2b. Noxious behaviors
(alcoholism, smoking, drug abuse)
Dangerous substances

- Alcohol
- Caffeine
- Cannabis
- Hallucinogens
  - PCP
  - others
- Inhalants
- Opioids
- Sedatives, hypnotics, and anxiolytics
- Stimulants
- Tobacco
- Other
Substance-related disorders

Two categories:

- substance use disorders:
  • previously split into abuse and dependence;
  • involves: impaired control, social impairment, risky use, and several pharmacological criteria.

- substance-induced disorders.
Substance use disorders
- quick clinical orientation -

- use of substance in larger amounts or for longer time than intended;
- persistent desire or unsuccessful attempts to cut down or to control its use;
- great deal of time obtaining / using the substance or recovering after consumption;
- craving;
- fail to fulfill major roles (work, school, home);
- persistent social or interpersonal problems caused by substance use.
### DSM-5 criteria for substance use disorder

**Problematic pattern of use that impairs functioning.**

**Two or more symptoms within a 1 year period:**

- Failure to meet obligations
- Repeated use in situations where it is physically dangerous
- Repeated relationship problems
- Continued use despite problems caused by the substance
- Tolerance
- Withdrawal
- Substance taken for a longer time or in greater amounts than intended
- Efforts to reduce or control use do not work
- Much time spent trying to obtain the substance
- Social, hobbies, or work activities given up or reduced
- Continued use despite knowing problems caused by substance
- Craving to use the substance is strong
Activation of the reward pathway by addictive drugs

Dopamine Pathways

- Cocaine
- Heroin
- Nicotine
- Alcohol
- Amphetamines
- Opiates
- THC
- PCP
- Ketamine
- Nicotine
- Alcohol
- Benzodiazepines
- Barbiturates
- Nucleus accumbens
- VTA
1. Alcoholism
Alcohol consumption

- high prevalence, despite restrictions and consequences on health;
- has a cultural dimension (associated to socializing, celebrations or seen as a coping mechanism): Europe, UK, Asia (Russian territory), North and South America, Australia, several countries in Africa;
- low consumption in Muslim countries (Asia and Africa);
Facts (WHO)

Worldwide, 3 million deaths every year result from harmful use of alcohol.
The harmful use of alcohol is a causal factor in more than 200 disease and injury conditions.
Overall 5.1 % of the global burden of disease and injury is attributable to alcohol, as measured in disability-adjusted life years (DALYs).
Alcohol consumption causes death and disability relatively early in life.
In the age group 20–39 years approximately 13.5 % of the total deaths are alcohol-attributable.
There is a causal relationship between harmful use of alcohol and a range of mental and behavioral disorders.
Recently, causal relationships have been established between harmful drinking and prognosis of infectious diseases, such as tuberculosis or HIV.
Beyond health consequences, the harmful use of alcohol brings significant social and economic losses to individuals and society at large.

https://www.who.int/news-room/fact-sheets/detail/alcohol
Possible long-term effects of Ethanol

Large consumption

Brain:
- Impaired development
- Wernicke-Korsakoff syndrome
- Vision changes
- Ataxia
- Impaired memory
- Psychological
  - Cravings
  - Irritability
  - Antisociality
  - Depression
  - Anxiety
  - Panic
  - Psychosis
  - Hallucinations
  - Delusions
  - Sleep disorders

Mouth, trachea and esophagus:
- Cancer

Blood:
- Anemia

Heart:
- Alcoholic cardiomyopathy

Liver:
- Cirrhosis
- Hepatitis

Stomach:
- Chronic gastritis

Pancreas:
- Pancreatitis

Peripheral tissues:
- Increased risk of diabetes type 2

Small to moderate consumption

Systemic:
- Increases insulin sensitivity
- Lower risk of diabetes

Brain:
- Atrophy
- Reduce the number of silent infarcts
- Decrease risk of dementia

Blood:
- Increases HDL
- Decreases thrombosis
- Reduces fibrinogen
- Increases fibrinolysis
- Reduces artery spasm from stress
- Increases coronary blood flow

Skeletal:
- Higher bone mineral density

Effects linked with both small and large consumption

Joints:
- Reduced risk of rheumatoid arthritis

Gallbladder:
- Reduced risk of developing gallstones

Kidney:
- Reduced risk of developing kidney stones
Theories regarding alcoholism

- Genetic theories – point to an important role of genetics in alcoholism:
  - twin and adoption studies;
  - genes involved in the alcohol metabolism.
- Theories based on the stress-relieving effect of alcohol
  - alcohol as a coping mechanism for stress.
- Learning theories of alcoholism - at the microsocial level (family, peers) and at the macrosocial level.
Factors involved in alcoholism

Individual:
- biological: genetics, biological susceptibility (e.g., acetaldehyde), gender (e.g., women are at risk of developing alcohol use disorder faster than men, due to differences in body mass, hormones, and metabolism), age (e.g. the younger the age, the higher the risk to become alcoholic);
- psychological: personality traits (e.g., reward seekers, psychological dependence), resilience to stress traits (e.g., self-efficacy provides protection towards the harmful use of alcohol), comorbid mental illness (e.g., anxiety, depression, bipolar disorder, and schizophrenia are very likely to concur to the alcohol use disorder).
- family history (e.g., childhood abuse, parental struggles and mental illness at close family members contribute to the risk of developing an addiction to drugs or alcohol);
- socio-economical status (e.g, poverty increase the risk of alcoholism).

Societal:
- social and cultural norms can be restrictive or permissive in what concerns alcohol consumption.
Individual factors - genetics

**Twin studies**
55% MZ twins, 28% DZ twins develop alcoholism, irrespective of their environment.

**Family history**
If father is alcoholic, 25% of sons and 5-10% of daughters are affected.

**Adoption studies**
e.g., Denmark:
- father alcoholic: 18% sons affected.
- father non-alcoholic: 5% sons affected.
What is inherited?

- high initial tolerance;
- increased rate of alcohol metabolization (via higher levels of acetaldehyde-dehydrogenase);
- as a result, even higher tolerance.
Individual factors - genes

ADH and ALDH genes involved in alcohol metabolism and risk for alcoholism.

- protective genes: *ADH1B* and *ADH1C* alleles encode particularly active ADH enzymes, resulting in more rapid conversion of alcohol (i.e., ethanol) to acetaldehyde;

- ALDH2 gene encodes an essentially inactive ALDH enzyme, resulting in acetaldehyde accumulation.

Other genes:

- *GABRB1*: mutations of the GABRB1 gene can increase the risk of AUD because of changes to gamma-aminobutyric acid (GABA).

- *Beta-Klotho*: This gene is associated with drinking less rather than experiencing pleasant feelings from drinking more. People with the beta-Klotho gene appear to be able to control their drinking, usually consuming one or two drinks and then successfully stopping.

Source: https://www.alcohol.org/alcoholism/is-it-inherited/
Individual factors:
psychological characteristics

- reward seeking;
- impulsive;
- gets bored easily;
- risk-taking;
- gregarious;
- pushing the limits;
- acting out.
Social factors

Alcoholism is low in cultures where:

• alcohol is served occasionally / in dilute forms;
• abstaining is seen as okay;
• parents model does not encourage drinking;
• getting drunk is not seen as being funny / cool;
• ground rules / group norms re: alcohol consumption are respected.
Social factors

Alcoholism is higher in cultures where:

• there are no ground rules / group norms re: alcohol consumption, or they are not respected.
• children / teenagers get mixed / ambivalent messages re: alcohol from different individuals and groups (getting drunk can be okay / cool / funny)
• heavy drinking is encouraged.
• drinking is largely seen as a sign of masculinity or adulthood.
## Screening for alcoholism

### CAGE questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you ever felt you needed to <strong>Cut</strong> down on your drinking?</td>
<td>No</td>
</tr>
<tr>
<td>Have people <strong>Annoyed</strong> you by criticizing your drinking?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever felt <strong>Guilty</strong> about drinking?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever felt you needed a drink first thing in the morning (<strong>Eye-opener</strong>) to steady your nerves or to get rid of a hangover?</td>
<td>No</td>
</tr>
</tbody>
</table>

>2 points = harmful drinking  
4 points = alcoholism
Screening for alcoholism

(cont’d)

- CAGE:
  - scores of two or higher had a 93% sensitivity + 76% specificity for the identification of “excessive drinking” and a 91% sensitivity + 77% specificity for the identification of alcoholism;
  - some clinicians consider the “eye opener” question as highly concerning for unhealthy drinking behavior, even if all other questions are answered negatively.

- AUDIT (10 items);

- AUDIT-C (uses only the first three questions of the full-length AUDIT).
Therapeutic intervention

Cognitive-behavioral therapy (CBT)

Effect on cognition in alcoholics in what concerns thinking distortions, esp. those regarding “beneficial effects” of alcohol. The therapists may help their client confront the struggle with alcohol by considering the negative impact of alcohol consumption on their relationships, physical health, and career.

Effect on behavior, as it focuses on specific behavioral changes. The therapist will guide the individual through managing discomfort like cravings for alcohol and choosing healthier behaviors instead.

Because the focus of CBT is goal-oriented the patients should attend sessions. Generally, in anout 12-16 sessions a change can be noticed (although the person may need more sessions, in order to maintain the changes, or to efficiently used the social support to keep implement life changes).
Therapeutic intervention

Hypnosis and relaxation

- these therapies operate fast at the unconscious level, build an aversion to alcohol, bypassing the multiple resistances of clients with alcoholism.
- useful in advanced alcoholics.
- useful in early alcoholism, as they reduce perceived stress and clients are able to construct alternative ways of coping with unpleasant or provocative situations.

Group therapy - ALCOHOLICS ANONYMUS

- emphasis on the fact that alcoholism is a progressive illness, which can be arrested through total abstinence from alcohol in any form.
- modelling: the AA program operates when a recovered alcoholic talks about his/her story of drinking alcohol, describes the sobriety found in AA, and invites the newcomers to join the informal fellowship.
- program run in steps (typically 12).
Ways to reduce the burden from the harmful use of alcohol (WHO policy)

- Health and safety can be improved, whereas the socioeconomic problems attributable to alcohol can be effectively reduced, if (a) actions are implemented at all levels and contexts of alcohol consumption and (b) the wider social determinants of alcoholism are approached through Public Health policies.
- Countries have the responsibility of formulating, implementing, monitoring and evaluating public policies destined to reduce the harmful use of alcohol.
- E.g., SAFER provides five high-impact strategic actions that are prioritized for implementation to promote health and development:
  - **Strengthen** restrictions on alcohol availability;
  - **Advance** and enforce drink driving countermeasures;
  - **Facilitate** access to screening, brief interventions, and treatment;
  - **Enforce** bans or comprehensive restrictions on alcohol advertising, sponsorship, and promotion;
  - **Raise** prices on alcohol through excise taxes and pricing policies.

Source: [https://www.who.int/substance_abuse/safer/launch/en/](https://www.who.int/substance_abuse/safer/launch/en/)
2. Smoking
Facts

Tobacco kills up to half of its users.
Tobacco kills more than 7 million people each year.
More than 6 million of those deaths are the result of direct tobacco use, while around 890 000 are the result of non-smokers being exposed to second-hand smoke.
Around 80% of the world's 1.1 billion smokers live in low- and middle-income countries.

Source: https://www.who.int/news-room/fact-sheets/detail/tobacco
Tobacco use

Nicotine is the main addictive component in tobacco. Cigarette smokers control their nicotine levels via cigarette consumption, number and volume of puffs, and depth of inhalation. During the most recent decade (2000–10), the prevalence of tobacco smoking in men fell in 125 (72%) countries, and in women fell in 155 (87%) countries. Rapid increases are predicted in Africa for men and in the eastern Mediterranean for both men and women, suggesting the need for enhanced measures for tobacco control in these regions.
Factors involved in nicotine dependence

Genetics:

- may play a role in initiation and persistence of smoking (especially at low starting age or in those person who have a high predisposition for dependence);
- MZ twins have a higher risk than DZ twins for smoking;
- nicotine binds to brain tissue with high affinity, especially in regular smokers, whose binding capacity is increased as a result of functional up-regulation of nicotinic acetylcholine receptors (nAChRs). In recent years, large genome-wide association study (GWAS) meta-analyses have revealed that the strongest genetic contribution for smoking-related traits comes from variation in the nAChR subunit genes.
Theoretical models

Learning theory of smoking – at the micro-social level (family, job, peers)
  – the relaxed attitude of others can act as an initiator or reinforcer;
  – familial influence:
    • direct modeling (parents smoke);
    • Indifference towards the child (tries to get attention by smoking);
    • constraint of emotional expression (the child smokes as a substitute for liberty);
    • insecure climate / violent environment (the child smokes in order to punish the aggressors)

Learning theory of smoking – at the macro-social level (society)
  – facilitators: insecure social climate, poverty, lack of perspective.

Health Belief Model
In regards to smoking, the HBM would predict that tobacco use is determined by an individual’s perceptions regarding: susceptibility to tobacco-related diseases; costs, benefits, and barriers to engaging in smoking or quitting behaviors; and triggers to change the smoking behavior.
Theoretical models

• Behavioral models of addiction
  – Classical conditioning: a person learns to associate two previously unrelated stimuli. In terms of smoking, a person can learn to associate smoking with other feelings and events (such as being in a stressful situation or having a coffee) and these situations then automatically induce cravings and represent a ‘cue’ for his or her smoking behavior.
  – Operant conditioning: behavior is shaped by its consequences (i.e., reward or punishment). When nicotine is inhaled, it causes a rapid release of dopamine, in turn causing feelings of pleasure that reward and reinforcing the behavior. Pleasure and reinforcement feed the process of addiction.
Theoretical models

• Physiological models of addiction
  – the binding of nicotine at the receptor binding-site stimulates the release of dopamine, serotonin, glutamate, and gamma aminobutyric acid (GABA);
  – dopamine controls the reward pathway, thereby representing a major contributor to the development of addiction;
  – nicotine increases the release of glutamate, which is believed to be involved in learning and memory, by enhancing synaptic plasticity,
  – the pleasurable experience of smoking is created by learning and memory, reinforcing the addictive effects of nicotine.
Effects of smoking

Smoking harms nearly every organ of the body, causing many diseases and harming the health of smokers in general.

 Quitting smoking has immediate, as well as long-term benefits, reducing risks for diseases caused by smoking.

 Smoking cigarettes with lower machine-measured yields of tar and nicotine provides no clear benefit to health.

 The list of diseases caused by smoking has been recently expanded to include abdominal aortic aneurysm, acute myeloid leukemia, cataract, cervical cancer, kidney cancer, pancreatic cancer, pneumonia, periodontitis and stomach cancer.
Therapeutic intervention

Tobacco dependence can be treated successfully with a combination of behavioral support and pharmacological therapy.

Smoking cessation should be based on a patient's coexisting medical conditions, level of smoking, compliance, previous experience with cessation agents, and the cost of therapy.

Pharmacological approach:
- nicotine replacement therapy (patch, spray, chewing gum), bupropion, varenicline;
- psychotropic medication (treatment of associated illnesses, e.g., anxiety, depression).
Therapeutic intervention

Self-help interventions available to smokers have not been found to be very effective.

Brief intervention techniques may include:

Cognitive-behavioral based counseling (stop-smoking national programs)
  – needs to provide smokers with (1) practical counseling (problem solving skills/skills training), and (2) support and encouragement as part of treatment.
  – telephone quit lines (which may include call-back counseling and proactive interventions by quit line counselors), are the most common form of counseling.
Therapeutic intervention

Cognitive-behavioral psychotherapy

- studies have shown that it may lead to high and stable abstinence rates;
- there is a strong relationship between the number of sessions of counseling, when it is combined with medication, and the likelihood of successful smoking cessation;
- it involves changing and restructuring thought processes, combined with new learning behaviors;
- CBT is particularly effective for people who also experience anxiety or depression, or who are dependent on additional substances.
Specific CBT techniques for quitting smoking

**Individual problem-solving strategies:** May involve developing behaviours to avoid smoking when the client is in contexts where he/she is used to smoke.

**Changing thinking patterns:** working on the way the client thinks about certain situations. For example, if when stressed the first thought that comes to mind is, "I need a cigarette," the client can change this to, "I need some fresh air," or, "I need to slow my breathing".

**Education about the quitting process:** learning about nicotine dependence, quit strategies and withdrawal symptoms.

**Identifying social or environmental cues** that trigger the urge for a cigarette.

**Identifying motivational cues.**

**Aversion therapy:** highlighting the negative associations of smoking.

**Social support:** assess the smoking status of the client current social network + planning the growth of the non-smoking network.

**Weight gain** discourages quitting for many people. CBT can include behavioral training to prevent weight gain by focusing on eating and exercise habits.
Therapeutic intervention

Hypnosis
- facilitates smoking cessation;
- has the advantage of bypassing the resistance mechanisms of the patient;
- involves the administration in a state of trance of aversive suggestions targeted on smoking and of positive messages enabling self-trust and the desire to succeed.

Group therapy
- facilitates emotional catharsis, the perception and providing of solidarity and new opportunities to each member to learn better coping strategies.
Ways to reduce the burden from smoking (WHO policy)

• WHO is committed to fighting the global tobacco epidemic. The WHO Framework Convention on Tobacco Control (WHO FCTC) became effective in February 2005 and has today 181 Parties covering more than 90% of the world's population.
• In 2008, WHO introduced a practical, cost-effective way to scale up implementation of the main demand reduction provisions of the WHO FCTC on the ground: MPOWER. Each MPOWER measure corresponds to at least 1 provision of the WHO Framework Convention on Tobacco Control.
• The 6 MPOWER measures are:
  – Monitor tobacco use and prevention policies;
  – Protect people from tobacco use;
  – Offer help to quit tobacco use;
  – Warn about the dangers of smoking;
  – Enforce bans on tobacco advertising, promotion and sponsorship;
  – Raise taxes on tobacco.

Source: https://www.who.int/fctc/text_download/en/
3. Drug use
I illicit drug use

It is estimated that 275 million people used illicit drugs, such as cannabis, amphetamines, opioids, and cocaine, which represents an annual prevalence of illicit drug use of 5.6%.

Cannabis is most used, with 192 million users.

Some 31 million of people who use drugs suffer from drug use disorders.

It is estimated that there are almost 11 million people who inject themselves drugs. Only 1 in 10 people who suffer from substance abuse disorders gets treatment.

Source: https://www.who.int/substance_abuse/facts/psychoactives/en/
Risk factors

Genetic predisposition accounts for 50-75% of the risk for addiction.

Certain brain characteristics can make someone more vulnerable to addictive substances than the average person.

Psychological factors (e.g., stress, personality traits like high impulsivity or sensation seeking, depression, anxiety, eating disorders, personality and other psychiatric disorders) can increase the risk of drug abuse.

Environmental influences (e.g., exposure to physical, sexual, or emotional abuse or trauma, substance use or addiction in the family or among peers, access to an addictive substance; exposure to popular culture references that encourage substance use) may also play a role in drug addiction.

Starting drug use at an early age represents an additional risk factor.
Psychotherapeutic intervention

Cognitive-behavioral therapy
- Cognitive reframing and behavioral change

Dialectical behavioral therapy (DBT)
- DBT therapists add validation/acceptance and dialectics into the CBT frame. This is illustrated in the view that acceptance and taking action to change are unified opposites.
- Validation is not used to permit or encourage unwanted behaviors, but it can offer instead an understanding of why the client would act in these ways.
- Dialectics is the idea that everything is connected and change is constant. Opposing forces can be brought together to reach the balance of the individual.
Psychotherapeutic intervention

Motivational interviewing

- attempts to move an individual away from a state of indecision or uncertainty towards finding motivation to make positive decisions and accomplishing established goals;

- it utilizes a non-confrontational, collaborative effort between therapist and client to spark motivation and initiate change. Rather than acting in an antagonistic or combative way, the therapist engages with the client to explore his/her feelings, including ambivalence about changing, and help the client to find and deal with his/her own motivations.

- the therapist becomes a person of support, allowing the client to make their own choices and arrive at their own conclusions, without feeling outside pressure to do so.
General objectives in the treatment of substance use disorders

In the management of substance use disorders, the goals of treatment are to:
- reduce drug use and cravings for drug use;
- improve health, well-being and social functioning of the affected individual, and
- prevent future harms by decreasing the risk of complications and relapse.