)		Summary score	Rank
	n	%	N	%	n	%		
<b>Aruba</b>	31	100	13	41.9	7	22.6	19.3	7
<b>Bahamas</b>	50	100	9	18.0	19	38.0	-20.0	11
<b>Barbados</b>	50	100	24	48.0	9	18.0	30.0	5
<b>Belize</b>	50	100	9	18.0	29	58.0	-40.0	14
<b>Cuba</b>	48	100	33	68.8	8	16.7	52.1	2
<b>Grenada</b>	47	100	14	29.8	14	29.8	0.0	9
<b>Guadeloupe</b>	30	100	18	60.0	4	13.3	46.7	3
<b>Guyana</b>	50	100	9	18.0	29	58.0	-40.0	14
<b>Jamaica</b>	50	100	18	36.0	17	34.0	2.0	8
<b>Martinique</b>	31	100	24	77.4	2	6.5	70.9	1
<b>Puerto Rico</b>	32	100	15	46.9	6	18.8	28.1	6
<b>St. Lucia</b>	47	100	6	12.8	19	40.4	-27.6	12
<b>St. Vincent and the Grenadines</b>	49	100	15	30.6	19	38.8	-8.2	10
<b>Suriname</b>	50	100	4	8.0	29	58.0	-50.0	16
<b>Trinidad and Tobago</b>	50	100	8	16.0	27	54.0	-38.0	13
<b>U.S. Virgin Islands</b>	26	100	13	50.0	5	19.2	30.8	4

We calculated the health policy performance summary score following Mackenbach & McKee<sup>17</sup>. First, we determined whether a certain value fell in the lower, intermediate or upper tertile of the distribution for each selected indicator. Next, we calculated the percentage of scores falling in the upper and the percentage of scores falling in the lower tertile based on the total number of indicators available for each Caribbean state. Finally, we combined these calculations by subtracting the percentage of scores falling in the upper and the percentage of scores falling in the lower tertile.

**Figure A1** Associations between selected health outcome and policy indicator per health policy area. BAH=the Bahamas, BEL=Belize, CUB=Cuba, GRE=Grenada, GUA=Guadeloupe, GUY=Guyana, StV=St. Vincent & the Grenadines, SUR=Suriname



**Table A5** Association between health policy performance summary score and country characteristics, without Cuba

<b>Indicator</b>	<b>n</b>	<b>R</b>	<b>r<sup>2</sup></b>	<b>P</b>
<b>Demographic characteristics</b>				
Population (in numbers)	15	0.09	0.007	0.76
Population density (in km <sup>2</sup> )	15	0.71	0.50	<b>&lt;0.01</b>
<b>Economical characteristics</b>				
GDP per capita (current US\$)	14	0.74	0.55	<b>&lt;0.01</b>
<b>Health system characteristics</b>				
Total health expenditure as % of the GDP	10	0.14	0.02	0.71
Total expenditure on health per capita at Purchasing Power Parity (NCU per US\$)	10	0.30	0.09	0.40
General government expenditure on health per capita Purchasing Power Parity (NCU per US\$)	10	0.44	0.20	0.20
General government expenditure on health as % of GDP	10	0.25	0.06	0.48
<b>Governance characteristics</b>				
Current sovereignty status	15	0.78	0.61	<b>&lt;0.01</b>
Years since independence	15	-0.70	0.50	<b>&lt;0.01</b>
Government Effectiveness	14	0.65	0.42	<b>0.01</b>
Voice and Accountability	14	0.26	0.07	0.36
Political Stability and Absence of Violence/Terrorism	14	0.33	0.11	0.25
Regulatory Quality	14	0.74	0.54	<b>&lt;0.01</b>
Rule of Law	14	0.63	0.40	<b>0.01</b>
Control of Corruption	14	0.58	0.34	<b>0.03</b>
<b>Cultural characteristics</b>				
Ethnic fractionalization index	10	-0.81	0.65	<b>&lt;0.01</b>
Language fractionalization index	15	-0.36	0.13	0.19
Religion fractionalization index	15	-0.65	0.43	<b>&lt;0.01</b>

Data sources:

-Population (in numbers), population density (in km<sup>2</sup>), GDP per capita (current US\$), 2000, were extracted from the United Nations database ([www.data.un.org](http://www.data.un.org))

-Total health expenditure as % of the GDP, total expenditure on health per capita at Purchasing Power Parity (NCU per US\$), general government expenditure on health per capita Purchasing Power Parity (NCU per US\$), general government expenditure on health as % of GDP, 2004, were extracted from the WHO Global Health Expenditures database (<http://apps.who.int/nha/database>)

-Current political sovereignty (1=sovereign, 2= affiliated) and years since independence, 2010, were derived from reference <sup>18</sup>

-Government Effectiveness, Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, Control of Corruption (ranges from -2.5 (weak) to 2.5 (strong) governance performance), 2000, were extracted from the Worldwide Governance Indicators database (<http://info.worldbank.org/governance/wgi/#home>)

-Ethnic fractionalization index, language fractionalization index, religion fractionalization index (ranges from 0 (low) to 1 (high) diversity), 2001, were extracted from reference <sup>19</sup>.

**Table A6** Association between partial health policy performance scores and country characteristics

	Policy implementation		Intermediate outcomes		Final outcomes	
	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>
<b>Demographic characteristics</b>						
Population (in numbers)	0.49	0.05	0.19	0.48	0.26	0.33
Population density (per km <sup>2</sup> )	0.45	0.08	0.37	0.16	0.62	<b>0.01</b>
<b>Economical characteristics</b>						
GDP per capita (current US\$)	0.52	0.05	0.36	0.19	0.62	<b>0.01</b>
<b>Health system characteristics</b>						
Total health expenditure as % of the GDP	0.48	0.14	-0.26	0.44	0.29	0.39
Total expenditure on health per capita at Purchasing Power Parity (NCU per US\$)	0.12	0.72	-0.24	0.48	0.12	0.73
General government expenditure on health per capita Purchasing Power Parity (NCU per US\$)	0.21	0.53	-0.09	0.80	0.24	0.48
General government expenditure on health as % of GDP	0.67	<b>0.02</b>	0.43	0.19	0.48	0.14
<b>Governance characteristics</b>						
Current sovereignty	0.45	0.08	0.54	<b>0.03</b>	0.67	<b>&lt;0.01</b>
Years independent	0.06	0.82	-0.16	0.55	-0.28	0.29
<b>Governance characteristics</b>						
Government Effectiveness	0.41	0.13	0.17	0.55	0.51	0.05
Voice and Accountability	-0.42	0.12	-0.31	0.27	-0.09	0.76
Political Stability and Absence of Violence/Terrorism	-0.09	0.76	0.24	0.38	0.33	0.23
Regulatory Quality	0.10	0.72	0.10	0.73	0.40	0.14
Rule of Law	-0.02	0.94	0.20	0.47	0.41	0.13
Control of Corruption	0.50	0.06	0.27	0.33	0.60	<b>0.02</b>
<b>Cultural characteristics</b>						
Ethnic fractionalization index	-0.18	0.61	-0.05	0.88	-0.66	<b>0.03</b>
Language fractionalization Index	-0.58	<b>0.02</b>	-0.08	0.77	-0.38	0.15
Religious fractionalization Index	-0.45	0.08	-0.34	0.19	-0.73	<b>&lt;0.01</b>

**Table A7** Results forward selection multivariate regression analysis, without Cuba

<b>Variable</b>	<b>B</b>	<b>SE</b>	<b><math>\beta</math></b>	<b>P-value</b>	<b>R-square</b>
<b>Model 1</b>					0.85
Population density (per km <sup>2</sup> )	0.12	0.02	0.92	<0.01	
<b>Model 2</b>					0.95
Population density (per km <sup>2</sup> )	0.07	0.02	0.56	<0.01	
Ethnic fractionalization index	-52.86	15.12	-0.47	0.01	
<b>Model 3</b>					0.97
Population density (per km <sup>2</sup> )	0.05	0.02	0.40	0.01	
Ethnic fractionalization index	-68.00	12.63	-0.61	<0.01	
Number of years independent in 2010	0.69	0.26	0.20	0.04	
<b>Model 4</b>					0.99
Population density (per km <sup>2</sup> )	0.04	0.01	0.34	<0.01	
Ethnic fractionalization index	-60.54	9.11	-0.54	<0.01	
Number of years independent in 2010	0.88	0.20	0.26	<0.01	
Rule of law	6.37	2.30	0.18	0.04	

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