Burden of disease
The burden of disease (BoD) is a combined measure of life-years lost due to premature death and years lived with disability due to temporary or permanent ill health or impaired function. The BoD is thus not only an expression of individuals’ and families’ suffering but also a measure of lost productivity and opportunities for social and economic development for the country. The technical measure for the burden of disease is “disability adjusted life-years” (DALY).

For Suriname, the total BoD, i.e., number of DALYs lost per year is 168,200. The shares contributed by “Communicable, maternal, neonatal, and nutritional disorders”, “Non-communicable diseases” and “Injuries” are 27%, 58%, and 15% respectively. The 15 single largest contributors to the BoD are shown in the table.

The table also shows Suriname’s rank among 15 comparator countries. It is noticeable that for ten of the 15 largest contributors to BoD, Suriname ranks at or near the bottom among the comparator countries.

Social determinants and inequity in health
The health of a population is largely determined by the conditions under which people are born, grow, live and die. Studies done elsewhere suggest that individual health care only explains about 20% of the level and distribution of population health. The remaining 80% is shaped by a range of social determinants (50%) and individual health behaviours (30%). However, health behaviours are in turn also shaped by social determinants. Sustained improvements to the overall level of health and to health equity thus must begin with identifying and addressing the important determinants. Health care services might compensate for some inequities in health. However, they might also further amplify already existing inequities.

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1 Suriname’s burden of disease rank among 15 comparator countries (15 is worst): Panama, Iran, Brazil, Serbia, South Africa, Cuba, Montenegro, Jamaica, Macedonia, Saint Vincent and the Grenadines, Dominican Republic, Colombia, Dominica, Belize. In GDB Profile: Suriname 2010 http://www.healthdata.org/sites/default/files/files/country_profiles/GBD/ihme_gbd_country_report_suriname.pdf

2 http://www.countyhealthrankings.org/
Risk factors

Overall, the three risk factors that account for the most disease burden in Suriname are dietary risks, high blood pressure, and high body-mass index. The leading factors for children under 5 and adults 15-49 years were suboptimal breastfeeding and occupational risks, respectively, in 2010.

The above graph illustrates the close links between the disease burden and social determinants. Addressing the social determinants will influence the risk factors, the level of disease and health, and health equity.

Inequity in health is not only unfair it also represents lost social and economic development opportunities for communities and the society at large. For each of the 15 largest contributors to the BoD in Suriname (table), master sheets have been prepared briefly describing the situation with respect to the burden of disease, risk factors, inequity and an analysis of the social determinants at play shaping the health of the Surinamese people.

3 In GDB Profile: Suriname 2010
1. HIV/AIDS

According to the Global Burden of Disease data 2010, Human Immunodeficiency Virus infection (HIV) and Acquired Immune Deficiency Syndrome (AIDS) represent the largest burden from a single disease in Suriname. While in absolute numbers there may be more people dying from stroke and ischemic heart disease at old age, death and disability due to HIV/AIDS is the main cause of premature death and years lived with disability. AIDS also affects younger population groups, including new-borns – thus the years of life lost are higher than for diseases that kill at a later stage in life. People living with HIV/AIDS require lifelong treatment, and as such the burden and cost to the health system are high. Pregnant women with HIV need treatment to prevent them from infecting their child.

**Main risk factors:** Unsafe sex, multiple casual sex partners, sexual abuse, co-existence of untreated other sexually transmitted infections (STI), sharing of injecting needles.

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![AIDS mortality rate per 10,000 by district (2010)](image)

**Disease / condition (per 10 000) by wealth quintile**

Currently, no data is available on HIV in Suriname by wealth quintile. Globally, there is conflicting evidence regarding the connection between wealth and HIV. Generally, evidence suggests that HIV is prevalent across all wealth quintiles.

![HIV prevalence by ethnicity and sex per 10,000 (2014)](image)

**Risk factor (per 10,000) by ethnicity**

The quick assessment did not find data on a risk factor for HIV/AIDS. Data should be collected on risk factors such as condom use, sexual networks or multiple partners among the whole (reproductive) population for both men and women.

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Source (ethnicity and sex data): Ministry of Health, Suriname Epidemiological Profile 2000-2013, mortality data; HIV infections 2014, Academic Hospital Surveillance data

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Introduction:
AIDS deaths occurred during 2013 in all but two ethnic groups. However, the AIDS related deaths had a marked concentration in three population groups (Creole, Maroon, and Amerindian), which experienced from 50% to 500% more AIDS deaths or more per 10,000 population compared to the other population groups. Five districts around the capital city (Paramaribo, Para, Saramacca, Wanica, and Brokopondo) saw more than one AIDS death per 10,000 population in 2010. Death from AIDS might be due to further inequities related to access to care, health care seeking and treatment of patients within the health care system. However, it is also likely that there is a considerable underreporting on AIDS death due to stigma. Due to the prevention on mother to child transmission program (PMCTP), which is free of charge and integrated in the primary health care, there is a high success rate of babies born free of HIV.

Society – socio-economic context and position: movement of population groups to urban centres combined with social exclusion

Social, economic and physical environment: particular social norms, including sexual behaviours / practices and gender roles and relations; social stigma and discrimination; poor community settings with alcohol and drugs exposure; male only environments (e.g., prisons and work-camp sites)

Age of first sexual contact, first pregnancy, use of contraceptives, marriage norms, sexual practices and perceptions of health and disease vary across ethnic groups. Most sex workers are active in clubs or in the streets of downtown Paramaribo, and in and around the goldmines in the interior. Sex workers, drug users, and men who have sex with men often live in an atmosphere of illegality, marginalisation, stigma and discrimination. Further studies are needed on the influence of socio-cultural factors (gender, ethnic-cultural, religious, etc.) with regard to sexual behaviour. More women than men are tested: HIV-testing is offered to all pregnant women, while more women than men register at Voluntary Counselling and Testing (VCT) sites. No studies have so far been carried out to gain more insight into such gender differences.

Vulnerability: dysfunctional families; low education; alcohol and drug abuse; co-existence of untreated other sexual transmitted infections (STI); difficult access to STI treatment and HIV/AIDS antiretroviral drug treatment; self-treatment of STIs; lack of access to condoms; sexual abuse.

The use of needles in transmitting HIV is not considered a high risk in Suriname. A survey\(^6\) of the anti-drug council showed high use of marihuana, solvents and inhalants, but hardly any use of needles.

Adolescents are often left on their own in the city; the age of first sexual contact was very low (as low as 10 years); the number of casual sexual partners ranged from 1-5\(^7\). Stigmatization and lack of service for stigmatized groups may play a role in HIV infection and prevention of death due to AIDS; lack of access to care and information, low health care seeking; difficult to reach target groups, especially in the remote interior; and a limited dedicated budget for specific prevention programs to reach vulnerable groups complicate roll out of treatment and surveillance.

A study conducted for Women’s Way in early 2012\(^8\) showed high drug use among MSM, transgenders, tranvestites and she-males with 61% having used drugs at some point and 44% still using drugs, only about half of those with more than one sexual partner had consistently used condoms during the past six months, 38% had never visited any service provider for help with sexuality, sexual health or gender identity, 5% reported having had a STI in the past one year, while 10% were not sure.

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\(^6\) National Household Drug Prevalence Survey 2007 conducted by the executive office of the National Anti-Drug Council (UBN) in collaboration with the Inter-American Drug Abuse Control Commission (CICAD)

\(^7\) Short study by Foundation for Human Development for National AIDS Programme among adolescents, 2008

\(^8\) Behoeften onderzoek ‘Vrouwen die houden van vrouwen’, Julia Terborg
Health care system: low acceptability by sex workers, drug users and men who have sex with men (see above); discrimination; lack of appropriately trained staff; inadequate or weak health services, including lack of continuum of care (high loss in follow-up), low adherence to treatment.

A survey\(^9\) among men having sex with men (MSM) and transgenders showed that 31.7% had experienced no barriers when using the health services, while 18.8% reported stigmatization and discrimination by health workers and 15.9% a lack of confidentiality by health workers. However, about 37.5% of the persons interviewed had never visited a clinic and preference by far was given to care from their own physician above other forms of health services: for information on sexuality/gender identity (56.7%); HIV and other STD testing (46.7%); STD treatment (65.7%).

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\(^9\) Needs assessment onder MSM en transgenders in Suriname, Tienieke Sumter & Zaïre van Arkel, for Stichting Lobi, June 2014
2. Stroke

Stroke is also known as cerebrovascular accident, cerebrovascular insult, or brain attack. It occurs when poor blood flow to the brain causes cell death, either due to lack of blood flow (ischemic stroke) or due to bleeding (haemorrhagic stroke). As a result, part of the brain will not function properly. Signs and symptoms of a stroke include: inability to move or feel one side of the body, problems understanding or speaking, feeling like the world is spinning and loss of vision to one side. Signs and symptoms often appear soon after the stroke has occurred and may be transient or permanent. Long term complications may include pneumonia or loss of bladder control. Prevention includes decreasing risk factors as well as possibly aspirin, statins, surgery to open up the arteries to the brain in those with problematic narrowing, and anticoagulant in those with atrial fibrillation (abnormal heart beat characterized by rapid and irregular beating). A stroke often requires emergency care. An ischemic stroke, if detected within three to four hours, may be treatable with medication that can break down the clot. Some haemorrhagic strokes benefit from surgery. Treatment to try recover lost function is called stroke rehabilitation, ideally taking place in a stroke unit.

Main risk factors: high blood pressure, tobacco smoking, diabetes, obesity, high blood cholesterol, unhealthy diet, processed red meat consumption, heavy alcohol consumption, previous transient attacks, and atrial fibrillation.

Disease / condition (per 10 000) by wealth quintile

No data in Suriname was found on the distribution of stroke across wealth quintiles. However, a global evidence base exists for the connection between poverty and risk of stroke\(^\text{10}\). Low socioeconomic groups were found to have lower survival and greater stroke severity than high socioeconomic groups. Differences in risk-factor prevalence could account for some of this variation.

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Source (Stroke): 2014 Academic Hospital Surveillance data, Ministry of Health, Suriname.
Source (Obesity by ethnicity): STEPS 2013 Academic Hospital Surveillance data, Ministry of Health, Suriname.

Social determinants analysis: Stroke

**Introduction:** The data presented here suggests that Suriname’s districts fall into three categories in terms of burden of disease from stroke: (1) six districts (Wanica, Commewijne, Coronie, Para, Saramacca and Paramaribo all had between 15 and 25 stroke cases per 10,000 population in 2014; (2) three districts, i.e. Marowijne, Nickerie and Brokopondo with less than 10/10,000 stroke deaths in 2014; (3) Sipaliwini stands out from the rest with 0/10,000 reported stroke deaths in 2014. This could well be because cardiovascular patients will go to the city to seek care prior to having a stroke. Hindustanis are most affected, with over 40 cases per 10,000 in 2014 followed closely by Creoles who experienced about 40 cases of stroke per 10,000. Javanese, Maroons and Amerindians are also significantly affected at around 20 cases per 10,000. However, for a large part of the strokes the ethnicity of the patient was not known.

**Society – socio-economic context and position:** a move from low to middle income country; globalization and popularization of fast food; urbanization; skewed distribution of power and resources.

**Social, economic and physical environment:** Marketing and availability of food rich in fat, salt and sugar; infrastructure that does not support walking and cycling; social norms and culture that do not encourage healthy diet and physical activity, including walking and cycling; low access to physical activity facilities. Food supply data indicated increased energy availability per capita over the past four decades (from 2000 kcal in 1961-1963 to ~2700 kcal in 2003-2005). The increased energy availability appears to be related to corresponding increases in fat and sugar availability and possibly reflects changing food consumption patterns. The Global School Health Survey 2009 indicated a continuous high consumption of sugar, with 81% of children in Suriname consuming carbonated soft drinks one or more times per day.

**Vulnerability:** Physical inactivity, over-intake foods and drinks rich in fat, salt and sugar, low (including parental) literacy around nutrition, low intake of healthy food rich in micronutrients, diabetes, genetics, family history, job stress, low health care seeking and lack of access to appropriate health care.

The Global School Health Survey 2009 mentions that the majority of children (73%) aged 13-15 years have less than one hour per day of physical activity. The survey data indicated that 26% of these children were either overweight or obese.

According to STEPS survey, the percentage of people with high blood pressure strongly increases according to age. Above 55 years old, 40-50% of the population suffers from hypertension. In this study about half of the cases were diagnosed for the first time. Hypertension is often called a silent killer, because those with hypertension do not notice until they get a fatal heart attack or stroke.

**Health care system:** lack of preventive care (educational, awareness raising and counselling services); lack of rehabilitative care, equipment and supplies; limited patient interaction.

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12 Idem
13 Idem
3. Preterm Birth Complications

Preterm birth complications are the 3rd largest disease-attributable cause of premature death and disability in Suriname. Preterm is defined as babies born alive before 37 weeks of pregnancy are completed. Many preterm babies die and many survivors face a lifetime of disability, including learning disabilities and visual and hearing problems. In almost all countries with reliable data, preterm birth rates are increasing. Inadequate knowledge on antenatal and pregnancy care and distance to a clinic is also known to increase the risk of inadequate antenatal care uptake, resulting in the inability to deal with preterm birth complications.

**Main risk factors:** multiple pregnancies; use of alcohol, tobacco or illicit drugs during pregnancy; infections and chronic diseases, such as diabetes and high blood pressure; high as well as low maternal age; nutrition; inadequate antenatal care; induction of labour or caesarean section, whether for medical or non-medical reasons; use of auto-abortion medicine and traditional auto-abortion practices; distance to clinic, changes in obstetric practices (more caesarean sections); genetics, iron deficiency anaemia.

<table>
<thead>
<tr>
<th>Disease / condition (per 10,000) by district</th>
<th>Disease / condition (per 10,000) by wealth quintile</th>
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<tbody>
<tr>
<td>Disease condition (per 10,000) by ethnicity and sex</td>
<td>Risk factor (per 10,000) by ethnicity</td>
</tr>
</tbody>
</table>
Introduction

The quick assessment found that no data is currently available on preterm birth complications. More studies are needed to assess the extent of these complications and the burden on the public’s health. Service reporting systems as well as repeated national surveys could be considered to include data collection on preterm births and related complications.

Society – socio-economic context and position: Urbanization; social status, economic, social or political inequality

Social, economic and physical environment: social norms, gender roles, cultural beliefs and practices, age of marriage, start of sexual activity, and maternal age; slum formation, crowding; clustering, deprivation;

Vulnerability: hard-to-reach populations; poverty; low access to health care; low health-seeking behaviour; low (parental) literacy, education and knowledge; low access to contraceptives and family planning; early childhood experiences, including abuse; sexual violence; lack of social capital, dysfunctional family or community links; low status of women; migration and work mobility; family size and birth order; neglect of the infant.

The lowest contraceptive prevalence is in Brokopondo (26%) and Sipaliwini (25%)\textsuperscript{14}. Women’s education is strongly associated with contraceptive prevalence: 19% of women with no formal education use contraceptives; 42% of women with primary education; 52% of women with at least secondary education. The total unmet need for contraception is also highest in Brokopondo (33%) and Sipaliwini (34%). Because of stigma, girls with complicated pregnancies often show up (too) late at the clinic. Lack of outreach or early detection programs hampers early response to these cases. In small settlements where everybody knows one another, young people who are sexually active prefer not to use contraceptives rather than their status should be discovered and questions asked.

Health care system: qualification of health staff; inadequate or weak health services; inequitable services; limited patient interaction and low social class.

According to MICS (2010), 92% of women delivered their babies in a health facility: 72% in a public facility; 21% in a private facility. Only 4% delivered at home. Women in urban areas (95%) were somewhat more likely to deliver in a health facility than in the rural areas (88%).

\textsuperscript{14} Suriname MICS (2010), http://microdata.worldbank.org/index.php/catalog/1913
4. Ischemic heart disease

Ischemic heart disease ranks 4th in terms of burden of disease in Suriname and is also known as coronary artery disease, atherosclerotic heart disease atherosclerotic cardiovascular disease, and coronary heart disease. It is a group of diseases that includes: stable angina, unstable angina, myocardial infarction and sudden coronary death and is among the most common type of cardiovascular diseases. A common symptom is chest pain and discomfort which may travel into the shoulder, arm, back, neck, or jaw. Usually symptoms occur with exercise or emotional stress, last less than a few minutes, and gets better with rest. Shortness of breath may also occur and sometimes no symptoms are present. The first sign is occasionally a heart attack and complications include heart failure and irregular heartbeat. Prevention is by eating a healthy diet, regular exercise, maintaining a healthy weight and not smoking. Sometimes medication for diabetes, high cholesterol, or high blood pressure is also used. Treatment involves the same measures as prevention. Additional medications such as aspirin, beta blockers, or nitro-glycerine may be recommended. In severe cases, procedures such as percutaneous coronary intervention or coronary artery bypass surgery may be used.

**Risk factors include:** high blood pressure, tobacco smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, excessive alcohol consumption, depression, and family history.

**Disease / condition (per 10 000) by wealth quintile**

This quick assessment has not found data on the distribution of cardiovascular disease by wealth. However, data on various risk factors was collected as part of the STEPS study in Suriname. The patterns found in distribution of risk factors in Suriname closely follow the distribution of cardiovascular disease risk in countries with similar income, and suggest that the burden of disease for cardiovascular illness is largest among the poorest and poorer quintiles, compared to middle and higher quintiles.

**Cardiovascular disease** by ethnicity and sex per 10,000 (2012)

Source (Smoking by wealth quintile): STEPS 2013 Academic Hospital Surveillance data, Ministry of Health, Suriname.
Social determinants analysis: Ischemic Heart Disease

Introduction: There is little specific data on ischemic heart disease in Suriname. However, data currently available suggests that the prevalence of cardiovascular disease (including ischemic heart disease and stroke among others) is considerably higher in Sipaliwini and Brokopondo compared to the other districts. In Sipaliwini district almost 10% and in Brokopondo 4% of the population suffers from cardiovascular disease. For the other districts the prevalence is around 2% or lower. 10% of the female and nearly 4% of the male Maroon population suffers, while within the Hindustani population the prevalence is almost the same among males and females, i.e., close to 4%. Among the other ethnic groups the prevalence is less than 2%. For all these groups, except Caucasians and Chinese, the female prevalence is higher than that of the males. Of note, a large inequity exists in terms of distribution of risk factor hypertension: according to STEPS data (2012) Amerindians and Maroons are most suffering from hypertension, which indicates an unmet need for these populations and might explain high detected prevalence in Sipaliwini and Brokopondo districts, but low count at the facility level (data not shown). Academic hospital data, however, suggests that ischemic heart disease happens most in Hindustani population, but this might be because more Hindustanis seek care at the Academic Hospital than Amerindians or Maroons, since the patients of the Medical Mission are serviced by Diakonessenhuis.

Society – socio-economic context and position: a move from low to middle income country; globalization and popularization of fast food; urbanization; skewed distribution of power and resources.

Social, economic and physical environment: social norms about gender roles, preferred food and body shape; marketing and availability of food rich in fat, salt and sugar; lack of infrastructure that supports walking and cycling, social norms and culture that do not encourage healthy diet and physical activity, including walking and cycling; low access to physical activity facilities.

Obesity among women in Suriname is particularly worrying. A quarter of the women in age-group 15-24 years was found to be obese; more than half in the age-group 25-34 years, and in age-group 55-64 years more than three-quarters were obese15.

Vulnerability: Physical inactivity, over-intake of foods and drinks rich in fat, salt and sugar, low (including parental) literacy around nutrition, low intake of healthy food rich in micronutrients, diabetes, genetics, family history, job stress; low health care seeking; lack of access to appropriate health care, including, preventive care and to secondary care by residents in emote districts.

The National Action Plan for the Prevention and Control of Non-communicable Diseases 2012-2016 mentions that the majority of children (73%) aged 13-15 years have physical activity of less than one hour per day. The survey data indicated that 26% of these children were either overweight or obese.

According to the STEPS survey, the percentage of people with high blood pressure strongly increases according to age. Above 55 years old, 40-50% of the population suffers from hypertension. In this study about half of the cases were diagnosed for the first time. Hypertension is often called a silent killer, because those with hypertension do not notice until they get a fatal heart attack or stroke.

Health care system: lack of appropriately trained primary health care staff as well as of specialists to treat ischemic heart disease, lack of equipment and supplies; limited patient interaction.

15 Suriname STEPS Study (2013), Ministry of Health, Suriname.
5. Self-Harm (*including suicide*)

Self-harm represents the 5th largest cause of burden of disease in Suriname. The most common form of self-harm or self-injury is skin-cutting, but self-harm covers a wide range of behaviours including, but not limited to, burning, scratching, banging or hitting body parts, interfering with wound healing, hair-pulling and the ingestion of toxic substances or objects. There is also an increased risk of suicide in individuals who self-harm to the extent that self-harm is found in 40–60% of suicides. However, generalising self-harmers to be suicidal is, in the majority of cases, inaccurate. The motivations for self-harm vary; it may be used to fulfil a number of different functions, e.g.: as a coping mechanism providing temporary relief of intense feelings such as anxiety, depression, stress, emotional numbness or a sense of failure or self-loathing, low self-esteem or perfectionism. Self-harm is often associated with a history of trauma and emotional and sexual abuse. Self-harm is most common in adolescence and young adulthood, usually first appearing between the ages of 12 and 24, however, it can occur at any age.

**Main risk factors:** depression, low self-esteem or perfectionism, lack of perspective, history of abuse, neglect.

![Diagrams of Suicide per 10,000 by district (2010) and Suicide by ethnicity and sex per 10,000 (2010)]

**Disease / condition (per 10 000) by wealth quintile**

*Although no data was found for self-harm and suicide by wealth quintile in Suriname, participants provided suggestions that suicide in Suriname is linked with lack of economic opportunity. This is supported by global evidence, where low income was found to be related to socioeconomic status*\textsuperscript{16}.

**Risk factor (per 10,000) by ethnicity and sex**

*Previous self-harm, depression and suicidal attempts as well as a (family) history with psychiatric incidents are generally accepted as key risk factors for self-harm and suicide. However, no data was found on any of these risk factors.*

Source: Bureau of Health (BOG), Doodsoorzaken in Suriname 2010-2011 (2012), mortality data

Social determinants analysis: Self Harm (including suicide)

Introduction

The quick assessment has not found specific data on self-harm beyond those on suicide presented on the recto page. This could suggest under-recognition and the need for improving service awareness and reporting, as well as targeted studies and inclusion in repeated national surveys.

Suicide rates in Commewijne, Nickerie, Saramacca and Wanica are between four and six times higher than in Paramaribo and Brokopondo. Among Hindustani, Caucasian and Amerindians, suicide rates are between three and nine times higher than among Javanese and Mixed population groups. Suicide rates among males are generally higher than among females. One of the factors could be that men have difficulty in expressing and communicating their emotions in a constructive way. This is often also the result of the stereotyped child raising practices, where boys/men are urged to be “strong”.

Society – socio-economic context and position: Distribution of power and resources; rights of individuals; urbanization and social exclusion.

Social, economic and physical environment: social norms and cultural changes, including men experiencing disjuncture between traditional roles and opportunities in contemporary society, macho-expectations, and loss of valued status; lack of job and education opportunities in particular for youth; intergenerational and historical trauma; community settings and infrastructure; availability of pesticides.

Strong social control and closed social structure, and clashes between generations about rigid family rules have been found in Suriname, especially among Hindustani communities\(^\text{17}\);

Vulnerability: poverty and unemployment; low education and knowledge; community and family dysfunction; domestic violence; alcohol and substance abuse; low health care seeking and access to appropriate health care; adverse childhood experiences, including sexual abuse; lack of adequate housing

In the study conducted for Women’s Way, 53% of the respondents reported having experienced stigma and discrimination, 50% being ostracized by family members, 36% felt loneliness, 63% mental problems in the past year, and 60% having had suicidal thoughts\(^\text{18}\).

Health care system: Qualification of staff particularly in primary health care services, training for staff in mental health care services is not always appropriate for responding to the complex psycho-social challenges and needs facing those committing self-harm, reporting systems not sensitive to capture cases.


\(^{18}\)Behoeften onderzoek ‘Vrouwen die houden van vrouwen’, Julia Terborg, 2012
6. Major depressive disorder

Major depressive disorder ranks 6th in Suriname’s burden of disease profile. This includes the years of life a person loses due to premature death and years lived with disability due to depression, but excludes suicide, which is categorized in the self-harm category. Major depressive disorder or depression is a mood disorder that causes a persistent feeling of sadness and loss of interest. It affects how you feel, think and behave and can lead to a variety of emotional and physical problems. You may have trouble doing normal day-to-day activities, and depression may make you feel as if life isn’t worth living. Depression often begins in the teens, 20s or 30s, but it can happen at any age. Depression may require long-term treatment. Most people with depression feel better with medication, psychological counselling or both. Small studies have shown that depression among youth is highly prevalent, with over fifty percent of children, teenagers and even infants diagnosed in small regional studies.

**Main risk factors**: Exposure to (domestic) violence, lack of (economic) opportunities, jobs and social isolation.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><em>Currently no data is available on major depressive disorders by district in Suriname.</em></td>
<td><em>In a national study (2010) on factors that make children vulnerable, 40% of the children stated that they were unhappy. Factors had to do with the family life situation</em>.</td>
</tr>
</tbody>
</table>

<table>
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<th>Risk factor (per 10,000) by ethnicity and sex</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Currently no data is available on major depressive disorders by ethnicity and gender in Suriname.</em></td>
<td><em>Alcohol or drug use, lack of (economic) opportunities and mental health issues are known as main risk factors for major depressive disorder. However, no data was found during the quick assessment on any of these risk factors.</em></td>
</tr>
</tbody>
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Social determinants analysis: Major Depressive Disorders

Introduction

Although no data was found during this quick assessment on the level and distribution of major depressive disorders, anecdotal evidence from participants in the Delphi round confirms the importance and suggests that some small studies were done around the issue in adults as well as in women and children. More data is needed and research is under way to better capture this significant burden of disease. For example depression among children has also been recognized in Suriname, caused by feelings of not being loved by parents, abuse and neglect (no sense of belonging and safety), or divorce of parents. Domestic violence, alcohol and drug abuse and psychiatric disorders are other risk factors. The repeated national surveys might also in the future included questions about depression.

Society – socio-economic context and position: globalisation with rapid economic, political, social and cultural changes; demographic transitions, age, and sex; social status, economic, social and political inequality; ethnicity, minority situation, race; social exclusion; urbanization.

Social, economic and physical environment: social norms, including gender roles, cultural beliefs and practices; social stigma and discrimination; food insecurity and hunger; toxins; crime, social conflict, civil unrest, natural disasters, and working environments; lack of housing and overcrowding; built environment;

Vulnerability: hard-to-reach populations; low income and lack of insurance; stressful life events and violence; chronic physical ill-health and disability; age and sex; ethnicity; low health seeking behaviours; low [parental] literacy, low education and knowledge; low mental health literacy; [parental] alcohol and substance abuse; early childhood experiences, including abuse; parental mental health; lack of social capital, dysfunctional family and community links; low status of women; job stress; family size and birth order.

According to the Nationaal beleidsplan structurele aanpak huiselijk geweld 2014 – 2017 and MICS 2012 survey data, domestic violence is becoming an increasingly serious problem in Suriname. The integrated steering group on domestic violence says that there is a shortage of good counselling and supporting services, in particular for children and adolescents who are traumatised by (domestic) violence. However, victims often do not seek help, because they feel they themselves are at fault.

Health care system: quality of mental health service; low qualification of health staff; inadequate or weak health services; poor rapport between service user and provider; discriminatory services; low adherence to treatment; services not decentralized.

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7. Road injuries

Road injuries account for the 7th largest burden of disease in Suriname in 2014. They include traffic accidents of moped, motorcycle and car drivers, and also pedestrians and cyclists who get hurt on the road. Children, pedestrians, cyclists and older people are among the most vulnerable of road users. Generally, young males are most susceptible to road traffic injuries.

Main risk factors: Lack of seatbelt use in front and backseat of car; driving without a driver’s license; drinking alcohol and driving; non- or improper use of safety helmets; exceeding speed limits; poor condition of sidewalks and roads; parking habits; and age.

Disease / condition (per 10 000) by wealth quintile

Globally, poorer population groups bear a disproportionate burden of avoidable morbidity and mortality from road traffic injuries. The distribution of road traffic injuries is generally influenced by socioeconomic factors. Poor countries bear a disproportionate burden of injuries and fatalities, and within countries, poor people account for a disproportionate portion of the ill health due to road traffic injuries.


Source (Injuries by district and ethnicity and sex): Academic Hospital Surveillance data, 2014.

Social determinants analysis: Road Injuries

**Introduction**

Suriname has a high annual rate of road traffic fatalities, in particular young males partaking in traffic on motor bikes and mopeds. Deaths from road injuries in 2006 – 2011 were on average 17.5 per 100,000 inhabitants. 73% of these deaths occurred in age-group 20-59 years; 40% of those were motor cyclists. Of the persons treated in the emergency department of the Academic Hospital in Paramaribo (AZP) after road accidents between 2010 and 2012, on average 48% were on mopeds/motor cycles. Most of the moped/ motor cycle riders were in the age group 15-24 years. The most recent surveillance data from the Academic Hospital indicates high incidence of road traffic injuries in 2014 in Suriname. The majority (54%) of these injuries were recorded in Paramaribo. Seventy per cent of those injured in traffic were men. Creole and Hindustani men are most likely to get injured in traffic. About 3.7 times as many men as women were admitted in the Academic Hospital after road injuries. Most of the men were in the age-group 20-24 years, riding mopeds/ motor cycles. This supports the hypothesis that young men show much more risky behaviour in traffic than women.

**Society – socio-economic context and position:** Increased number of vehicles and heavier traffic.

**Social, economic and physical environment:** social norms, including gender norms, cultural beliefs, practices, attitudes towards alcohol intake and speed driving; slum formation, crowding and road congestion, clustering and deprivation; poorly designed and developed infrastructures, including roads, side-walks, crossings; roads not built for traffic burden and almost no separation of cars and slow traffic (mopeds, bicycles, pedestrians - increased proximity between vehicles, cyclists and pedestrians, etc.); poor living and working environment; availability, safety and use of alcohol: television exposure; unsafe condition of vehicle fleet.

**Vulnerability:** poverty; low education and knowledge; [parental] alcohol and substance use and abuse; early childhood experiences; lack of social capital, dysfunctional family and community links;

*Most traffic accidents take place due to unfamiliarity with the road, high speed, fatigue, possible drugs and alcohol abuse, heavy rush hour traffic, possible reduced visibility.*

**Health care system:** qualification of health staff; inadequate or weak trauma care services, including adequacy of staffing

*A survey in 2012 showed that in 82% of the cases, it took ambulances about 20 minutes to reach the location of the traffic accidents, which were all within 15 km of the stand of the ambulances.*

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23 Idem


25 Dijksteel CN. The response time of ambulance transportation for traffic accidents in Paramaribo and Wanica. October 2012
8. Diabetes

Diabetes is ranked as the 8th largest burden of disease in Suriname. Diabetes Mellitus (DM) is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. Symptoms include frequent urination, increased thirst and hunger. If left untreated, diabetes can cause many complications. Serious long-term complications include cardiovascular disease, chronic kidney failure, foot ulcers, and damage to the eyes. There are three main types of diabetes mellitus: Type 1 DM results from failure of the pancreas to produce enough insulin, the cause is unknown; Type 2 DM - the most common - begins with insulin resistance. As the disease progresses a lack of insulin may also develop; and gestational diabetes that occurs when pregnant women without a previous history of diabetes develop a high blood sugar level. With about 11% of the overall population suffering, and increasing according to age up to 20% among people aged 55 and older.

Main risk factors (type 2 DM): Obesity, unhealthy diet, tobacco smoking, high blood pressure, sedentary lifestyle.

Source (Diabetes per district and per ethnicity and sex): Source: Bureau of Health (BOG), Doodsoorzaken in Suriname 2010-2011 (2012), mortality data
Source (Diabetes per wealth quintile): STEPS 2013 Academic Hospital Surveillance data, Ministry of Health, Suriname

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26 Suriname STEPS Study (2013), Ministry of Health, Suriname
Social determinants analysis: Diabetes

Introduction: Diabetes is more prevalent in Coronie and Para, followed closely by Saramacca and Nickerie. Further, it is found more often among the Hindustani population group. In addition, Hindustanis have an earlier onset of diabetes; a study on 637 diabetes patients in 12 primary health care centers reported the onset of diabetes for Hindustanis (44 years) compared to Creoles (53 years). The quick assessment has not found data to fully explain the considerable different in diabetes prevalence between the Hindustani population and all other population groups. Diabetes also increases according to age, up to 20% among people aged 55 and older. Overweight and having high blood pressure are important risk factors for diabetes. In the past 35 years, the percentage of persons who are overweight (one of the main risk factors for diabetes) has doubled; in some population groups even three to four times. As a result, diabetes and complications such as ischemic heart disease and strokes have dramatically become more frequent. The causes for the situation and trends are complex and so are the solutions.

Society – socio-economic context and position: globalization, knowledge about healthier life-styles, transnational food corporations penetrating the market; urbanization; social status, economic, social and political inequality: ethnicity, minority status and race.

Social, economic and physical environment: social norms, including gender norms, cultural beliefs and practices, lifestyles, desirable body size and shape; increased pressures of modern life; slum formation, crowding, clustering, deprivation; poorly developed infrastructures; obesogenic environments, low walkability and high access to processed and fast food; ‘nutritional transition’, promotion and availability of highly processed and energy-dense food (high in saturated fat, salt and sugar); food of poor nutritional value; non-regulated markets and outlets; production and preparation of food; marketing and advertisement; mechanization of work; import duties / pricing of insulin and medication.

Vulnerability: hard-to-reach populations, undiagnosed, urban / rural; low health-seeking behaviour; low [parental] literacy, education and knowledge; poverty, poor health insurance coverage; tobacco smoking and excessive alcohol intake; food insecurity, malnutrition and poor nutrition in early life, low birth weight; genetics – family history; physical inactivity; diets high in fat and sugar, obesity; low access to health services (poor availability and high costs of diagnostics, monitoring and treatment).

According to the National Action Plan for the Prevention and Control of Noncommunicable Diseases 2012-2016, among the main reasons for visits to a PHC clinic of persons aged 60 years or older diabetes accounted for 13.2% of visits, while hypertension accounted for 26.4% of visits. When observing visits due to co-morbidity, diabetes and hypertension accounted for 12.5%, and a combination of diabetes, hypertension and cardiovascular diseases accounted for 11%. Diabetes and hypertension are the most common reasons for seeking care, and a steady increase in the percentage of registered patients with diabetes, hypertension or a combination of both is evident. Women are twice more likely than men to visit the clinics for diabetes and three times as likely for hypertension or a combination of diabetes and hypertension.

Health care system: qualification of health staff; inadequate or weak health services; limited patient interaction and low social class; and low adherence to treatment

9. Iron Deficiency Anaemia

In Suriname, iron deficiency anaemia ranks 9th in terms of burden of disease. Iron deficiency anaemia is caused by insufficient dietary intake and absorption of iron, or iron loss from bleeding. Bleeding can be from a range of sources such as the intestinal, uterine or urinary tract. Because women lose blood during menstruation, they in general are at greater risk of iron deficiency anaemia. Infants, especially those who have a low birth weight or were born prematurely or who don't get enough iron from breast milk or formula, and children who do not eat a healthy, varied diet are also at risk. Vegetarians may have risk of iron deficiency anaemia if they do not eat iron-rich foods. In men and women over 50 years old, the most common cause of iron-deficiency anaemia is chronic gastrointestinal bleeding from nonparasitic causes, such as ulcers or gastrointestinal cancer. An important consequence of iron deficiency is a potential increased risk of heavy-metal poisoning in children. Other consequences include: decreased work capacity, impaired neurocognitive / learning function29 in children, prematurity and low birth weight, perinatal mortality, maternal mortality, and child mortality.

Main risk factors: For women: teenage pregnancy, lack of access to or funds for health services. For children: helminth infections in early childhood. For both groups: nutrition and feeding practices.

![Graph of Iron Deficiency Anaemia by district](image1)

**Disease / condition (per 10 000) by wealth quintile**

Although no data is available on iron deficiency anaemia by wealth status in Suriname, international evidence points out that low food security and low wealth status are associated with lower blood iron levels in young children30.

![Graph of Iron Deficiency Anaemia by ethnicity and sex](image2)

**Risk factor (per 10,000) by ethnicity and sex**

The quick assessment has not found data on risk factors that can explain the marked differences in prevalence of Iron deficiency anaemia shown in the graph to the left between the population groups.

Source: 2014 Academic Hospital Surveillance data

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29 Mental abilities and processes related to knowledge: attention, memory, judgment and evaluation, reasoning and "computation", problem solving and decision making, comprehension and production of language

Social determinants analysis: Iron Deficiency Anaemia

**Introduction**
Data from the Academic Hospital for 2014 shows that iron deficiency anaemia is most prevalent in Paramaribo at around 1.6 per 10,000 population. In all other districts prevalence of Iron Deficiency Anaemia is below 1 per 10,000 population. Women are consistently more affected than men, which suggests a combination of menstrual, dietary and pregnancy related factors and determinants at play. Although rates per 10,000 population remain below 1, surveillance data for 2014 shows Hindustani and Creole women are most affected. However, these numbers might grossly underrepresent the real magnitude of the problem as they are hospital based and only few people with iron deficiency anaemia will likely show up or be diagnosed at an academic hospital.

**Society – socio-economic context and position:** Socio-economic status, ethnicity, occupation, education

**Social, economic and physical environment:** Altitude, climate, natural disasters; urban / rural; community settings availability of: health services, water and electricity supply, sanitation services; agricultural system

**Vulnerability:** age (adolescent females not consuming sufficient iron to offset menstrual loss); poverty, wealth and income; [parental] literacy, education and knowledge; occupation; household hygiene and sanitation; household size; domestic food production; inadequate micronutrient intake; lack of knowledge on good nutrition; protein-energy malnutrition; infections (diarrhoea, malaria, helminths, HIV/AIDS); chronic conditions; genetics; food insecurity; access to health care; insufficient iron intake during breastfeeding; pre-term birth and low birth weight; low health care seeking, including ANC.

There is a cultural practice in the use of so called “pemba” or “kaolin”- a traditional “medicine” used by pregnant Maroon women. No studies have been done yet in Suriname, but the calcium in pemba is known to reduce freely available iron for absorption in the stomach. This is a potential cause for exacerbating pregnancy-related anaemia. Among children in Suriname, infections by small parasites called helminths in early childhood are a key cause of iron deficiency anaemia.

**Health care system:** qualification of health staff; inadequate or weak health services; limited patient interaction and low social class; low adherence to treatment; overdosing of pyremethamine and/or trimethoprim (antifolate antimalarial)

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10. Low back pain

Low back pain ranks 10th in terms of burden of disease in Suriname in 2014. This includes years of life lost and years lived with disability due to low back injuries. It is estimated that, in all populations, an individual has a very high probability of having low back pain at some period during their life time. Most of the time, resolution and return to work occur within three months’ time or less. It is often considered “chronic” when it lasts for seven weeks or more. Chronic low back pain (CLBP) has high social and economic effects and is an important source of demand for health services. Current treatments are inadequate for many patients who fail to achieve adequate relief. Treatment directed exclusively at the physical component may not stimulate the desired therapeutic effects as CLBP often has strong psychological overlay.

Main risk factors: Occupational status, occupational injury, sedentary lifestyle, traffic injuries.

<table>
<thead>
<tr>
<th>Disease / condition (per 10,000) by district</th>
<th>Disease / condition (per 10 000) by wealth quintile</th>
</tr>
</thead>
<tbody>
<tr>
<td>The quick assessment did not found data on low back pain by district in Suriname</td>
<td>The quick assessment has not found data on low back pain by wealth status in Suriname. However, international evidence points out that socioeconomic factors play an important role in low back pain32.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disease condition (per 10,000) by ethnicity and sex</th>
<th>Risk factor (per 10,000) by ethnicity and sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>The quick assessment has not found data on low back pain by ethnicity and sex in Suriname</td>
<td>No data on risk factors, such as occupational status for Suriname were found or suggested by Delphi participants during this quick assessment.</td>
</tr>
</tbody>
</table>

Social determinants analysis: Low Back Pain

Introduction
No substantial data was found on low back pain in the quick assessment. Only a few cases were registered at the Academic Hospital. However, comments from General Practitioners and other medical staff provided in the Delphi rounds of this quick assessment suggest that low back pain is a common problem in Suriname. Some suggest that the majority of low back are work-related, including for agricultural labourers, industrial workers and people working in the healthcare sector. It is also suggested that this relatively high burden of disease in Suriname may also partially be caused by road traffic injuries. More data should be collected and a study regarding the prevalence of low back pain in Suriname would greatly help in assessing this burden of disease. Improved service reporting and inclusion into the repeated national surveys would also help reducing the gap in knowledge about the burden of disease related to low back pain.

Society – socio-economic context and position: social status, economic, social and political inequality: ethnicity, minority status and race.

The emerging middle class in Suriname and the associated increase in mopeds, motorcycles and car driving.

Social, economic and physical environment: adverse working environment, the functions of available equipment, the way work is organized and carried out; lack of separation of small road traffic (bicycles, mopeds, motorcycles) and four wheeled traffic (cars, trucks, buses).

Vulnerability: [parental] literacy, low education and knowledge; low parental [childhood] social position and downward social mobility; physical inactivity, TV and video watching; genetics; smoking; reduced intake of animal protein; daily alcohol consumption; psychological problems, dissatisfaction with work, boredom; long working hours, heavy duties; whole body vibrations and static uncomfortable positions; depression; personal problems related to alcohol abuse, marital problems and financial difficulties.

Low SES members of society are more likely to drive a moped or motorcycle instead of a car and thus be susceptible to accidents; occupational problems for low-income agricultural workers and industrial workers.

As low back pain has a considerable overlap with stress and psychological problems, increased work pressure and economic stress may also contribute to disease stratification.

Health care system: qualification of health staff; inadequate or weak health services, including to provide multidisciplinary treatment; limited patient interaction and low social class; lack of specialists for low back pain and trained nursing personnel, lack of rehabilitation services.
11. Neonatal Encephalopathy

Neonatal encephalopathy is the 11th largest burden of disease in Suriname. This burden of disease represents the years of life lost due to premature death and years lived with disability due to neonatal encephalopathy. Neonatal encephalopathy is a syndrome in new-born babies, where neurological function is disturbed in the earliest days of life in the infant. This manifests itself by difficulty with initiating and maintaining respiration, depression of tone and reflexes, sub-normal level of consciousness and often seizures. Neonatal encephalopathy is considered an important cause of later neurodevelopmental impairment with consequences for general cognitive functioning, educational achievement, neuropsychological functioning and behaviour, including elevated levels of hyperactivity and autism.

**Main risk factors**: incomplete vaccination coverage of women; low use of ANC services; birth without skilled birth attendants; increased maternal age; mothers are stunted, non-attendance for ANC, multiple births, induction of labour [with oxytocin], reduced concentration of maternal haemoglobin

<table>
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<tbody>
<tr>
<td>The quick assessment has not found data on distribution of prevalence of neonatal encephalopathy by district</td>
<td>The quick assessment has not found data prevalence of neonatal encephalopathy by wealth, education, occupation or any other measure of socio-economic status?</td>
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</table>

<table>
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<th>Disease condition (per 10,000) by ethnicity and sex</th>
<th>Risk factor (per 10,000) by ethnicity and sex</th>
</tr>
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<tbody>
<tr>
<td>The quick assessment has not found data on the prevalence of neonatal encephalopathy by ethnicity and sex in Suriname</td>
<td>The quick assessment has yet found data on prevalence of risk factors for neonatal encephalopathy in Suriname by ethnicity or SES?</td>
</tr>
</tbody>
</table>
Social determinants analysis: Neonatal Encephalopathy

Introduction
The quick assessment has not found data regarding Neonatal Encephalopathy. However, Delphi participants have reported that a study is currently under way to assess this burden of disease in Suriname. However, improved service reporting as well as inclusion in the repeated national surveys might be considered.

Society – socio-economic context and position: social status, economic, social and political inequality: ethnicity, minority status and race

Social, economic and physical environment: social norms, including gender roles, cultural beliefs and practices, lifestyles; insurance and residence registration system; poor living environment, including availability of appropriate sources of drinking water;

According to MICS In urban areas, appr. 80% have access to piped water. In the rural districts this is 45%, and in the interior 15%. The population there relies on rainwater collection for drinking purposes

Vulnerability: hard-to-reach population; poverty, unemployment, unskilled manual labour; mother stunted; increasing maternal age; low [parental] literacy, education and knowledge; low status of women; lack of access to ANC and contraceptives; low health seeking behaviour and ANC attendance; maternal deficiency states (iodine, magnesium and anaemia) and infection (e.g., thyroid disease); family history of seizure and neurological disease

The MICS survey (2010) showed that 67% of the women surveyed received antenatal care at least four times. However, 59% of the women in poorest households reported such four or more antenatal visits, compared with more than 70% among the women of the richest households. A similar pattern is found if the education level of the women is taken into account: 52% of the women with no education received antenatal care at least four times, as opposed to more than 70% among women with secondary and higher levels of education. In the interior districts of Sipaliwini and Brokopondo relatively larger numbers of women obtained care from community health workers than in the other districts. A similar observation is evident among the poorest women with no education, who make up relatively larger shares of eligible women in these two districts.

The lowest contraceptive prevalence is in Brokopondo (26%) and Sipaliwini (25%). Women’s education is strongly associated with contraceptive prevalence: 19% of women with no formal education uses contraceptives; while 42% of women with primary education; 52% of women with at least secondary education use contraceptives. The total unmet need for contraception is also highest in Brokopondo (33%) and Sipaliwini (34%). Literacy rates of women 15 – 49 years are 96% in urban areas, 80% in rural coastal areas, and 54% in the rural interior.

Health care system: poor obstetric care; qualification of health staff; inadequate or weak health services, including referral for complicated births; discriminatory services; limited patient interaction and low social class.
12. Congenital anomalies

Congenital anomalies represent the 12th largest burden of disease in Suriname. This burden of disease includes years of life lost due to premature death, as well as years lived with disability due to congenital anomalies. Congenital anomalies are also known as birth defects, congenital disorders or congenital malformations. Birth defects vary widely in cause and symptoms. Congenital anomalies can be defined as structural or functional anomalies (e.g. metabolic disorders) that occur during intrauterine life and can be identified prenatally, at birth or later in life.

Main risk factors: Incomplete vaccination coverage of women, toxin exposure (medicine, drugs, environmental toxins, etc.), low use of ANC services, genetic predisposition.

<table>
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<tbody>
<tr>
<td>The quick assessment has not found data prevalence of congenital anomalies by district</td>
<td>The quick assessment has not found data on distribution of prevalence of congenital anomalies by wealth, education, occupation or any other measure of socio-economic status</td>
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<tr>
<td>The quick assessment has not found data on the prevalence of neonatal encephalopathy in Suriname by ethnicity and sex</td>
<td>The quick assessment has not found data on the prevalence of risk factors for congenital anomalies in Suriname by ethnicity and sex or SES</td>
</tr>
</tbody>
</table>
Social determinants analysis: Congenital Abnormalities

**Introduction**

This quick assessment has not found any substantial data on the level and distribution of congenital abnormalities. Only two cases were registered in 2014 at the Academic Hospital, but participants in the Delphi rounds of this quick assessment suggest that is a more common problem in Suriname and that in some ethnic groups, e.g., Hindustani, Javanese and Chinese, cases are hidden from the community. More data should be collected to assess this burden of disease. Due to the possible stigma of this condition carefully designed studies would likely be the feasible first approach to getting more insight.

**Society – socio-economic context and position:** social status, economic, social and political inequality; ethnicity, minority status and race

**Social, economic and physical environment:** social norms, including gender norms, cultural beliefs and practices, lifestyles; exposure to certain pesticides, chemicals (e.g. mercury), and radiation; unhealthy living and working environments, e.g., near or in waste sites, smelters or mines; lead poisoning (batteries are disposed of carelessly)

*Data from a WWF review of mercury contamination in the Guianas* shows that there is widespread mercury contamination with mean sediment loads consistently above CCME guidelines in all areas except the northwest of the country. A survey in the villages of Kwakoegron and Pikin Saron found that mean mercury levels were above the EPA reference levels and WHO background levels for both children and adults. The concentration range showed individuals close to harmful levels in women and above the harmful level in the children, who are the most vulnerable to mercury toxicity.

**Vulnerability:** poverty; low [parental] literacy, education and knowledge; food insecurity and poor diet; both advanced and young maternal age; consanguinity (parents related by blood); maternal infections, e.g., syphilis and rubella; maternal nutritional status (iodine deficiency, folate insufficiency, excessive vitamin A intake, obesity and diabetes mellitus); tobacco smoking and excessive alcohol use; use of psychoactive drugs; intake of certain medicines; low use of ANC and low vaccination coverage in some sub-populations.

High mercury concentrations found in individuals in some villages in the interior are driven by high fish consumption where there is a preference for predatory fish. In addition, high levels of mercury contamination are likely driven by atmospheric deposition. Research was undertaken to assess the risk in the capital city of Paramaribo. Hair samples were taken from a mixed population of mothers of various ethnicities. Worryingly, 80% of the new-borns had a higher mercury concentration in their hair than their mothers.

**Health care system:** qualification of health staff; inadequate or weak health services; limited patient interaction and low social class; and low adherence to preventive treatment

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34 Idem
13. Lower Respiratory Infections

Lower respiratory infections (LRIs) rank 13th in terms of burden of disease in Suriname. There are a number of infections that can affect the lower respiratory tract. The two most common are bronchitis and pneumonia. Influenza affects both the upper and lower respiratory tracts. Bronchitis can be classified as either acute or chronic. Acute bronchitis can be defined as acute bacterial or viral infection of the larger airways in healthy patients with no history of recurrent disease. There are no effective therapies for viral bronchitis. Treatment of acute bronchitis with antibiotics is common but controversial, as their use has only moderate benefit weighed against potential side effects (nausea and vomiting), increased resistance, and cost of treatment in a self-limiting condition. Pneumonia occurs in a variety of situations and treatment must vary according to the situation. It is classified as either community or hospital acquired depending on where the patient contracted the infection. It is life-threatening in the elderly or those who are immunocompromised. The most common treatment is antibiotics and these vary in their adverse effects and their effectiveness. Pneumonia is also the leading cause of death in children less than five years of age. The most common cause of pneumonia is pneumococcal bacteria, *Streptococcus pneumoniae* accounts for 2/3 of bacteremic pneumonias. This is a dangerous type of lung infection with a mortality rate of around 25%.

**Risk factors include:** severe malnutrition, exposure to smoke from solid cooking fuels, second hand tobacco smoke exposure, incomplete pertussis vaccination coverage, hospital infections.

**Disease / condition (per 10 000) by wealth quintile**

*The quick assessment has far found no data on prevalence of lower respiratory infections by wealth, education, occupation or any other measure of socio-economic status*

**Risk factor (per 10,000) by ethnicity and sex**

*The quick assessment has not found data on the prevalence and distribution of risk factors for lower respiratory infections in Suriname*

Sources: Academic Hospital Surveillance data, Ministry of Health, 2014
Social determinants analysis: Lower Respiratory Infections

Introduction
Surveillance data from the Academic Hospital show that in 2014, lower respiratory infections were most prevalent in Paramaribo, where over 13 per 10,000 population were affected. Although considerably less than Paramaribo, Wanica also has an elevated rate of lower respiratory infections at around 5 per 10,000. Very little (1 in 10,000 population or less) lower respiratory infections were registered in all other districts. However, service and in particular hospital based data are likely grossly under-reporting the true burden of LRI and might show the relative distribution more accurately than the true level. Interestingly, this disease distribution overlaps well with the major center of urbanization in Suriname. Ethnic groups seem to fall in three groups in terms of prevalence: Creole and Hindustani populations are most affected at 3-4 cases per 10,000 population. Javanese and Maroons had around 1 case per 10,000 population, and Amerindians and Chinese are least affected – or more grossly under-reported.

Society – socio-economic context and position: social status, economic, social and political inequality: ethnicity, minority status and race

Social, economic and physical environment: social norms, including gender norms, cultural beliefs and practices; slum formation, crowding, clustering, deprivation; poorly developed and poorly maintained infrastructures, including lack of sewerage / latrines and low quality of drinking water; indoor air pollution from solid fuels

Vulnerability: poverty, young maternal age; low maternal literacy, low education, and knowledge; low immunization coverage; low health seeking, including ANC and under 5 services; severe protein-energy malnutrition and micronutrient (vitamin A and zinc) deficiency; low breast feeding; first and second-hand smoking; premature birth and low birth weights; comorbidity with HIV, TB, malaria, diarrhoea, pertussis and measles; female sex; [adults] old age and chronic disease (liver or renal failure); alcohol abuse; family size; remoteness and lack of financial means; lack of access to health care; lack of access to clean cooking fuels; poor health education and communication around water and sanitation practices.

According to the MICS Survey (2010), higher levels of status with respect to the education of head and wealth status in households are associated with a greater likelihood of having water and soap available or soap anywhere in the dwelling. Mothers’ knowledge of the danger signs is an important determinant of care-seeking behaviour. Overall, just 10 percent of women know of the two danger signs of pneumonia – fast and difficult breathing. Such knowledge is relatively more frequent among mothers who had secondary education (12%) than among those with lower levels of education (8% primary education; 8% no education). Rural coastal areas have higher proportions of mothers who know the two danger signs of pneumonia (14%), compared to urban interior (10%) and rural interior (8%). The most commonly identified symptom for taking a child to a health facility is if the child develops a fever (72%). Nonetheless, 12 percent of mothers identified fast breathing and 17 percent of mothers identified difficulty breathing as symptoms for taking children immediately to a health care provider. 63 percent of mothers identified other symptoms not specifically mentioned in the questionnaire, which should inform future data collection activities.

Health care system: qualification of health staff; inadequate or weak health services; poor infection control; discrimination, including gender inequality in quality of care; limited patient interaction and low social class; and low adherence to treatment

Medical practitioners often prescribe antibiotics to babies instead of searching for other factors (in the environment) that can cause bronchitis.
Kidneys play a key role in cleaning the blood. In Suriname, chronic kidney disease, also known as chronic renal disease, represents the 14th largest burden of disease. The data below reflect the burden of disease for chronic kidney afflictions, which include conditions that damage the kidneys and decrease their ability to keep a person healthy. Kidney malfunction eventually leads to build up of waste in the blood and make a person feel sick. Early detection and treatment can often keep chronic kidney disease from getting worse. When kidney disease progresses, it may eventually lead to kidney failure requiring dialysis or a kidney transplant to maintain life.

**Main risk factors:** Diabetes, high blood pressure, obesity, sedentary lifestyle, high salt intake and overconsumption of alcohol.

**Disease / condition (per 10 000) by wealth quintile**

Although no data was found in the quick assessment for Suriname on chronic kidney disease by wealth, internationally there is compelling evidence that disadvantaged communities, i.e. those from low resources and racial and minority ethnic communities and/or indigenous and socially disadvantaged backgrounds, suffer from marked increases in the burden of unrecognized and untreated CKD.35

Source: 2012 Census data, Suriname Bureau of Statistics and STEPS; 2013 Academic Hospital Surveillance data.

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Social determinants analysis: Chronic Kidney disease

Introduction
No comprehensive studies on chronic kidney disease have so far been done in Suriname. There has been one study on dialysis, namely an assessment of the individual and institutional costs of dialysis due to end stage renal failure caused by chronic kidney failure. The number of renal dialysis patients has steadily increased over ten years (in 1997: 33 patients, while in 2008: 240 patients and 20,000 dialyses). More men (60%) than women (40%) are registered patients of renal dialysis, while by far most of the patients fall in the age-group 40 – 60 years (47%).

Five districts: Saramacca, Wanica, Nickerie, Commewijne and Sipaliwini have markedly higher prevalence of chronic kidney disease compared to the other districts. Further, chronic kidney disease is much higher among Hindustani, Maroon, Javanese, and Amerindian compared to other population groups and generally higher among men than women. However, within the Maroon population chronic kidney disease rate is higher among women than men. This pattern is largely similar for the key risk factor diabetes for the city dwelling Hindustani and Javanese populations. Maroon and Amerindian populations are less likely to be included in Academic Hospital diabetes surveillance data; they are primarily serviced by the Medical Mission clinics and Diakonessenhuis.

Society – socio-economic context and position: social status, economic, social and political inequality: ethnicity, minority status and race; marginalization from majority society, discrimination, institutional racism, loss of culture, cultural conflicts.

Social, economic and physical environment: social norms, including gender norms, cultural beliefs and practices, lifestyles; urban / rural; slum formation, overcrowding, poor housing; poorly developed infrastructures and environmental sanitation; obesogenic environments, low walkability; environmental toxin exposure, e.g., agrochemicals - extensive exposure to pesticides might also play a role; poor hygiene; infectious diseases; use of certain traditional herbal medications

Vulnerability: poverty and lack of insurance; unemployment; low literacy, education and knowledge; poor nutrition, low birth weight and malnutrition; physical inactivity; chronic stress, depression; alcohol, tobacco and substance abuse; low health care seeking; low access to appropriate health care; obesity; co-morbidity: diabetic nephropathy, CVD, high blood pressure; genetic factors,

In Suriname, besides genetic predisposition, high uptake of alcohol and over-eating, especially of salty and fatty foods, may be linked to the high burden of chronic kidney disease.

Health care system: qualification of health staff; inadequate or weak health services; limited patient interaction, mistrust and discrimination; and low adherence to treatment
15. Adverse Medical Treatment

The 15th largest burden of disease in Suriname is due to adverse medical treatment and the country ranks second lowest among the comparator countries. This burden of disease is about the health system (defined broadly) actually doing harm rather than good or not doing anything. Lack of adherence to treatment guidelines, outdated nursing curricula, understaffing and lack of availability of medicines in the health system, and low quality of drugs in private and informal sectors might contribute to this considerable burden of disease. Adverse medical treatment also include harm caused by adverse drug reactions, medical error, bedsores, nosocomial infections, malnutrition, not admitting patients when required and unnecessary medical and surgical procedures.

Usually poor, less educated people, the old and the marginalized get poorer quality services (if they get any) compared to the more advantaged groups and run a greater risk of experiencing adverse medical treatment. In many countries transparency and accountability concerning quality and adverse medical treatment are facing challenges of being documented and addressed effectively.

**Main risk factors:** malpractice, low provider compliance, low patient adherence, self-medication, sale of prescription drugs without prescription, sub-standard drug quality.

<table>
<thead>
<tr>
<th>Disease / condition (per 10,000) by district</th>
<th>Disease / condition (per 10 000) by wealth quintile</th>
</tr>
</thead>
<tbody>
<tr>
<td>The quick assessment has not found data in Suriname that are currently available on adverse medical treatment by district.</td>
<td>The quick assessment has not found data for Suriname on adverse medical treatment for Suriname by wealth or other SES. Lack of data on adverse medical treatment is a global problem.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disease condition (per 10,000) by ethnicity and sex</th>
<th>Risk factor (per 10,000) by ethnicity and sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data in Suriname has been found by the quick assessment on adverse medical treatment by ethnicity and gender.</td>
<td>The quick assessment has not found data on risk factors adverse medical treatment by ethnicity and sex.</td>
</tr>
</tbody>
</table>
Social determinants analysis: Adverse Medical Treatment

Introduction
Adverse medical treatment is about the quality of health services. This includes a complex number of determinants, e.g.: individual health staff patient interaction and procedure; how staff and service providers are paid; how the health service provider system is composed and regulated; level and how resources are allocated; globalization, including in- and outbound migration; etc. Little data and information have been found in the quick assessment on complaints by patients or others on care provided by physicians, nurses, midwives, or pharmacists. However, the problems are acknowledged – though controversial and some small scale studies, including a growing body of master theses have addressed the topic. The institution of a medical disciplinary tribunal has officially existed for over 70 years, and everyone can submit a complaint through the attorney-general. After a long period of inactivity of this institution, new members for this medical tribunal were installed by the President in September 2012.

Society – socio-economic context and position: urbanization; social status, economic, social and political inequality: ethnicity, minority status and race; lack of or weak legislation/regulation; lack of safe, convenient and effective mechanisms for redressing malpractice and poor health service quality; seeking public versus private care, ability to pay for medical experts,

Brazilian migrants are usually illegal small-scale goldminers, while Chinese are predominantly legal migrants who end up working in shops and restaurants. This has caused additional challenges of unknown cultures and languages for the health sector. Added to this, is the recruitment of health workers from Cuba and the Philippines, who might be unable to properly communicate with patients, and who might be less familiar with Surinamese culture.

A study on quality of antimalarial drugs in 2009 showed sub-standard drug quality in the licenced private facilities and the informal sector³⁶.

Social, economic and physical environment: social norms, including gender norms, cultural beliefs and practices; marketing and advertisement; non-regulated markets and outlets for medical services and drug sales; slum formation, crowding, clustering, deprivation; poorly developed infrastructures, including availability of quality health services

In 1980s and 1990s, Suriname faced considerable population displacements, owing to the armed conflict in the interior. The predominantly Maroon people settled in non-completed housing projects and low-income areas in and around Paramaribo, causing slum areas to develop and grow, and creating challenges to both the educational and health systems in the urban coastal area, and especially in Paramaribo. Although no studies have been carried out, it is assumed that large numbers of these persons settled in and around Paramaribo and did not return to their original villages after the conflict ended. In fact, the migration flow from the interior to the coastal urban area seems to have grown.

Vulnerability: low [parental] literacy, low education and knowledge; poverty; low or inadequate health insurance coverage; low health care-seeking and access to health care; clustering of disadvantages, including food insecurity, malnutrition and poor nutrition in early life, tobacco smoking, alcohol and drug abuse, coexistence of multiple health conditions

Change of health behaviour in light of a modernizing society, especially among indigenous and tribal peoples.

³⁶ http://www.biomedcentral.com/content/pdf/1475-2875-11-203.pdf
Health care system: qualification of health staff; inadequate or weak health services, including reporting systems, shortage of adequately trained nurses and doctors; lack of provider compliance, including with treatment guidelines; perverse incentives; limited patient-interaction and low social class, including too little time, discrimination; and low adherence to treatment; poor transparency, accountability and lack of participation; increased work pressure of medical staff in public sector.

An assessment of knowledge, attitudes and practices of General Practitioners in Suriname towards the National Diabetes Guideline showed low provider compliance and patient adherence. Further, the same assessment showed that lack of time was more pronounced among the public compared to the private doctors. Other studies have shown the adverse consequences of understaffing and lack of availability of medicines and equipment in the health system adding considerably to the burden of disease in Suriname.