ADDICTION

# COCAINE, AMPHETAMINES, KETAMINE, OPIOIDS

# COCAINE

- stimulant drug extracted from coca plants (growing in Ands)
- Usually powder (of very bitter taste) that is snorted or pills that are eaten. Less commonly administered via injection. Cocaine is not smoked.
- Crack cocaine – smoked substance made of cocaine and other chemicals (e.g. baking soda) that forms wax like block
- After cannabis the most frequently used illicit drug
- In brain, cocaine blocks reuptake of dopamine, noradrenaline, serotonin and even helps their release. Dopamine causes feelings of pleasure, noradrenaline increases physical energy (increased blood pressure, body temperature, heart rate,…), serotonin causes higher confidence

# effect

- If eaten (chew coca leaves, drink as tea), effect comes slowly and is less potent (most of cocaine is degraded by stomach acid)
- If snorted (most common), effect comes in couple of minutes, plateaus in 20 minutes and comes down in 60 minutes. Party drug – often taken several times during night or as multidose
- If smoked (crack cocaine) the effect comes in a dozen of seconds. Effect is short (2-3 minutes) but powerful
- Injection, although the fastest, it is less common
- Smoked and injected is not only faster, but also stronger and more addictive (general rule – the faster the effect comes, the more addictive)

# effect

- **Positive and desired**

Euphoria, mood lift

Physical and mental boost

Increased sexual stimulation

Appetite suppression

- **Neutral**

Increased blood pressure, heat rate and body temperature, significant weight loss over time

- **Negative and undesired**

Dry mouth, sensation of throat closing

Insomnia

Rapid mood swings and emotional instability

Anxiety, panic, paranoia

Sensation of insect crawling (and consequent skin damage from scratching)

Strong psychological need to take more

Destroyed nose mucosa in long term use of powder; burn lips and destroyed lungs in crack cocaine

# effect - overdose

- Heart arrhythmia, heart attack (and consequent death)
- Overheating (and consequent death)
- Acute psychosis- anxiety, paranoia, fear
- Extreme aggression
- Rhabdomyolysis – muscle fibre degradation and consequent kidney failure (and consequent death)

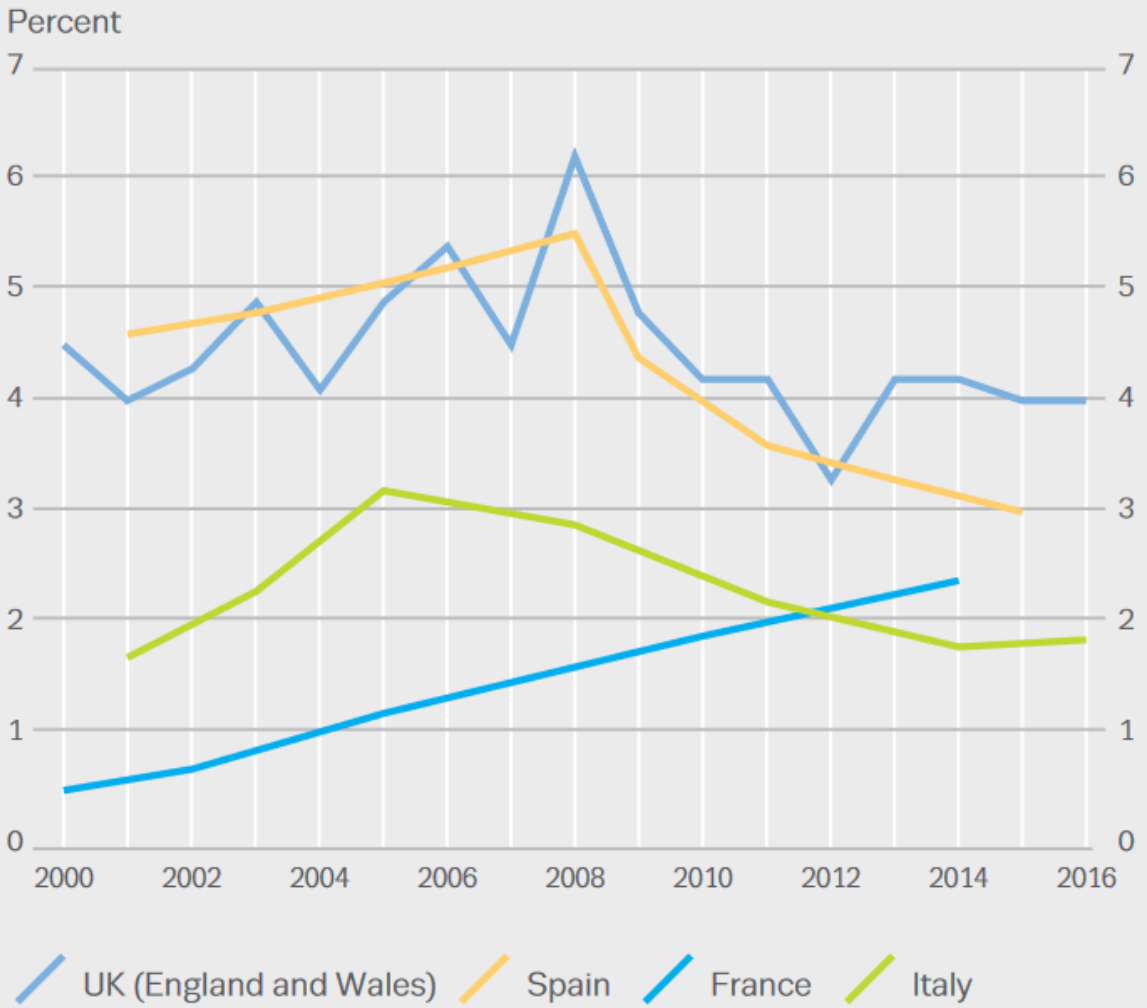
- Overdose often happen when cocaine is taken together with other stimulants and alcohol (creates cocaethylene that lasts longer in body plus synergic effect)
- If one is overdosed – keep cooling the body, sedatives like diazepam may help too

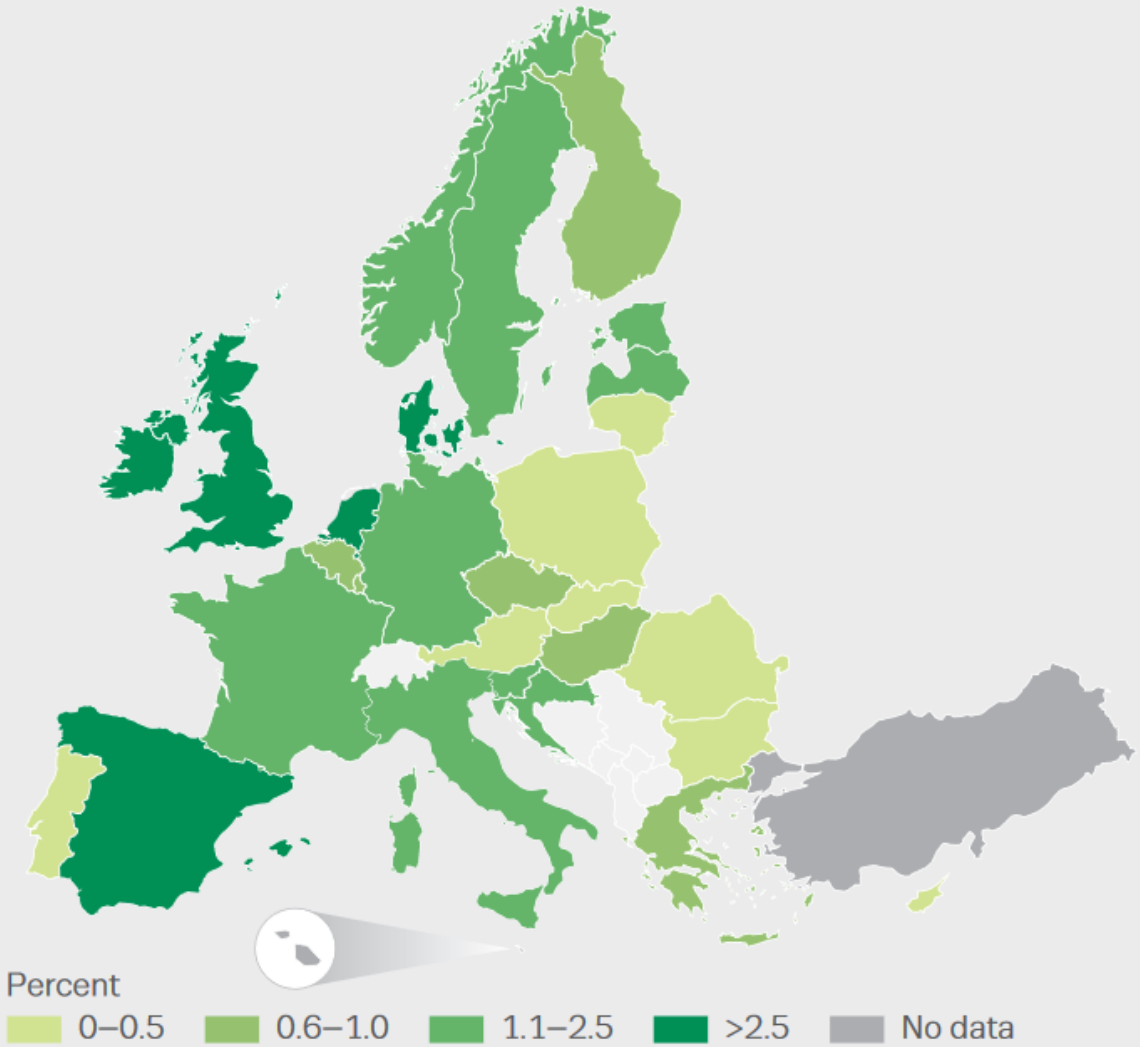
# addiction

- Highly addictive
- There is no physical dependency and physical withdrawal
- Psychological withdrawal  does exist (excessive appetite, anxiety, excessive sleepiness, tiredness. Worst withdrawal so called “crash” – suicidal tendencies
- Tolerance is built quickly, but is levelled also rather quickly
- Treatment can be almost only psychological (therapy)

- About 5% of European population ever tried cocaine, about 1% used cocaine in the last year (2% in population under 35) and between 0.3-0.6% are risk users.
- Males prefer cocaine much more (about 3 times more likely to try compared to females)
- Rather expensive and thus more used in rich places like London or party cities like Barcelona
- Usage is currently on the raise (after decade of lower use)
- Rich risk group reports powder cocaine usage with alcohol and cannabis, poorer risk group reports usage of crack cocaine (often injected) with use of heroin

## Last year prevalence of cocaine use among young adults (15–34): selected trends and most recent data



# AMPHETAMINES

- Meth – crystal, ice, pervitin. Usually injeckted, smoked (vaporized) and inhaled. Only pure material can grow crystals



- Speed – street name for various amphetamines and methamphetamines. Usually in form of tablets or powder

- MDMA – ecstasy. Usually in form of tablets

- Various prescription drugs (e.g. Ephedrine, Adderall)


# METHAMPHETAMINE

- First synthesized 1887 and used as prescript drug since 1930s, largely used during ww2
- Stimulant that is often used for treatment (ADHD, narcolepsy, obesity, depression) e.g. Adderall
- Mimic the sympathetic system (“psycho-motor stimulant” - similar to cocaine, but even more powerful) – huge presynaptic release of dopamine and noradrenaline. Methamphetamine has the highest potential for dopamine release of all drugs (up to 20 times higher that the highest possible via natural way).

# effects

- **Positive**

increased alertness and motivation

increased sociability / talkativeness

positive mood shift, sense of well-being and euphoria

increased sex drive

reduced appetite

# effects

- **Negative**

Dry mouth, headaches

Increased heartrate, blood pressure, sweating, temperature

Increased body movements, convulsion

Impaired speech

Insomnia (person can stay awake for days)

Anxiety, fear, panic – psychotic episodes

Overdose – convulsion and coma. Extremely influenced by tolerance – poisoning and death can happen after administration between 2-500mg

# long-term effects

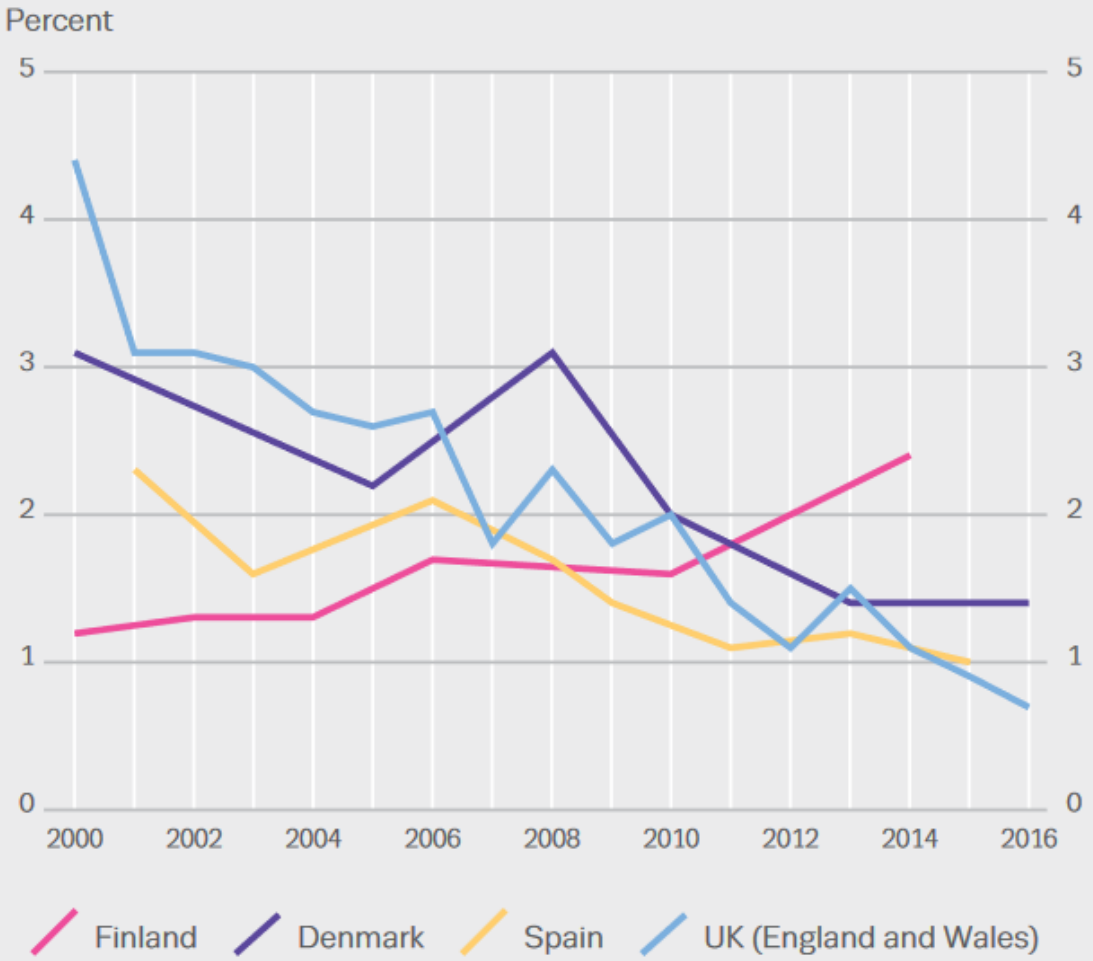
Methamphetamine psychosis (lasts for weeks after last usage)
Aggression and violent behaviour
Crime
Sexual transmitted diseases
Hepatitis B &C
Malnutrition
Skin problems
Sleep deprivation
Bizarre manners
Dental problems
Cognitive deterioration – permanent brain

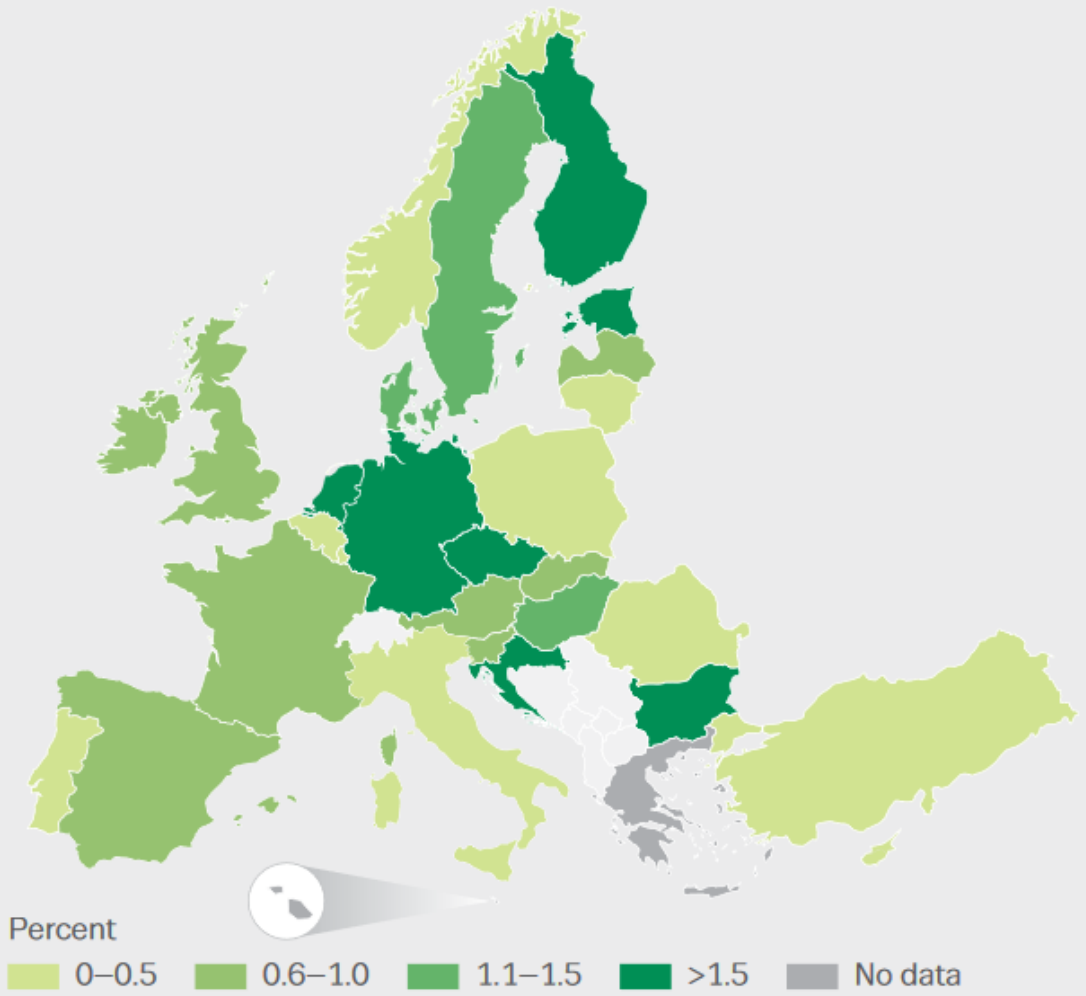
# addiction

- Both physical and psychological withdrawal exist – confusion, extreme hunger, depression, anxiety, fatigue
- High tolerance
- Dependency develops slowly and within years – amphetamines (especially meth – smoked and injected) are usually not the drugs of first choice. Develops in about 20% people who used
- Males are much more vulnerable
- Social environment plays very strong influence – challenge for treatment (as e.g. peer pressure to stop is needed). Sedatives, antidepressants and antipsychotic are sometimes used to help from withdrawal
- Widely popular in West and North Europe. Meth is popular in USA (drug of bike gangs), Central Europe, Australia and Asia

- https://www.youtube.com/watch?v=PB5bsFzl98Q
- https://www.youtube.com/watch?v=CVp9rKF3hag

## Last year prevalence of amphetamines use among young adults (15–34): selected trends and most recent data



# MDMA

- “psychedelic amphetamine”
- Party drug, however, heavily unreliable on street market content wise - can consist basically of anything from ephedrine, caffeine, methamphetamine to fertilizer
- Effect starts after 20 minutes and lasts 3-5 hours
- Apart from general amphetamine effects, **positive special effects include**:

Ego softening

Feelings of love and empathy

Spiritual feelings and inner peace

Appreciation of sensation (music,…)

- **Negative special effects include**

Inappropriate social bonding

Erectile and orgasm dysfunction

Confusion and memory loss

Sadness on coming down effect

Hangover may last up to a week! – inability to focus, depression (even up to 2 weeks)

# mdma

- Taking mdma during parties can be associated with various health risks:
- Overheating
- Excessive drinking and loss of salt
- Overreaction to impurities
- Overreaction with combination with other stimulants
- Dangerous combination with Viagra (penis injuries, heart attacks – mdma users often need more than one Viagra pill)
- Animal studies showed permanent brain damage  - not confirmed for humans yet but it prevent to use in psychotherapy (promising therapy results in PTSD patience)

- Addiction:
- For most users mdma lose its magic after 10-25 pills
- It is probably not addictive as it dominantly works through serotonin

# KETAMINE

- dissociative anesthetic with analgesic and amnestic properties
- Used for medical (especially emergency, surgery, pain management) and veterinary purposes since 60s. Sometimes used as unofficial antidepressant and anti-asthma. As a drug used since 80s.
- Used as a pill, liquid, powder, solution in injections
- Effects are very similar to other hallucinogens
- Extra psychological effect – tantra-like sexual feeling; passivity; lethargy
- Extra physiological effect – relaxes muscles (especially of rectum)


# Addiction and risks

- Ketamine can be addictive – confirmed also from animal studies
- Overdose has been reported (ketamine does not have know overdose reversal agent)
- Withdrawal symptoms include anxiety attacks, palpitations, shaking
- Most risk comes from the setting – danger of accidents, injuries
- Spreading of transmitted diseases
- Risk of rape and use in sexual slavery
- Ketamine is usually found at the same places as MDMA

# OPIATES

- Group of chemicals derived from poppy
- Includes opium, morphine, methadone, heroin
- Morphine - natural opioid used for treatment of pain e.g. in palliative treatment
- Heroin – semi-natural derivate of morphine (often in form of white to dark brown powder that is either smoked, snorted or taken intravenously)
- Body has natural opioid receptors (in CNS, spinal cord, GI tract) and produces own opioids like endorphin (endogenous morphine). The are active on inhibitory neurons – when bid to receptors there inhibitory neurotransmitters are blocked. As a result they block pain or cause more dopamine in the system. Exogenous opioids cause massive release of dopamine in reward pathway that has euphoric and calming effect

# Heroin effects

- Intravenous injection can produce strong effects in 3-5 seconds; smoking produces milder effects in 5-15 seconds. Intramuscular and subcutaneous injection produce a more gradual onset in 5-10 minutes. Insufflate heroin produces effects within 2-10 minutes, similar to suppository distribution (anus or vaginal insertion). Oral use can take 60-90 minutes to produce effects.
- Intravenous injection, smoked, or insufflate - euphoria followed by a sedation lasting for 2-4 hours. Intramuscular and subcutaneous injection lack the wave of intense euphoria, and cause only feelings of sedation
- Overdose causes death by lack of oxygen (person has very shallow breath and gradually stops breathing). Typical sign are pinpoint pupils. Naloxone (opioid antagonist) is used as immediate treatment – it binds to opioid receptors with higher priority

# health risks

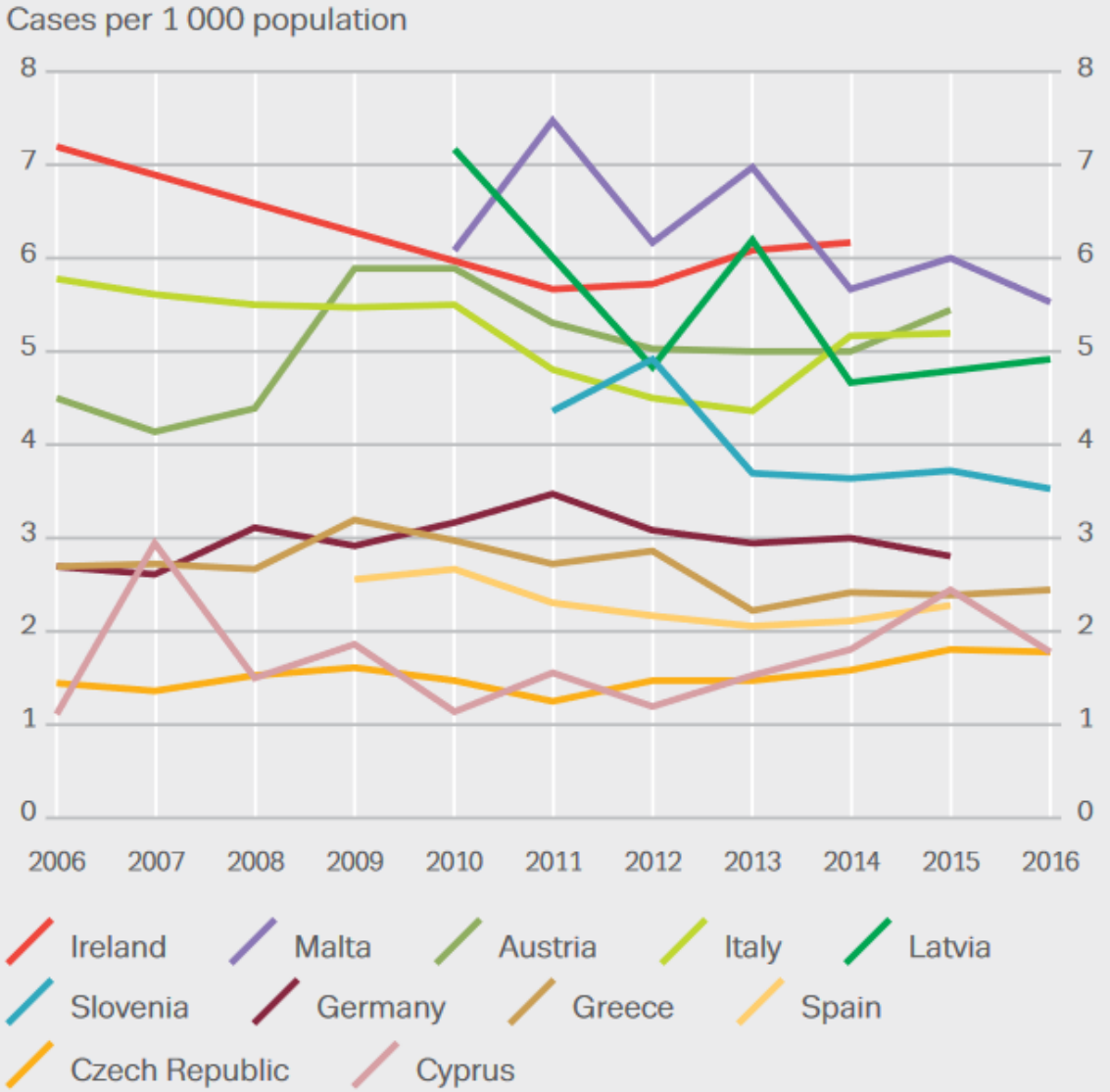
- Connected to injection way of distribution: hepatitis C, HIV, superficial veins deterioration, emboli
- Financial issues
- Drug purity issues
- Overdose risks

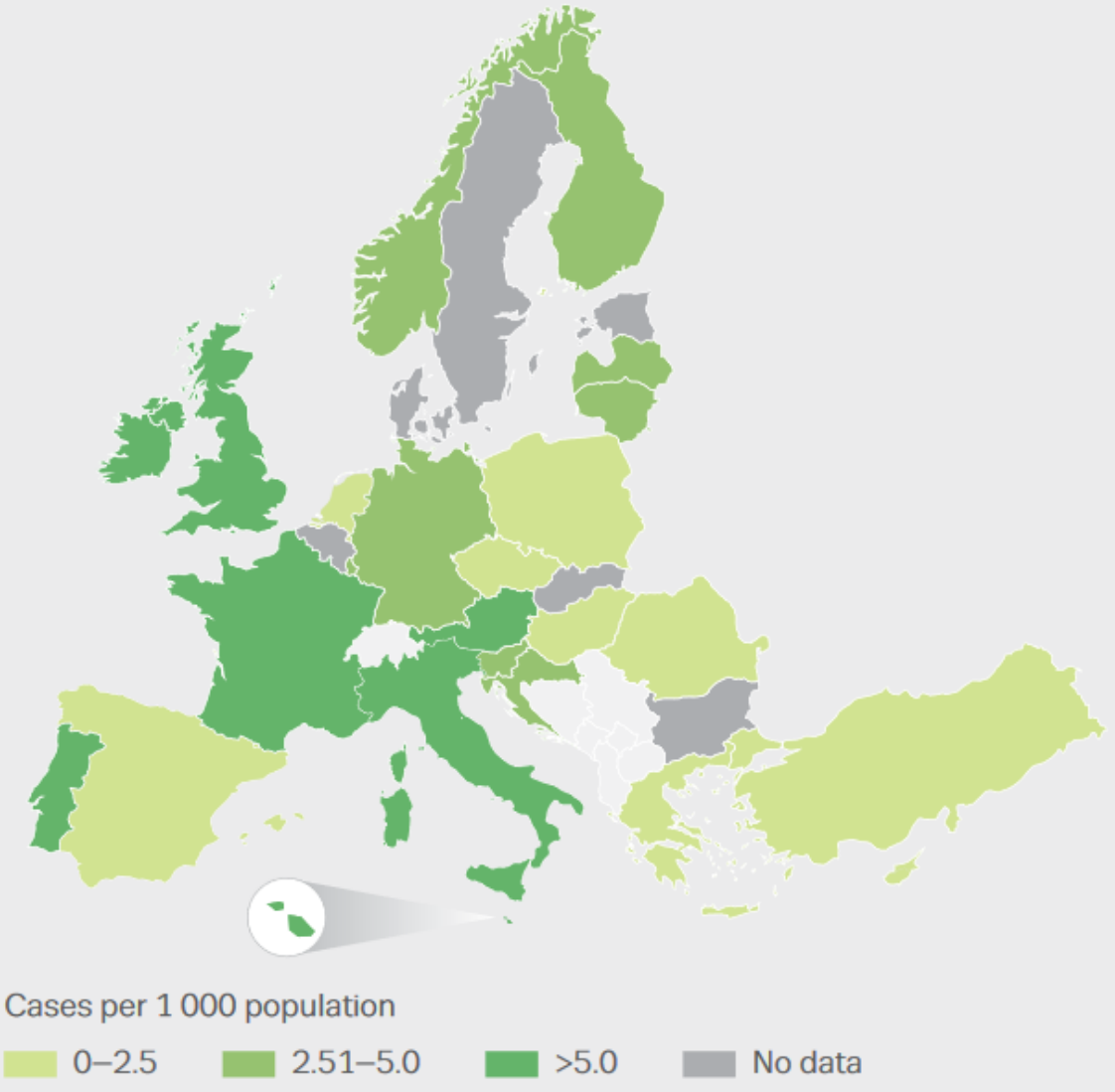
- Heroin is popular in south and west Europe (Turkey, Greece, Spain, France, UK)
- Usage of heroin is not growing, but its purity in – increasing number of overdose and deaths

# addiction

- Rapid tolerance and physical dependency  - high addictive potential
- Withdrawal symptoms are very unpleasant but not life threatening – vomiting, sweating, hallucination, anxiety, oversensitive genitals (e.g. permanent painful erection in males), body shaking and shivering
- Tolerance is rapidly fluctuating – even a short break may lead to overdose. Overdose may be also caused by break in daily habits and by higher purity of substance or when in combination with other sedatives.
- Treatment is usually combination of psychotherapy and help of substitute treatment (methadone – opioid agonist that binds to receptors but does not produce euphoria)

## National estimates of annual prevalence rate of high-risk opioid use: selected trends and most recent data



# Current opioid overdose crisis (USA)

- In 2017, 47000 Americans died on opioid overdose
- Increase from 2016 is 30% overall, 70% in Midwest area, 50% in large cities
- 25% of patients prescribed opioids for chronic pain misuse them
- Between 8 and 12 % develop an opioid use disorder
- An estimated 4 to 6 % who misuse prescription opioids transition to heroin
- About 80 % of people who use heroin first misused prescription opioids
- Cause of the problem: massive increase in prescription of opioid painkillers since 90s – believe that every pain should be avoided/treated, believe that prescript opioids are not addictive
- Solution? Change our attitude towards pain, other pain management strategies (e.g. psychological), more accessible anti-overdose drugs (e.g. Naloxone in form of spray in emergency and police cars).

The New York Times

# *Sacklers Directed Efforts to Mislead Public About OxyContin, Court Filing Claims*

A filing in a Massachusetts lawsuit contains dozens of internal Purdue Pharma documents suggesting the family was far more involved than the company has long contended.

Purdue Pharma's headquarters in Stamford, Conn. The Sacklers, who own Purdue Pharma, became one of the wealthiest families in the United States in part because of sales of OxyContin.
George Etheredge for The New York Times

When evidence of growing abuse of the drug became clear in the early 2000s, one of them, Richard Sackler, advised pushing blame onto people who had become addicted.

"We have to hammer on abusers in every way possible," Mr. Sackler wrote in an email in 2001, when he was president of the company, Purdue Pharma. "They are the culprits and the problem. They are reckless criminals."

The New York Times

# *Study Links Drug Maker Gifts for Doctors to More Overdose Deaths*

Counties where doctors got more meals, trips and consulting fees from opioid makers had higher overdose deaths involving prescription opioids.


Family and friends of people who died of opioid overdoses left pill bottles in protest outside the headquarters of Purdue Pharma, the maker of OxyContin, in August. Jessica Hill/Associated Press

- Heroin attempt to quit and relaps effect

https://www.youtube.com/watch?v=pm4fsi6OvFI

https://www.youtube.com/watch?v=7RoMaS1pzOE

- Heroin overdose

https://www.youtube.com/watch?v=v6uBkJSbQO0

- Heroin withdrawal

https://www.youtube.com/watch?v=KYAmt9WRoNo