

**PREVENTION OF BIRTH DEFECTS IN EAST AFRICA:
A REVIEW OF NATIONAL POLICIES**

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ABSTRACT

Close to 8 million children are born annually with a serious birth defect, accounting for 5% of all newborn deaths globally. Many birth defects are associated with folic acid insufficiency, non-communicable diseases (NCDs), teenage or advanced age pregnancies, short birth intervals, and exposure to harmful substances. The majority of countries with the highest birth defects prevalence are in Africa, and the East African Community has made important commitments to improving reproductive, child, and adolescent health and nutrition. The aim of this review was to identify the advances and gaps in national policies addressing birth defect risk factors in the East African Community (Burundi, Kenya, Rwanda, Tanzania, and Uganda) in order to inform additional actions. National laws, regulations and policies were reviewed from the East African Community countries related to grain fortification and supplementation with folic acid; reducing too-early, unwanted and rapid successive pregnancies; and addressing NCDs and exposure to tobacco. All five countries have adopted a policy of mandatory folic acid fortification of wheat and maize flour. However, only in Kenya and Tanzania, are the folic acid levels in line with international recommendations. And, only Uganda has a policy requiring folic acid supplementation administration in the pre-conceptual period. The East African Community countries have made efforts to reduce too-early, unwanted and rapid successive pregnancies. All countries have banned child marriage and three of five countries have introduced laws to allow unrestricted access to contraception for adolescents. With regards to promoting prevention and control of NCDs and reducing populations' exposure, compliance with World Health Organization (WHO) guidelines is limited. Only two countries have developed multi-sectoral policies for NCDs and no countries comply fully with the recommendations of the Framework Convention on Tobacco Control. Much work remains in ensuring that opportunities for prevention of birth defects are fully realized in the East African Community countries. This review revealed that all countries in the East African Community have, to some extent, adopted policies that are conducive to reducing the risk of birth defects in the region, but significant gaps remain in some key areas of either policy development or implementation.

Key words: Congenital abnormalities, Folic acid, Family planning services, Child marriage, Non-communicable Diseases



INTRODUCTION

Birth defects, also known as congenital anomalies, are structural or functional abnormalities that occur during intrauterine life and may be detected prenatally, at birth or later in life. Worldwide close to 8 million children are born per year with a birth defect and the toll is particularly high in low-and middle-income countries, where approximately 95% of deaths due to birth defects occur [1]. Birth defects remain a major cause of child mortality worldwide, accounting for 5% of all newborn deaths globally [2]. Although not all birth defects can be prevented, improving the health of a woman before pregnancy and ensuring that she has access to preconception and inter-conception care increases a woman's likelihood of having a healthy infant [3]. On an individual level, women and their partners can reduce their likelihood of having a baby with birth defects by planning their pregnancy and choosing a healthy lifestyle, while on a population level, public health policies and interventions implemented by governments can also have a significant impact on reducing national birth defects prevalence [3, 4].

In 2010, the World Health Assembly adopted a Birth Defects Resolution encouraging member states to develop national plans to prevent birth defects [4]. Further, the 2013 report from the World Health Organization (WHO) Meeting to Develop a Global Consensus on Preconception Care to Reduce Maternal and Childhood Mortality and Morbidity urged low- and middle-income countries to adopt a package of preconception interventions supported through national-level policies [3].

Low-income countries suffer a particularly high burden of birth defects with prevalence of 64.2 per 1000 live births compared to 47.2 per 1000 live births in high-income countries [1]. The majority of countries with the highest birth defects prevalence are in Africa, indicating a need for targeted surveillance and prevention efforts in the continent. Noting the recent efforts of the East African Community (EAC) to improve reproductive, child, adolescent health and nutrition [5], selected national level policies with potential to reduce birth defects prevalence were reviewed in the five EAC countries in 2015: Burundi, Kenya, Rwanda, Tanzania, and Uganda [5]. An increasing body of evidence shows that many of the birth defects are associated with teenage or advanced age pregnancies [6], short birth intervals [7], exposure to harmful substances (for example, tobacco) [8], folic acid insufficiency [9], and non-communicable diseases (NCDs) [10].

Objectives

Our aim was to highlight the advances and gaps in the above-mentioned areas to inform additional efforts to decrease the burden of birth defects in EAC. The three public policy areas included in this review are policies for folic acid fortification and supplementation, policies aimed to reduce too-early, unwanted and rapid successive pregnancies, and policies that address prevention of NCDs and reduction of exposure to tobacco.

1) Policies for folic acid fortification and supplementation

Neural tube defects, including spina bifida, anencephaly and encephalocoele, affect an estimated 320,000 pregnancies annually around the globe [1]. According to the estimates published in 2006, the birth prevalence of neural tube defects was at 13 per 10,000 births for each of the East African Community countries [1]; for Tanzania, however, this



estimate is lower than the 30.2 per 10,000 births reported based on hospital-based surveillance data from Dar es Salaam for the 2000-2002 period [11]. These estimates would have excluded the contribution of wheat and maize flour fortified with folic acid, as legislation mandating the fortification of these foods was passed in 2015 in Burundi, 2012 in Kenya, 2013 in Rwanda, and 2011 in Tanzania and Uganda [12]. The birth prevalence for neural tube defects that are not preventable by folic acid is only approximately 5–6 per 10,000 births, less than half of the 13 per 10,000 births for all neural tube defects for the Eastern African Community countries [9]. In other words, folic-acid interventions should reduce the birth prevalence of neural tube defects in the East African Community.

To reduce the risk of neural tube defects, WHO recommends women consume folic acid supplements prior to conception and during the first 12 weeks of pregnancy [13]. Additionally, WHO fortification recommendations note that “wheat and maize flour fortification with folic acid increases the intake of folate by women and can reduce the risk of neural tube and other birth defects” [14]. Delivering folic acid through supplementation and/or fortified flour produces demonstrable reductions in neural tube defects.

2) Policies aimed to reduce too-early, unwanted and rapid successive pregnancies

In East Africa, 37% of women aged 20-24 years report being married by 18 years of age [15]. According to a 2013 report from the United Nations Population Fund [16], percentages of girls who gave birth before the age of 18 years were 33%, 28%, 26%, 11% and 5% in Uganda, Tanzania and Kenya, Burundi and Rwanda, respectively - the rates in Uganda, Tanzania and Kenya are among the highest in the world.

Contraceptive prevalence rate, a measure of family planning access, is calculated by determining the proportion of reproductive age women (or their partners) using a contraceptive method. The most recent estimates of contraceptive prevalence rates, published by the United Nations in 2015, show that Burundi and Uganda with prevalence rates of 27.5% and 30% are close to the median of 28% for Sub-Saharan Africa while Kenya (57%), Tanzania (41%) and Rwanda (53.5%) have rates that are higher than most countries in Sub-Saharan Africa [17]. Laws that ban child marriage and allow adolescents to access contraception without parental or spousal consent were examined as indicators of policy areas that may help reduce the rates of adolescent pregnancies. Commitments to improve women’s access to family planning and national budgets for family planning were examined as essential measures for reducing unwanted and rapid successive pregnancies.

3) Policies that address prevention of NCDs and reduction of exposure to tobacco

The four main types of NCDs include cardiovascular diseases, cancers, diabetes, and chronic respiratory conditions. Non-communicable diseases account for 52% of global deaths under the age of 70 years worldwide and the burden of mortality due to NCDs is very high in Africa where the age-standardized mortality rate for NCDs is over 650 per 100,000 compared to 539 per 100,000 globally [18]. The age standardized mortality rates for EAC countries in 2012 were 729.5 (Burundi), 514.7 (Kenya), 585.3 (Rwanda), 664 (Uganda) and 569.8 (Tanzania) per 100,000 population [19].



In response to the rapidly rising NCD prevalence and mortality around the world, in 2011 the UN high-level meeting on NCDs recommended that all member countries take urgent actions to prevent and control NCDs. To drive progress in preventing and controlling NCDs, WHO monitors country level progress related to targets for reducing occurrence of NCDs and related risk factors. Four progress monitoring indicators that WHO encouraged countries to achieve by 2015 are as follows: 1) set national targets and indicators; 2) set up a system for producing cause-specific mortality data; 3) develop multi-sectorial national NCD strategies and plans to address major NCDs and their risk factors, and 4) develop a risk factor survey to measure progress every five years.

Along with physical inactivity, unhealthy diet, and alcohol, exposure to tobacco smoke is one of the leading behavioral risk factors for NCDs. Tobacco accounts for the most deaths each year, at around 6 million deaths, including deaths to second-hand smoke exposure, and kills up to half of its users [20]. Globally, the prevalence of smoking is 21% while in EAC countries, the overall smoking prevalence is 24.6% in Kenya, 27.5% in Tanzania and 16.4% in Uganda, and data are not available for Burundi and Rwanda [21,22]. Because of the unique threat of tobacco, there has been growing momentum to address the tobacco epidemic independent of other NCDs. The WHO Framework Convention for Tobacco Control (FCTC) was adopted by the World Health Assembly in 2003 to reduce demand and supply of tobacco through measures such as, increasing tobacco prices and taxation, regulating of content, packaging, labeling and advertising of tobacco products, creating smoke-free environments and promoting public awareness [23].

To note, overweight/obesity, raised blood pressure, hyperglycemia, and hyperlipidemia are considered metabolic/physiological risk factors for NCDs [1]. Policies to address these metabolic/physiological risk factors in addition to the other behavioral risk factors (physical inactivity, unhealthy diet, and alcohol) fall under the broader NCD efforts. Tobacco exposure policies are described independently because of the magnitude of the burden associated with this one behavioral risk factor and the unique efforts that have been outlined under the FCTC.

Progress on implementation of the four WHO NCD recommendations and FCTC framework measures was considered as evidence for commitment to reducing the burden of NCDs and exposure to tobacco.

MATERIALS AND METHODS

In April 2016, South Sudan officially joined EAC; however, this paper only covers the five EAC countries, namely, Burundi, Kenya, Rwanda, Tanzania and Uganda, that comprised EAC when the review process was initiated in 2015.

To extract relevant policies, peer-reviewed and gray literature were searched using the Google search engine, Medline database, and individual websites for WHO, UNICEF, the Food Fortification Initiative (FFI), and individual country ministries.



Country names were searched in combination with key terms for the policy areas of interest and key terms relevant to the type of documents or policy descriptions desired. The following key terms were used for the policy areas: *food fortification, folic acid supplementation, family planning, teenage pregnancy, age of marriage, child marriage, smoking, non-communicable diseases or chronic diseases*. These terms were used to search policy documents or descriptions: *national, policy, strategy, ministry of health, report, guidelines, or program*. The search period was from July 2015 to December 2016. No limitation regarding publication date was used. The most recent information available was always used, especially when two sources reported different policies. To identify other relevant literature, the bibliographies of the extracted documents were systematically reviewed and online resources explored extensively. Moreover, when information was difficult to find, in-country experts were consulted through email or phone interviews on sources for the most recent policy information.

Only the documents that presented population- or national-level data, policies and interventions in the five East African countries were included in the review. Documents found included policy statements, national or ministry guidelines, national or ministry strategies, national legislation, national or ministry level reports, analyses, reports and briefs by international non-governmental organizations, bilateral aid agency program briefs and reports, United Nations and WHO reports and updates and peer-reviewed research articles.

RESULTS AND DISCUSSION

Grain fortification and supplementation with folic acid

For Kenya, Rwanda, Tanzania and Uganda, folic acid supplementation during pregnancy is national policy; however, only Uganda recommends supplementation with folic acid during the preconception period (Table 1) [24-27]. To our knowledge, Burundi does not have folic acid supplementation policies for the preconception or pregnancy periods. Nationally representative Demographic and Health Surveys report on the prevalence of women taking supplements during their previous pregnancy [28]. For Kenya, the survey reported women who took iron tablets, iron syrup, or iron and folic acid supplements. For the remaining EAC countries, the survey reported women who took iron tablets or syrup during the pregnancy of their last birth; the tablets or syrup may have also contained folic acid if they were administered to pregnant women. More than 58% of women reported taking a prenatal supplement that could have contained folic acid during their previous pregnancy: 70.8% in Burundi, 65.3% in Kenya, 73.0% in Rwanda, 58.9% in Tanzania, and 75.1% in Uganda [28]. Women may receive the supplements during their first antenatal care (ANC) visit. Among women with an ANC visit, the median month of pregnancy when they first attended ANC was 5.3 months in Burundi, 5.4 months in Kenya, 4.5 months in Rwanda, 5.4 months in Tanzania and 5.1 months in Uganda [28]. Less than 40% of women attended their first antenatal care visit in the first trimester of pregnancy: 20.6% in Burundi, 19.8% in Kenya, 38.2% in Rwanda, 15.1% in Tanzania and 20.8% in Uganda [28]; however, the proportion of women who attended their first antenatal visit in the first month of pregnancy, when folic acid can help reduce the risk of a neural tube defect-affected pregnancy, is unknown.



In all EAC countries, both commercially distributed wheat and maize flour must be fortified by legislative mandate (Table 1, Table 2); there is no legislative mandate to fortify rice in these countries [7]. For all countries, the required nutrients include folic acid. The amount of folic acid required in country standards is expressed as a target \pm an acceptable variation. Considering both wheat and maize flour availability together (as dietary intake data are not available), the target folic acid levels in Kenya and Tanzania meet the minimum WHO recommendations [14], but Rwanda and Uganda do not. For example, for Kenya, the combined per capita availability of both flours is 304 grams per day [12]. The World Health Organization (WHO) recommends that for this flour intake, at least 1.0 µg/g of folic acid be added to flour [12]. Kenya adds 1.5 µg/g to both flours and, therefore, meets the minimum recommendations. For Burundi, it was not possible to determine because grain availability information could not be found; however, Burundi follows the East African Community fortification standards [29-30], as do Rwanda and Uganda.

In summary, all countries adopted a policy of mandatory folic acid fortification of wheat and maize flour - this is a major first step in reducing folic acid preventable birth defects. However, only in Kenya and Tanzania are the folic acid levels in line with international recommendations [14]. And for folic acid supplementation, only Uganda's policy recommends folic acid be administered in the pre-conceptional period—when it can do the most good for reducing the risk of neural tube defects [13]. Effective implementation of both folic acid policies (fortification and supplementation) can contribute to reductions in neural tube defects.

Reducing too-early, unwanted and rapid successive pregnancy

Child marriage is defined as formal marriage or informal union or co-habitation of persons under the age of 18 years [31]. The United Nations Population Fund calls upon countries to raise the legal minimum marriage age to 18 years. With Tanzania's announcement in 2016 that it raised the legal minimum age for marriage to 18 years, all five EAC countries now have laws that ban child marriage and establish 18 years as the legal marriage age for girls, which contributes to the prevention of pregnancies at young age (Table 1) [32-33]. With regard to adolescents' access to contraception, Kenya, Tanzania and Uganda have legislation that allows adolescents to access contraception without parental or spousal consent while Burundi and Rwanda do not have such legislation [34].

Access to safe and voluntary family planning services is essential to enable couples to exercise their reproductive rights and to plan their families. Hosted by the United Nations, an initiative called Family Planning 2020 (FP2020) aims to expand access to family planning in 69 of the world's poorest countries by 2020 [35]. All five EAC countries have made commitments to FP2020. A review of national family planning budgets, conducted by Deutsche Stiftung Weltbevölkerung, revealed that Kenya, Rwanda, Tanzania, and Uganda increased financial resources to family planning and reproductive health services in the 2014-2015 budget cycle compared to the previous year [36]. No recent data could be found regarding Burundi's family planning budget allocation; however, a study reviewing Burundi's financing for family planning showed that Burundi's share of the public health spending allocated to reproductive health



increased from 15% (US\$ 35,463 million) in 2010 to 19% (US\$ 41,163 million) in 2012 [20].

Thus, in all five countries, family planning related efforts and allocation of funding to increase access to reproductive health services and contraception are present, but policies aimed to reduce adolescent pregnancies are not as strong as they could be.

Prevention and control of non-communicable diseases (NCDs) and reducing exposure to tobacco

According to the 2015 WHO NCD monitoring report, none of the EAC countries has fully achieved all four WHO NCD recommendations; Kenya and Burundi have documented national time-bound targets and indicators, and only Kenya and Rwanda have developed multi-sectorial national strategies or plans to address NCDs. No country has set up a functioning surveillance system to produce cause-specific mortality data, and only one country, Rwanda, has fully achieved implementing a risk factor survey every five years [18, 37].

All five EAC countries are signatories to FCTC and are monitored by WHO for compliance on six measures (see Table 1) [38]. According to the 2015 monitoring report by WHO all five EAC countries have implemented a tobacco tax with the percent of taxation of retail price ranging from 23% in Rwanda to 49% in Kenya [39]. However, the overall compliance with the FCTC measures is very low in EAC, with Burundi and Rwanda not implementing any of the other recommendations [39]. Uganda is the only country that has made efforts to create smoke-free public places and to implement a national anti-tobacco mass media campaign, and Kenya and Tanzania are the only two EAC countries that have banned several forms of tobacco advertising. Only Kenya and Uganda have policies mandating warning labels on tobacco packages. In summary, all the five EAC countries are implementing some measures in compliance with the FCTC measures [21,39], but none comply with all recommendations of the Framework Convention on Tobacco Control. A comprehensive effort to control the population's tobacco exposure, both in terms of specific areas of policy regulation and degree of rigor of the approved regulations, is lacking.

Limitations and strengths

This review has some limitations and strengths. Actual government documents were reviewed and published reports from non-governmental organizations and international agencies (for example, WHO) were relied on to gather evidence and draw conclusions. The review aimed to identify the most recent policies; however, governments continuously develop and update them to address the changing population health needs and international standards. Hence, it is possible that by the time of this publication, some of the policies may have changed or new ones may have passed. Additionally, this paper only focuses on the role of the governments in prevention of birth defects. Prevention of birth defects is a complex multi-disciplinary undertaking that requires actions to be taken by individuals, health care providers, civil society organizations and the governments. Actions taken by non-governmental entities were not reviewed. This type of comprehensive review of national policies for prevention of birth defects for a region will be necessary to promote further government action and identify best



practices. This review builds on earlier regional reviews by taking a more comprehensive review of birth defect risk factors. For example, a review of the South Asian region did not address policies aimed to reduce too-early, unwanted and rapid successive pregnancy or did not provide an in-depth analysis of policies that address prevention of NCDs and reducing exposure to tobacco [40]. However, the Southeast Asia analysis did consider policies related to birth defects screening, genetic services, and services for people with birth defects—areas which this review did not address. Moreover, this review was not a systematic review and thus the results and conclusions may be affected by unknown biases of unintentional exclusion of informative sources.

CONCLUSION

Birth defects are a global problem--a major cause of childhood mortality and long-term disability among those who survive. Hence, prevention of birth defects is an urgent global health priority. During the 1990-2015 era of Millennium Developmental Goals (MDGs), many countries in Africa made a noticeable progress in reducing maternal and childhood mortality due to the commitment of the governments and the support of many international agencies and funders to achieve the goals set under MDG4 to reduce child mortality and MDG5 to improve maternal health. In the new era (2015-2030) of Sustainable Development Goals (SDGs), an overall health goal (Goal 3) has shifted the focus from specific populations to ensuring health and well-being of “all at all ages.” As governments and the civil society gear up to meet SDG Goal 3, the birth defects experts in a 2016 consensus statement on prevention of congenital disorders and care of affected children call for the global community to work toward reducing risk of birth defects through concerted efforts at all levels.

Evidence related to surveillance and estimated birth defects data reveals that the burden of birth defects is particularly high in low- and middle-income countries. Recommendations from WHO and information in other published literature highlight the need for countries to adopt population-based programs and policies that reduce risk factors associated with birth defects. In this paper, national laws, regulations and policies were reviewed from five East African countries, Burundi, Kenya, Rwanda, Tanzania and Uganda, related to three policy areas: grain fortification and supplementation with folic acid; reducing too-early, unwanted and rapid successive pregnancies; and addressing NCDs and exposure to tobacco.

All five countries have adopted a policy of mandatory folic acid fortification of wheat and maize flour. However, only in Kenya and Tanzania, are the folic acid levels in line with international recommendations. And, only Uganda has a policy requiring folic acid supplementation administration in the pre-conceptional period. The EAC countries have made efforts to reduce too-early, unwanted and rapid successive pregnancies through banning child marriage and enacting policies for improving the population’s access to contraception. With regards to promoting prevention and control of NCDs and reducing population’s exposure, the compliance with WHO guidelines is limited.



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Table 1: Summary of National Policies for Prevention of Birth Defects in Five East African Countries^a

Policy	Standard	Burundi	Kenya	Rwanda	Tanzania	Uganda	Summary
Grain fortification	Folic acid added to flour, and with levels that are consistent with international fortification recommendations	Unable to determine	Folic acid levels consistent with international recommendation	Folic acid levels lower than international recommendations	Folic acid levels consistent with international recommendations	Folic acid levels lower than international recommendations	Kenya and Tanzania are consistent with the standard Folic acid levels below international standards in Rwanda and Uganda. This information could not be determined for Burundi.
Folic acid supplementation	Folic acid supplementation recommended in pre-pregnancy and pregnancy periods	No policy	Folic acid supplementation recommended in pregnancy	Folic acid supplementation recommended in pregnancy	Folic acid supplementation recommended in pregnancy	Policy includes supplementation in preconception and pregnancy periods	Full compliance with the standard in Uganda In Kenya, Rwanda, and Tanzania, policy does not cover preconception and no policy in Burundi
Child marriage	Legislation stating 18 years as legal marriage age for girls	Legal marriage age is 18 years	Legal marriage age is 18 years	Legal marriage age is 18 years	Legal marriage age is 18 years	Legal marriage age is 18 years	All countries are in compliance with the standard
Reducing too-early, unwanted and rapid successive pregnancy	Adolescents have to access contraception	No policy	Legislation allows adolescents to access contraception without parental or spousal consent	No policy	Legislation allows adolescents to access contraception without parental or spousal consent	Legislation allows adolescents to access contraception without parental or spousal consent	Legislations in Kenya, Tanzania and Uganda are in compliance with the standard; Burundi and Rwanda do not have policies to support the standard



Policy	Standard	Burundi	Kenya	Rwanda	Tanzania	Uganda	Summary
Prevention and control of non-communicable diseases	Family planning commitment and budget	Country is a signatory to FP2020 and has a budget for reproductive health and family planning services	Has made commitment to FP2020 and recent budget increased allocation to FP/ RH	Has made commitment to FP2020 and recent budget increased allocation to FP/ RH	Has made commitment to FP2020 and recent budget increased allocation to FP/ RH	Has made commitment to FP2020 and recent budget increased allocation to FP/ RH	All five countries have made commitments to improving family planning access and are allocating increased budgets to support their commitments
	National targets and indicators	Time-bound national targets and indicators as per WHO guidelines	Achieved	Achieved	Unable to determine	Unable to determine	Only Kenya and Burundi have known established time bound targets and indicators per WHO guidelines
	A system for producing cause-specific mortality data	Functioning system for generating reliable cause-specific mortality data on a routine basis	Not achieved	Not achieved	Not achieved	Not achieved	No country has established a functioning system for generating reliable cause-specific mortality data routinely
	Develop a risk factor survey to measure progress every five years	STEPS survey or a comprehensive health survey every 5 years	Not achieved	Partially achieved- WHO NCD STEP survey conducted in 2015	Achieved	Partially achieved- WHO NCD STEP survey conducted in 2012	All countries except Burundi have conducted a recent risk factor survey, but only Rwanda conducts comprehensive health survey conducted every 5 years
	Develop multisectorial national NCD strategies and	Operational multisectorial national strategy/action plan	Not achieved	Achieved	Achieved	Not achieved- National NCD policy exists but it is not multisectorial	Only Kenya and Rwanda have an operational multisectorial



Policy	Standard	Burundi	Kenya	Rwanda	Tanzania	Uganda	Summary
plans to address major NCDs and their risk factors,	that integrates the major NCDs and their shared risk factors					is not multisectorial	national strategy. Tanzania and Uganda have NCD national strategies, but they are not multisectorial. Burundi has no national strategy.
Public protection from tobacco smoke by creating smoke-free public places ^b	All public places (For example, healthcare facilities, education facilities, universities, government facilities, public transport, indoor offices, restaurants, and pubs and bars) should be declared smoke-free under national legislation or at least 90% of the population should be covered by complete sub-national smoke-free legislation.	No completely smoke-free public places	No completely smoke-free public places	No completely smoke-free public places	No completely smoke-free public places	Three to five public places completely smoke free	None of the five countries is in full compliance with the standard. However, Uganda has made the greatest progress with 3-5 public places smoke free.
Provision of government supported smoking cessation programs ^c	A national quit line is offered and both non-pharmacological and pharmacological, nicotine replacement therapy, are cost-covered	No programs	Nicotine replacement therapy and/or some cessation services (at least one of which is cost-covered)	No programs	Nicotine replacement therapy and/or some cessation services (at least one of which is cost-covered)	Nicotine replacement therapy and/or some cessation services (at least one of which is cost-covered)	No country is fully compliant with FCFC standards. Burundi and Rwanda do not have any government cessation programs



Policy	Standard	Burundi	Kenya	Rwanda	Tanzania	Uganda	Summary
Warning labels for tobacco packaging covering 50% or more of the outside packaging ^d	Laws specify that labels cover at least 50% of the cigarette pack, describe the harmful effects of tobacco use on health, are in large, clear, visible and legible font, are written in all principal languages of the country, include a photograph or graphic, are rotating, and appear on both unit packets and any outside packaging.	No warning labels or warning labels covering <30% of package surface	Warning labels cover 31-49% of surface area including pictures or pictograms and other appropriate characteristics	No warning labels or warning labels covering <30% of package surface	No warning labels or warning labels covering <30% of package surface	Warning labels cover ≥30% of surface are but no pictures or pictograms and/or other appropriate characteristics	No county fully meets the standard. Only Kenya and Uganda have substantial warning labels on cigarette packages
National Anti-Tobacco Mass Media Campaign ^e	Implementing and sustaining a campaign with at least seven of the following characteristics: being part of a comprehensive tobacco control program, campaign was pre-tested, formative research was conducted, campaign aired on television and/or radio, campaign utilized media planning, earned media/public relations were used to promote the campaign, process evaluation was	No national campaign	No national campaign	No national campaign	No national campaign	National campaign conducted but was not fully promoted	Uganda is the only country to have conducted a campaign, but it did meet FCTC standards



Policy	Standard	Burundi	Kenya	Rwanda	Tanzania	Uganda	Summary
	employed to assess implementation, and outcome evaluation was employed to assess effectiveness						
Enforce Comprehensive bans on tobacco advertising, promotion and sponsorship ^f	A ban on all forms of direct and indirect advertising.	No or minimal ban	Complete ban on all forms of direct and indirect advertising	No or minimal ban	Partial ban, for example., ban on national TV, radio and print media but not on all forms of direct and/or indirect advertising	No or minimal ban	Kenya has achieved a full ban, meeting the FCTC standard while Tanzania has achieved a partial ban
Impose substantially high taxes on tobacco products ^g	Taxes set above 75% of the retail price for packets of the most sold brand of cigarettes	Tax equals 43% of the retail price	Tax equals 49% of the retail price	Tax equals 23% of the retail price	Tax equals 30% of the retail price	Tax equals 45% of the retail price	None of the countries has fully met the standard
Country Summary		Burundi does not have a policy on folic acid supplementation and its policy on grain fortification could not be determined. Burundi meets standards for child marriage and family planning commitment, but not for adolescents'	Kenya meets standards for grain fortification but does not meet the supplementation standard. It also meets standards for child marriage, adolescents' access to contraception and for family planning commitment. Kenya met three of the ten	Rwanda does not meet the standards for grain fortification or folic acid supplementation. Rwanda meets standards for child marriage, adolescents' access to contraception and for family planning commitment, but not for adolescents' access to contraception. Rwanda met only two of the ten standards under	Tanzania meets standard for grain fortification but does not meet the standard for folic acid supplementation. It meets standards for child marriage, adolescents' access to contraception and for family planning commitment. Tanzania is not in full compliance with any of the ten standards for prevention and control of NCDs.	Uganda meets standards for folic acid supplementation, but does not meet the standard for grain fortification. It meets standards for child marriage, adolescents' access to contraception and for family planning commitment. Uganda did not meet any of the	All countries have met the standards for child marriage and family planning commitment. Compliance with folic acid supplementation standard is weak among the countries examined. None of the five countries are in full compliance with the standards for prevention and control of NCD.



Policy	Standard	Burundi	Kenya	Rwanda	Tanzania	Uganda	Summary
		access to contraception. Burundi met only one of the ten standards under prevention and control of NCDs.	standards under prevention and control of NCDs.	prevention and control of NCDs.		ten standards for prevention and control of NCDs.	

Abbreviations: FP/RH, family planning and/or reproductive health; NCD, non-communicable disease; STEPS, STEPwise approach to Surveillance; WHO, World Health Organization; WHO-FCTC, World Health Organization Framework Convention on Tobacco Control

^aThis is a summary of the evidence presented and cited in the results

^b The FCTC standard is for countries to declare all types of public places (for example, healthcare facilities, education facilities, universities, government facilities, public transport, indoor offices, restaurants, and pubs and bars) smoke-free by national legislation or at least 90% of the population should be covered by complete sub-national smoke-free legislation

^c The FCTC standard is defined as universal access to cessation services that include a toll-free quit line and treatment for tobacco dependence, including both advice in healthcare settings and pharmacological therapy, such as nicotine replacement therapy, in health clinics or primary care facilities, offices of health professionals, the community, and in other settings. Costs for treatment are expected to be covered in all settings

^d The FCTC standard is for all countries to establish national laws specifying that labels cover at least 50% of the cigarette pack, describe the harmful effects of tobacco use on health, are in large, clear, visible and legible font, are written in all principal languages of the country, include a photograph or graphic, are rotating, and appear on both unit packets and any outside packaging

^e FCTC mass media standards involve implementing and sustaining a national anti-tobacco mass media campaign with at least seven of the following characteristics: being part of a comprehensive tobacco control program, campaign was pre-tested, formative research was conducted, campaign aired on television and/or radio, campaign utilized media planning, earned media/public relations were used to promote the campaign, process evaluation was employed to assess implementation, and outcome evaluation was employed to assess effectiveness

^fThe FCTC standard is defined as a ban on all forms of direct and indirect advertising, involving any promotion and sponsorship of the tobacco industry

^g FCTC standard is for taxation on tobacco products to be above 75% of the retail price for packets of the most sold brand of cigarettes. Data is the tax as a percent of the price of the most sold brand of a 20 pack of cigarettes



Table 2: Policies Related to Supplementation and Grain Fortification with Folic Acid

Country	Grain	FAO availability (g/capita/d) ^a	Mandatory fortification?[12]	Amount of folic acid added (µg/g)[12]	Meets WHO recommendations ^b
Burundi	Wheat flour	No data	Yes	2.3 ± 1	Cannot determine ^c
	Maize flour	No data	Yes	1.2 ± 0.5	Cannot determine ^c
	Rice	No data	No	NA	NA
Kenya	Wheat flour	93	Yes	1.5 ± 1.0	Yes ^d
	Maize flour	211	Yes	1.5 ± 1.0	
	Rice	28	No	NA	NA
Rwanda	Wheat flour	38	Yes	2.3 ± 1	No ^e
	Maize flour	39	Yes	1.2 ± 0.5	
	Rice	22	No	NA	NA
Tanzania	Wheat flour	42	Yes	3 ± 2	Yes ^f
	Maize flour	156	Yes	1.5 ± 1	
	Rice	54	No	NA	NA
Uganda	Wheat flour	31	Yes	2.3 ± 1	No ^g
	Maize flour	111	Yes	1.2 ± 0.5	
	Rice	15	No	NA	NA

Abbreviation: NA, not applicable

^a 2011 data for “wheat and products”, “maize and products” and “rice (milled equivalent)”. FAO data [12] are expressed in kg/capita/year; these were multiplied by 1000 and divided by 365 to generate g/capita/day

^b Met at least the amount recommended by WHO [17] based on the combined per capita availability of wheat and maize: 5.0 µg/g for availability <75 g/capita/day, 2.6 µg/g for availability 75-149 g/capita/day, 1.3 µg/g for availability 150-300 g/capita/day, and 1.0 µg/g for availability >300 g/capita/day

^c Cannot determine because lacking information on per capita flour availability

^d The combined per capita availability of both flours is 304 grams per day. WHO recommends that for this flour intake, at least 1.0 µg/g of folic acid be added to flour. Kenya adds 1.5 µg/g folic acid to both flours and therefore meets the minimum recommendations



^e The combined per capita availability of both flours is 77 grams per day. WHO recommends that for this flour intake, at least 2.6 µg/g of folic acid be added to flour Rwanda adds 2.3 or 1.2 µg/g folic acid to wheat and maize flours, respectively and therefore does not meet the minimum recommendations

^f The combined per capita availability of both flours is 198 grams per day. WHO recommends that for this flour intake, at least 1.3 µg/g of folic acid be added to flour Tanzania adds 3 or 1.5 µg/g folic acid to wheat and maize flours, respectively and therefore meets the minimum recommendations

^g The combined per capita availability of both flours is 142 grams per day. WHO recommends that for this flour intake, at least 2.6 µg/g of folic acid be added to flour Uganda adds 2.3 or 1.2 µg/g folic acid to wheat and maize flours, respectively and therefore does not meet the minimum recommendations



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