

Alcohol Consumption & Cancer Risk Burden in Uganda: A Review for Evidence-based Alcohol Control



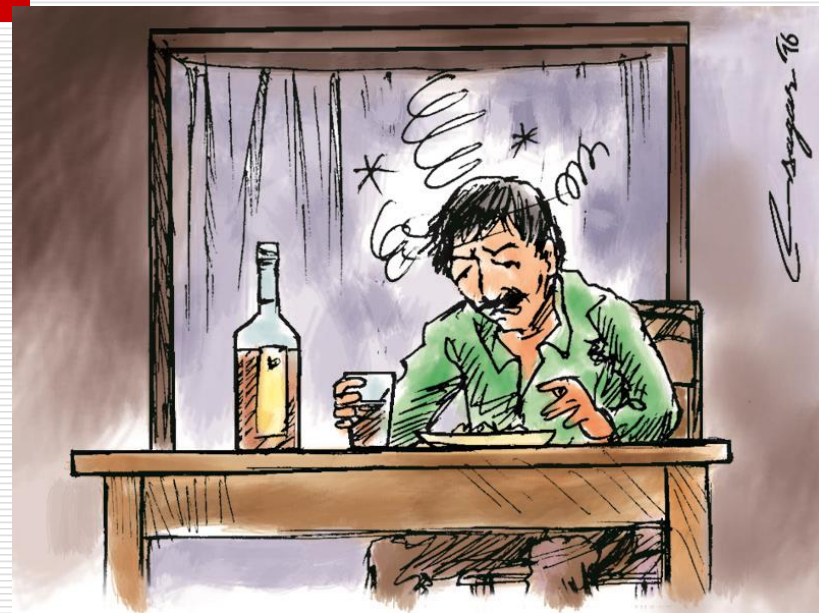
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Declaration of no conflict of interest

- I hereby declare that I have no financial, personal, or professional conflicts of interest related to the content of this presentation.
 - I also confirm that I have not received any funding, sponsorship, or support from the alcohol industry or related organizations.
 - My views and recommendations are based solely on available evidence and are intended to advance the understanding and prevention of alcohol-related harm
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Alcohol burden in Uganda

- ❑ In 2019, Uganda ranked the eight-leading country in the world, with 12.48 liters of pure alcohol per capita.
- ❑ In Africa, Uganda leads in alcohol drinking
- ❑ Alcohol consumption has been linked to more than 200 diseases and injury conditions,

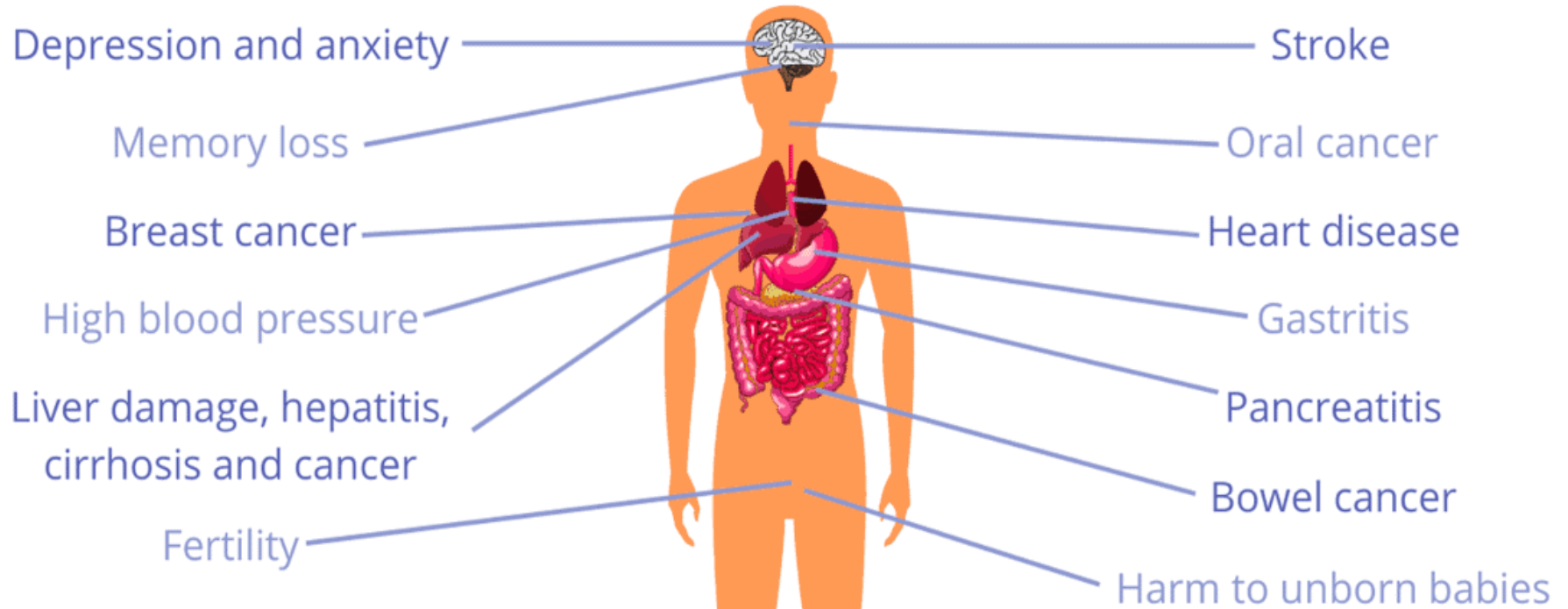


Prevalence of alcohol consumption in Uganda: 2023 STEPS of NCDs

Alcohol consumption status									
Men									
Age Group (years)	n	% Current drinker (past 30 days)	95% CI	% Drank in past 12 months, not current	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
18-29	469	36.6	31.5-41.8	12.8	9.0-16.7	8.8	6.0-11.6	41.7	35.7-47.8
30-44	451	47.5	41.1-53.9	6.1	3.3-8.9	17.2	13.4-21.0	29.2	23.3-35.0
45-69	506	50.4	44.5-56.4	6.8	4.2-9.4	18.6	13.6-23.6	24.1	19.3-29.0
18-69	1426	44.6	41.0-48.2	8.8	6.9-10.6	14.6	12.4-16.9	32.0	28.6-35.4
Alcohol consumption status									
Women									
Age Group (years)	n	% Current drinker (past 30 days)	95% CI	% Drank in past 12 months, not current	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
18-29	750	13.4	9.7-17.0	12.8	9.7-15.9	14.5	11.8-17.3	59.3	54.5-64.1
30-44	816	21.7	17.8-25.7	9.5	7.3-11.8	21.2	16.9-25.4	47.6	43.1-52.0
45-69	702	22.7	18.9-26.4	9.1	6.3-11.9	25.6	21.5-29.6	42.7	37.9-47.5
18-69	2268	19.1	16.7-21.5	10.5	8.8-12.2	20.2	17.7-22.6	50.2	47.4-53.0

The effects of alcohol on health

Alcohol is a causal factor associated with over 200 medical conditions.



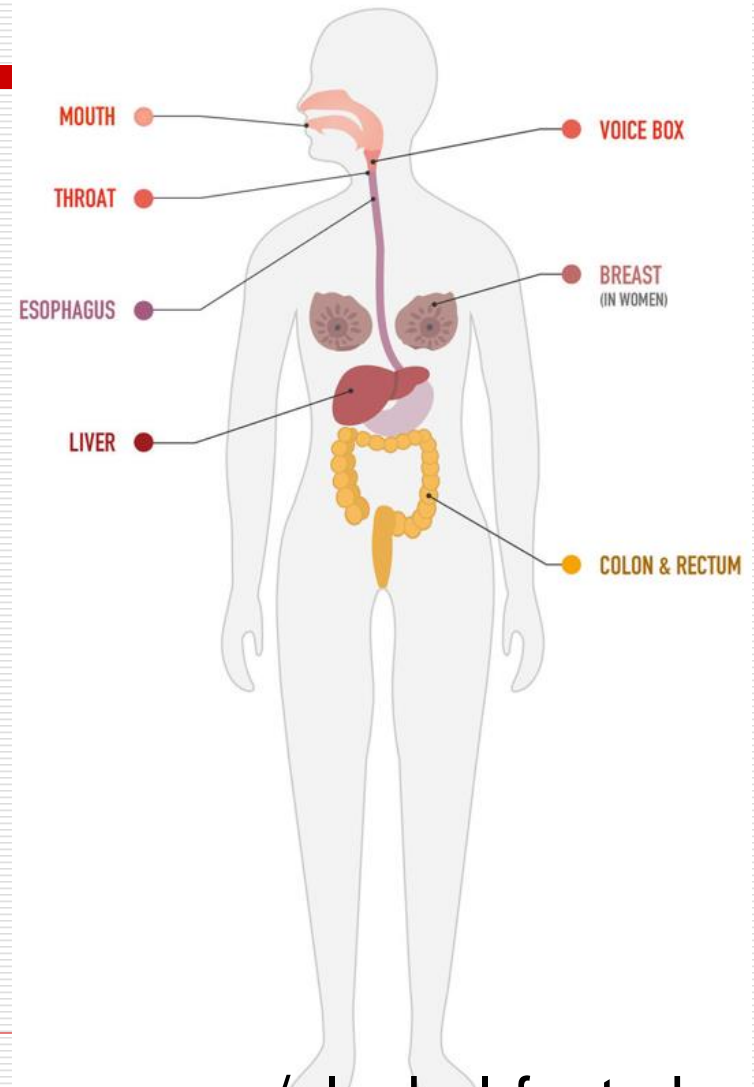
Source: Alcohol Focus Scotland, 'Alcohol and physical health' (2018)

Alcohol and Cancer risk: Evaluation of Human Carcinogens by IARC

Group	Example
Group 1	Formaldehyde, Benzo[a]pyrene, Alcoholic beverages , Benzene, Asbestos, Outdoor air pollution, Processed meat, Solar radiation, Tobacco use, Welding fumes, Wood dust, oncogenic infections such HPV, HBV, HCV, etc
Group 2A	DDT, Acrylamide, Glyphosate
Group 2B	Vinyl acetate, Pyridine, Lead, Digoxin
Group 3	Ampicillin, Ethylene, Fluorene, Coal dust, Coffee, drinking, Dental materials, Fluorescent lighting, Electric fields, Hepatitis D virus, Hair colouring products (personal use of), Human papillomavirus types 6 and 11, Paint manufacture (occupational exposure in), Silicone breast implants, Printing inks

What is the evidence that alcohol drinking can cause cancer?

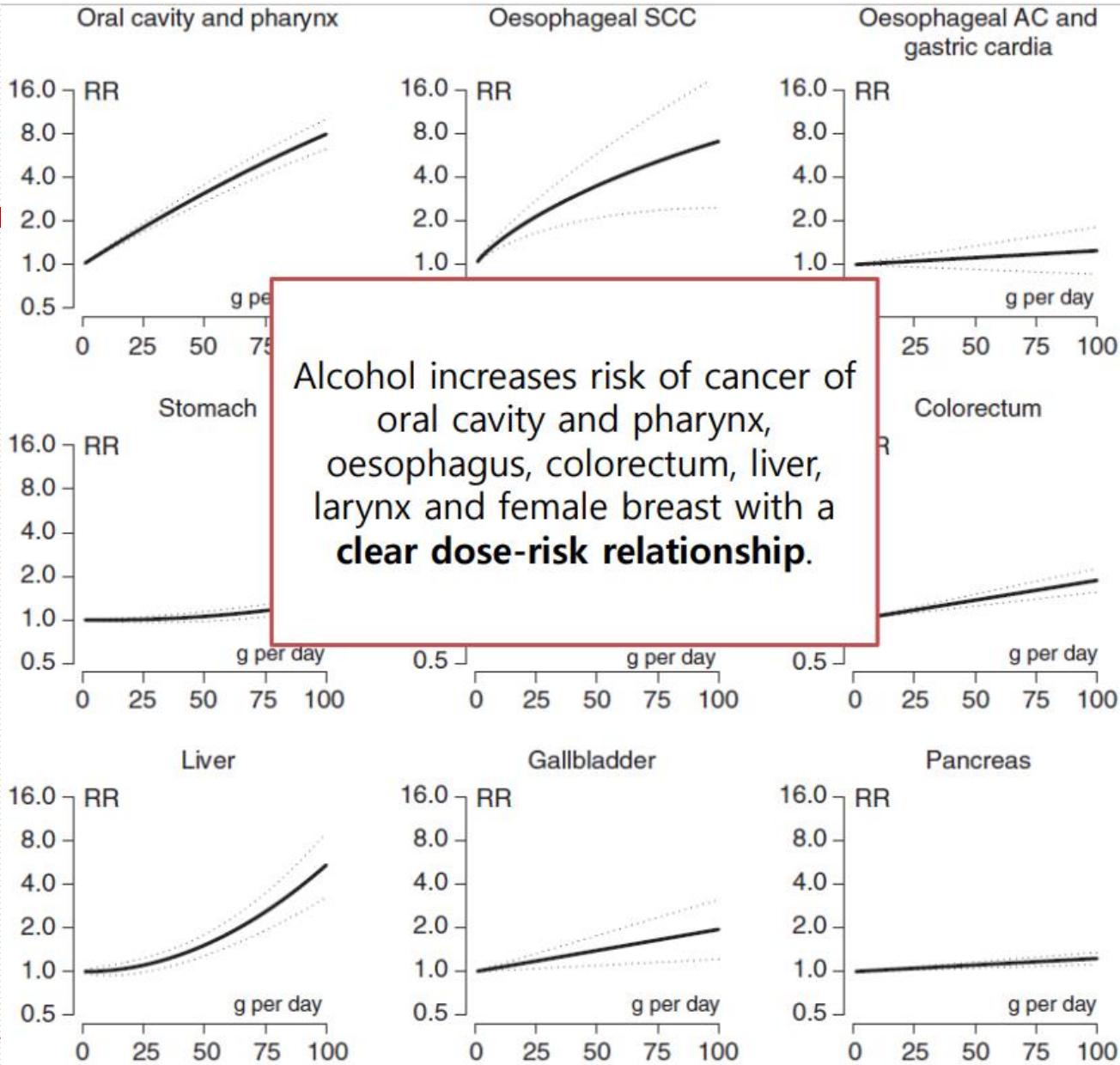
- Alcohol consumption causes cancers of the oral cavity, pharynx, larynx, oesophagus, colorectum, liver and female breast (IARC, 2012) and
- possibly cancer of the stomach, pancreas, lung, and gallbladder (Cao et al. 2015).



Alcohol and Cancer risk

- ❑ Alcohol consumption accounts for about 3% and 10% of total cancers diagnosed in women and men, respectively.
 - ❑ In both genders, the alcohol-attributable fraction is high for upper aero-digestive tract; lips, mouth, tongue, nose, throat, esophagus and trachea (25–44%), liver (18–33%), and colorectal (4–17%) cancers, and in women for breast cancer (about 5%) (Scoccianti et al. 2015).
 - ❑ In liver cancer, for example, alcohol increases HCC risk at least twofold; some studies suggest at least a fivefold increase (Lafaro, Demirjian & Pawlik 2015)
-

Alcohol and Cancer risk



How does alcohol cause cancer?

1. Acetaldehyde

- ❑ When we drink alcohol (ethanol in an alcoholic beverage), it is turned in to a chemical called acetaldehyde.
 - ❑ Acetaldehyde is a genotoxic (can damage the DNA/ genetic information within a cell) metabolite of ethanol.
 - ❑ This happens mainly in the liver.
 - ❑ Acetaldehyde can cause cancer by damaging DNA and stopping our cells from repairing this damage.
 - ❑ The carcinogenicity of alcoholic beverages does NOT seem to vary with the type of beverage; the effect appears to be caused by ethanol itself (Scoccianti et al. 2015)
-

How does alcohol cause cancer?

2. Hormone changes

- ❑ Hormones act as messengers in the body, giving our cells instructions - including when to grow and divide.
 - ❑ Alcohol can increase the blood levels of some hormones such as oestrogen and insulin.
 - ❑ Oestrogen, a sex hormone, is linked to the risk of breast cancer.
-

How does alcohol cause cancer?

3. Increased absorption of other carcinogens

- Alcohol can affect the cells between the mouth and throat, which may make it easier for other carcinogens to be absorbed.
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How does alcohol cause cancer?

4. Impairing absorption of a variety of nutrients

- ❑ Alcohol impairs the body's ability to break down and absorb a variety of nutrients that may be associated with cancer risk.
 - ❑ Notably, vitamin A; nutrients in the vitamin B complex, such as **folate**; vitamin C; vitamin D; vitamin E; and carotenoids.
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How does alcohol cause cancer?

5. Mitochondrial injury

- ❑ Ethanol potentiates mitochondrial injury by further increasing reactive oxygen species (ROS) production and enhancing oxidation, ex. hepatic glutathione oxidation.
 - ❑ ROS are chemically reactive molecules that contain oxygen.
 - ❑ ROS can damage DNA, proteins, and lipids (fats) in the body through a process called oxidation
 - ❑ Thus, resulting in increased apoptosis and cell injury (Singal & Anand 2007)
-

How does alcohol cause cancer?

6. Carcinogenic contaminants

- ❑ Alcoholic beverages may also contain a variety of carcinogenic contaminants that are introduced during fermentation and production, such as:
 - ❑ Nitrosamines,
 - ❑ Asbestos fibers,
 - ❑ Phenols, and
 - ❑ Hydrocarbons.
-

The levels of metals ($\mu\text{g/L}$) in each brand of alcohol and their associated health indices (HI). HI is listed from the most significant (top) to the least (bottom).

Sachet brand	Metal content ^a	HI metals	Ratio ^b
Ethanol	—	4.1 (1.0) ^c	>1 (1) ^c
TEB	12143 ^d	7.3x10 ^{-2 e}	1/14
AWE	4342 ^d	2.6x10 ^{-2 e}	1/38
REX	794.5	1.3x10 ⁻²	1/83
NSB	1479 ^d	1.1x10 ^{-2 e}	1/91
BOL	1340 ^d	9.6x10 ^{-3 e}	1/104
TGL	538.0 ^d	5.7x10 ^{-3 e}	1/192
B5V	200.8	1.9x10 ⁻³	1/529
B7W	64.8	1.5x10 ⁻³	1/714
BEG	148.4	1.3x10 ⁻³	1/769
GOV	123.3	1.1x10 ⁻³	1/909
KPW	166.5	1.1x10 ⁻³	1/1000
BRG	123.3	8.9x10 ⁻⁴	1/1136
CW1	43.3	8.7x10 ⁻⁴	1/1176
ROV	164.1	8.3x10 ⁻⁴	1/1266
CW2	113.6	7.8x10 ⁻⁴	1/1300
SAG	138.9	6.9x10 ⁻⁴	1/1493
UGW	16.1	6.3x10 ⁻⁴	1/1639
V6T	148.5	5.8x10 ⁻⁴	1/1818

The 13 brands were Big 5
Vodka (B5V),
Beckham Spirit (BEG), Bond 7 Whisky (B7W),
Brigade Spirit (BRG), Chief Waragi Spirit (CW1 and CW2, duplicates sampled one year apart), Goal Vodka (GOV), Kick Spirit Pineapple Waragi (KPW), Relax (REX), Royal Vodka (ROV), Salongo Spirit (SAG), Uganda Waragi (UGW), and V6 Tangawizi Vodka (V6T).

How does alcohol cause cancer?

7. Synergistic mechanism

- ❑ Research shows that people who use both alcohol and tobacco have higher risks of developing cancers of the oral cavity, pharynx (throat), larynx, and esophagus than people who use either alcohol or tobacco alone.
- ❑ For oral and pharyngeal cancers, the risks associated with using both alcohol and tobacco are multiplicative; that is, they are greater than would be expected from adding the individual risks associated with alcohol and tobacco together (Turati et al. 2013, Hashibe et al. 2009).
- ❑ Synergistic mechanism has also been observed with HBV and HCV.
- ❑ EX. greater HCV replication in the presence of alcohol, increased oxidative stress & inhibition of hepatic expression of Bcl-2 (Singal & Anand 2007)

How does alcohol cause cancer?

8. Increased risk of sexually transmitted cancer-causing infections

- ❑ Alcohol consumption is linked to infectious diseases such as HIV in Uganda (Kim et al. 2016, Zablotska et al. 2006).
 - ❑ Alcohol impairs judgment and may influence the risk of sexually transmitted oncogenic infections such as HPV (risk factor for cervical, anal, penile and head and neck cancers), HBV and HCV (risk factor for liver cancer), HIV (risk factor and co-factor for several cancers such cervical cancer, KS, and certain types of lymphoma), and HHV-8 (risk factor of KS).
 - ❑ The infection-associated cancers such as cervical, KS, liver, lymphoma, and penile cancers are among the top 10 cancers in Uganda.
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What happens to cancer risk after a person stops drinking alcohol?

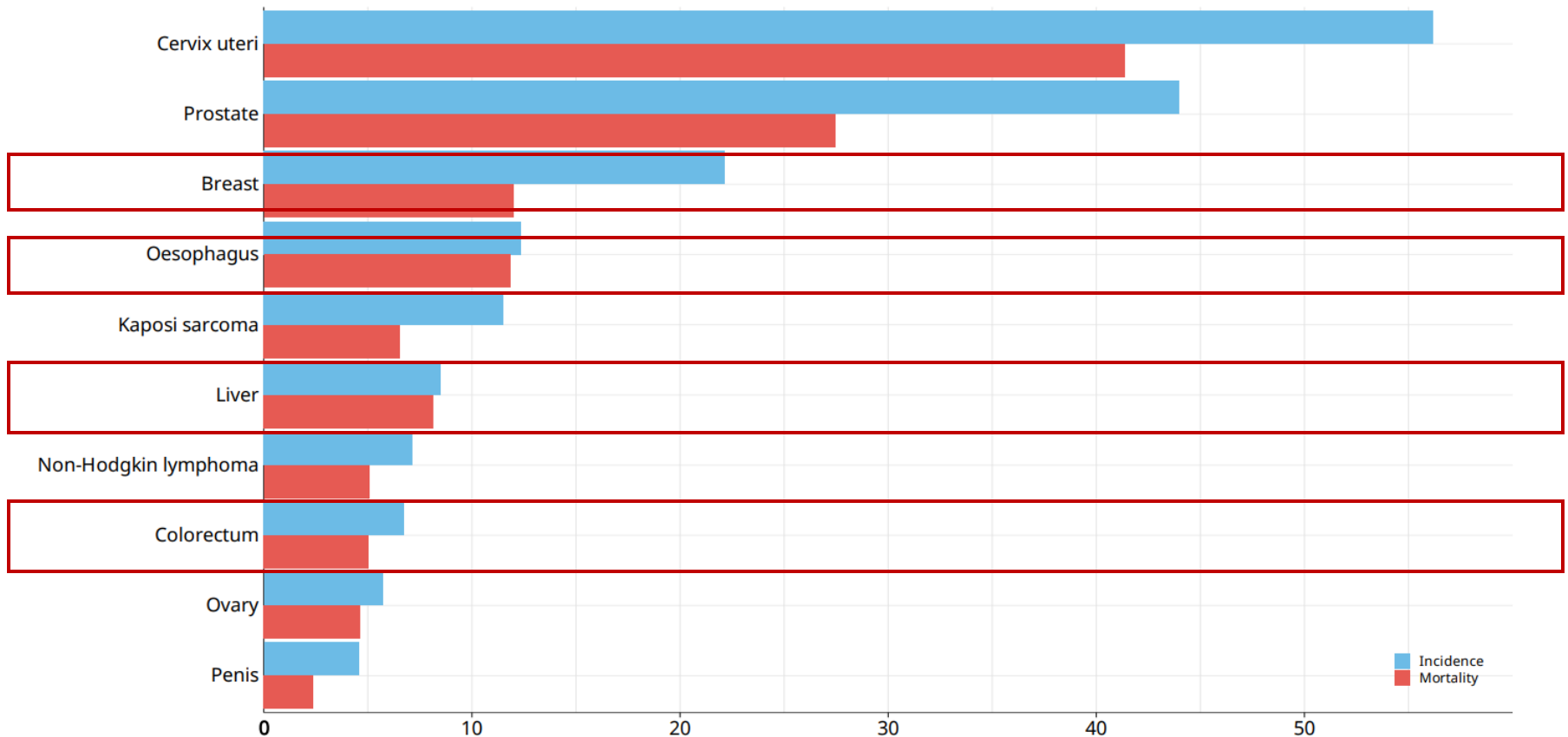
- ❑ Stopping alcohol consumption is not associated with immediate reductions in cancer risk.
 - ❑ The cancer risks eventually decline, although it may take years for the risks of cancer to return to those of never drinkers.
 - ❑ This was demonstrated in study on head and neck cancers and on esophageal cancer.
-

What happens to cancer risk after a person stops drinking alcohol?

- For example, ex-drinkers still had higher risks of oral cavity and pharyngeal cancers than never drinkers even 16 years after they stopped drinking alcohol, although it was lower than before they stopped drinking (Rehm et al. 2007).
 - One study estimated that it would take more than 35 years for the higher risks of laryngeal and pharyngeal cancers associated with alcohol consumption to decrease to the level of never drinkers (Ahmad Kiadaliri et al. 2013).
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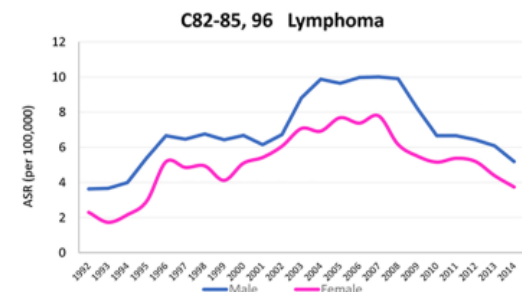
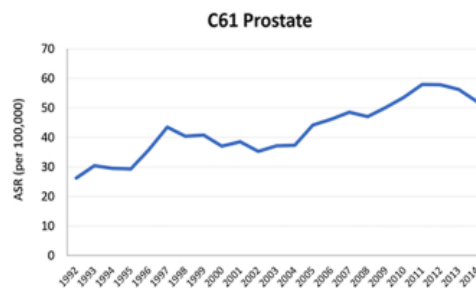
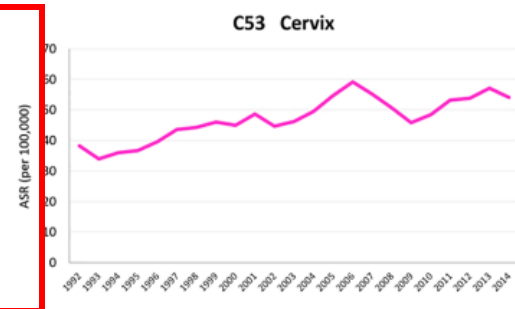
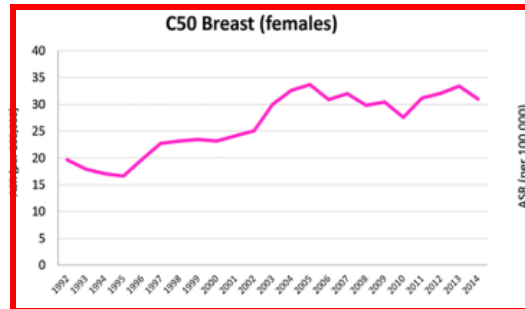
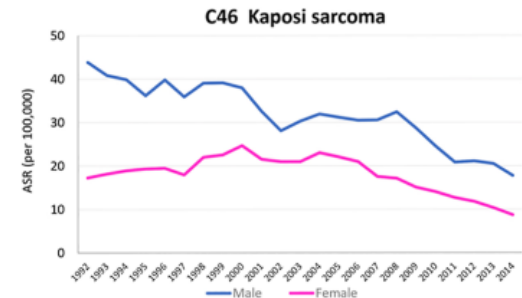
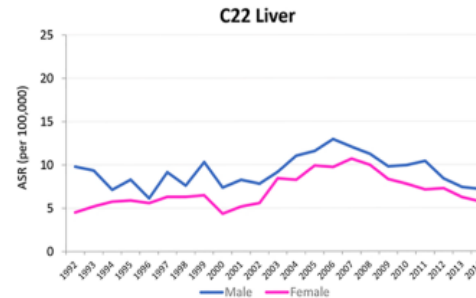
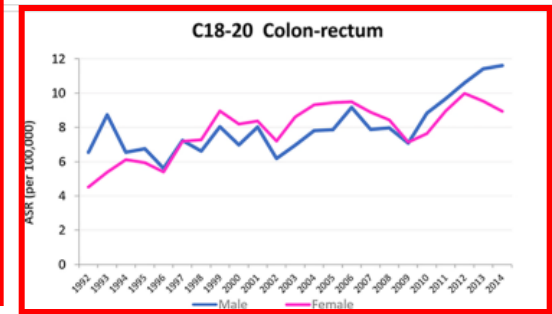
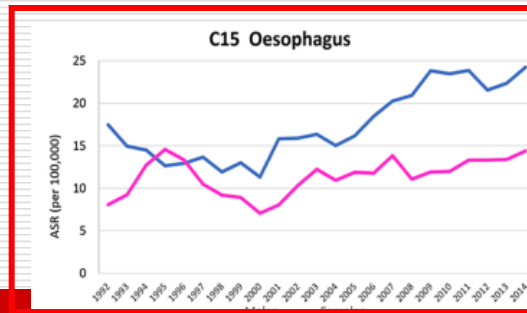
The Burden of Alcohol Associated Cancers In Uganda

Estimated age-standardized incidence and mortality rates (World) in 2020, Uganda, both sexes, all ages (excl. NMSC)



Trends of the most common Cancers in Uganda:

Trends in age-standardized incidence rates per 100,000 (3-year moving averages) Vs other cancers-
KPBCR
(Bukirwa et al 2020)



Cost of cancer attributable to Alcohol consumption in Uganda: Using Population attributable fraction (PAF)

Study and year published	Alcohol associated cancer	Population attributable fraction (PAF)-Uganda	Average annual Cost of treatment per patient	Cost of treating Alcohol attributable cancer in Uganda
Rumgay et al. 2021	Oesophageal cancer	48.7	219,766.90	419,535,012.1
Rumgay et al. 2021	Liver cancer	16.8	173,127.70	93,142,702.6
Rumgay et al. 2021	Colorectal cancer	5.2	182,913.50	28,534,506
Rumgay et al. 2021	Female Breast cancer	11.3	114,620.30	90,779,277.6
Rumgay et al. 2021	Lip and oral cavity	7.6	174,689.20	13,276,379.2
Rumgay et al. 2021	Pharynx (Nasopharynx)	3.0	158,759	6,191,601
Rumgay et al. 2021	Larynx	3.2	158,759	3,016,421
Danaei et al. 2005	Stomach cancer	5	208,211.30	10,202,353.7
Danaei et al. 2005	Pancreatic cancer	5	251,623.20	4,529,217.6
Danaei et al. 2005	Lung cancer b	5	190,929.70	8,782,766.2
Total annual cost				\$ 677,990,237.00 UGX 2,508,563,876,000 /

Recommended public policy strategies for alcohol control at national level

- ❑ **The WHO 2010 global strategy on harmful use of alcohol supports ten target areas for national actions:**
 - ❑ Leadership, awareness and commitment;
 - ❑ Health services' response;
 - ❑ Community action;
 - ❑ Drink-driving policies and countermeasures;
 - ❑ Availability of alcohol;
 - ❑ Marketing of alcoholic beverages;
 - ❑ Pricing policies;
 - ❑ Reducing the negative consequences of drinking and alcohol intoxication;
 - ❑ Reducing the public health impact of illicit alcohol and informally produced alcohol;
 - ❑ Monitoring and surveillance.
-

The three best public policy and prevention interventions at national level

- ❑ WHO recently identified the three best interventions to tackle harmful alcohol use at national level.
 - ❑ Restricted access to retailed alcohol
 - ❑ Limitation of alcohol advertising, and
 - ❑ Taxes on alcohol.
-

Challenges: The interest & legal vacuum

- ❑ Lack of an Act of Parliament on alcohol control
 - ❑ Weak enforcement of the existing regulations
 - ❑ Varying interests; trade, revenue, health, social function and leisure.
 - ❑ Emerging evidence on high level of carcinogenic contaminants in alcoholic beverages in Uganda.
 - ❑ Limited number of higher-level evidence studies in Uganda, esp. risk assessment, due to lack of or limited local research funding opportunities (Jatho et al. 2021).
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Recommendations

- ❑ Enact a law (Act of Parliament) on alcohol control in Uganda with provisions on regulation of production, packaging, distribution, marketing, sale and consumption of all alcoholic beverage. This will strengthen the legal basis of the Uganda National Alcohol Control Policy (2019).
 - ❑ Set prohibitive fines for the breach of the provisions of the Alcohol Control Act.
 - ❑ Provide for the registration and licensure of all trade in alcohol right from production. Note that this will not reduce the revenue associated with alcohol trade, but instead will increase revenue directly through registration and licensure fees.
-

Recommendations

- Provisions for restricted access to retailed alcohol, limitation of alcohol advertising, regulated licensing and taxes on alcohol are recommended. This will provide for more working time for the economically productive age groups and restricting alcohol access in and in proximity of critical institutions such as schools, health facilities, among others
 - Provide for a strong enforcement measure including enforcement institution capability in this Act.
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Recommendations

- ❑ Multi-sectoral consideration and a healthy balance of interest especially among; trade, revenue, health, alcohol use for social function and leisure should be evaluated and taken care of in the provisions.
- ❑ Provide for packaging of all alcoholic beverages including locally brewed products such as Kwete, Mulamba, Lacoyi / Maluwa intended for public sale. This will promote value addition and health /safety. This will also tract the provisions on registration and licensure of trade in alcoholic beverages.
- ❑ Provide for quality assurance and monitoring the content of alcoholic beverages in Uganda, relative to the permissible level (upper limit) to ensure public health and safety.
- ❑ Provide for alcoholic beverage content substitution with healthier ingredient

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Thank you

