



Smoking and Smoking Cessation during COVID-19: Facts and key observations!

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Knowledge Hub for Waterpipe Tobacco Smoking Webinar - 24/April/

Objectives

At the end of the presentation, you will be able to:

1. Identify the association between tobacco smoking and respiratory viruses
2. Explain the relationship between tobacco smoking and ACE-2 receptors
3. Recognize the impact of smoking cigarettes, waterpipe, e-cigarettes, and IQOS on COVID 19
4. Identify the new smoking cessation interventions that increase cessation rates
5. Select evidence-based smoking cessation interventions to implement during COVID 19

Types of Tobacco Products

Cigarettes



Cigar



Waterpipe



Pipe



E-cigarettes



IQOS



Are smokers at higher risk of contracting SARS-COV 2?



- Biological reasons:
 - High risk of getting respiratory infections
 - Reduced respiratory immune defense
- Behavioral factors:
 - Repetitive hand-to-mouth movements
 - Sharing waterpipe
 - Second-hand smoking

Tobacco as risk factor for respiratory infections

❖ Biological reasons:

1- Established causal relationship between smoking and acute respiratory infections, viral and bacterial (colds, influenza, pneumonia and tuberculosis)

- Smoking increases incidence, duration and/or severity of respiratory viral infection
- Past and current smokers are at risk
- Smokers are twice more likely than non-smokers to contract influenza and have more severe symptoms



Tobacco as risk factor for respiratory infections

❖ Biological reasons:

2- Tobacco negatively affects immune systems and increases susceptibility of infections:

Burning tobacco forms an aerosol vaporized chemicals and particles (nicotine, multiple carcinogens, oxidants, and carbon monoxide)

- Alteration in structural and immune defenses
- Harmful effects on cell counts and distribution in peripheral blood and lung fluids
- Impairment of the functioning of white blood cells, lymphocytes (natural killer cells) and humoral immune system function (production of antibodies)
- Distortions to the normal microbial communities of the upper respiratory tract

Tobacco as risk factor for respiratory infections

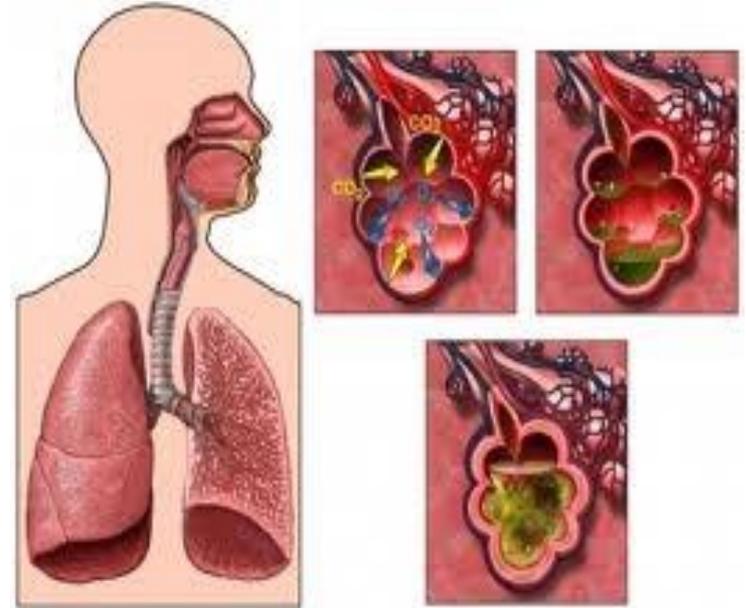
❖ Biological reasons:

- Impaired mucociliary clearance:
 - Cilia are small brush-like hairs that line the upper and lower airways
 - Vital role in clearing mucus, dust and infectious agents
 - Inhaled smoke reduces their movements and chronic smoking kills these cilia and make smoker more susceptible to infection



Tobacco as risk factor for respiratory infections

- Smokers with **normal** lung functions have:
 - Damaged mucociliary function, which impairs clearance of inhaled substances
 - Oropharyngeal flora colonizing the lower airways, a normally sterile environment



Tobacco as risk factor for coronaviruses respiratory infections

- SARS-CoV-2 is from the same family as MERS-CoV and SARS-CoV
- Case-control study: smoking and heart disease were also significantly associated with MERS-COV illness
- Smokers are at greater risk for developing colds than non-smokers

Alraddadi BM, Watson JT, Almarashi A, Abedi GR, Turkistani A, Sadran M, et al. Risk Factors for Primary Middle East Respiratory Syndrome Coronavirus Illness in Humans, Saudi Arabia, 2014. *Emerg Infect Dis.* 2016;22(1)

Cohen S, Tyrrell DA, Russell MA, Jarvis MJ, Smith AP. Smoking, alcohol consumption, and susceptibility to the common cold. *Am J Public Health.* 1993;83(9):1277-1283. doi:10.2105/ajph.83.9.1277

Kang et al. Cigarette smoke selectively enhances viral PAMP- and virus-induced pulmonary innate immune and remodeling responses in mice. *Journal of Clinical Investigation,* 2008;

Tobacco as risk factor for respiratory infections

❖ Behavioral factors:

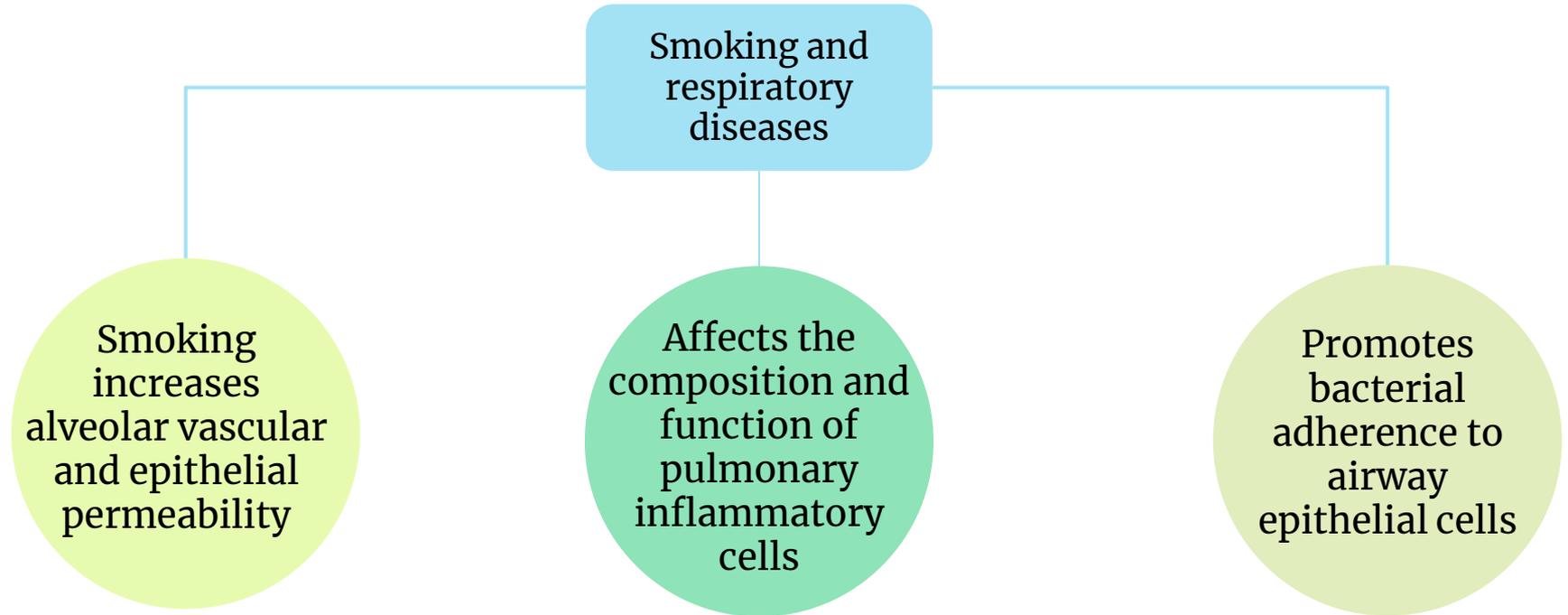


➤ Regular hand-to-mouth movements involved in smoking when fingers are in contact with lips may increase SARS-CoV-2 transmissions as has been observed for other coronaviruses



➤ Sharing the mouthpiece or hose of waterpipe

Tobacco smoking exacerbates respiratory diseases

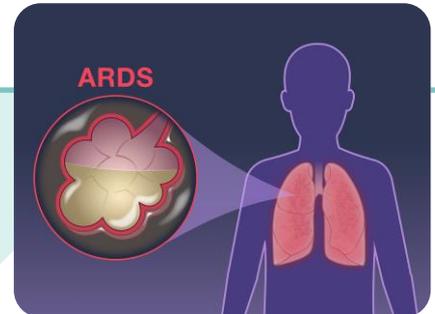


Tobacco smoking increases risk of severe COVID-19

- Smoking is a major risk factor for chronic obstructive pulmonary disease:
 - - Swelling and rupturing of the air sacs in the lungs
 - - Impairment of the lungs' functions
 - - Build-up of mucus(chronic cough and shortness of breath)

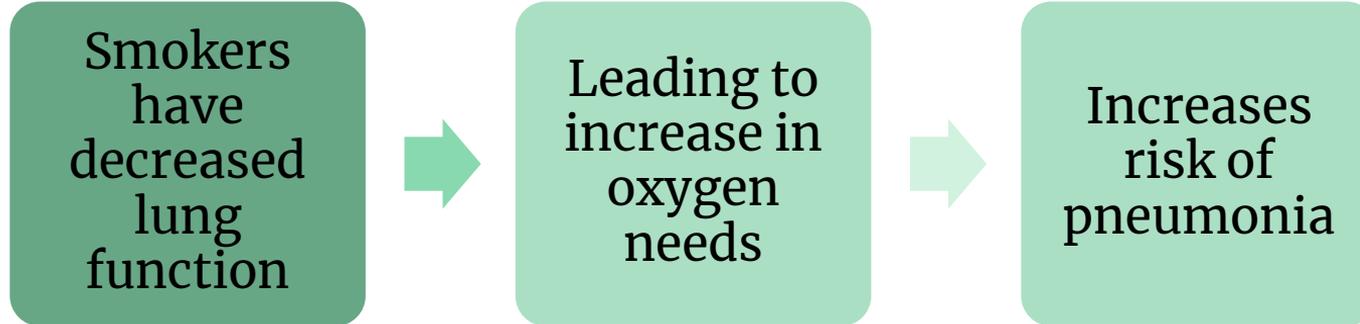
SARS COV2 affects respiratory system causing mild-severe respiratory damage

Smoking is associated with increased development of **acute respiratory distress syndrome (ARDS)**



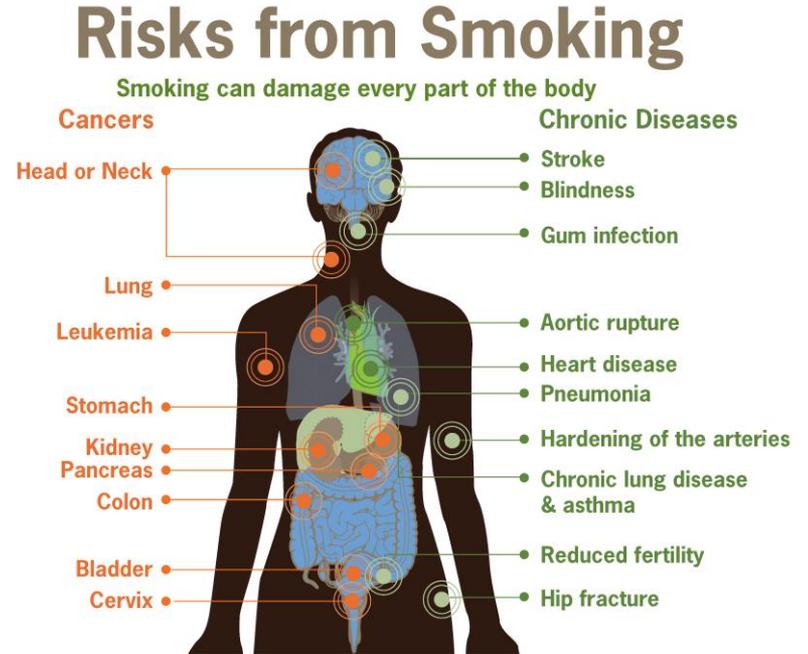
Tobacco smoking, COVID-19 and pneumonia

- Tobacco smoke exposure is significantly associated with the development of community acquired pneumonia in current smokers and ex-smokers
- Adults aged > 65 years passive smokers are also at higher risk of CAP
- For current smokers, a significant dose-response relationship is evident



Tobacco smoking increases risk of COVID-19 complications

- Research on 55 924 positive PCR: mortality rate is much higher among those with cardiovascular disease, diabetes, hypertension, chronic respiratory disease or cancer than those with no pre-existing chronic medical conditions
- Smoking is a major risk factor for these chronic diseases
 - Any kind of tobacco smoking is harmful to cardiovascular, respiratory system and diabetes control



Smoking is a risk factor for COVID 19 progression

- Large study on 1099 patients with COVID-19:
 - Smokers were 1.4 times more likely (RR=1.4, 95% CI: 0.98–2.00) to have severe symptoms of COVID-19
 - 2.4 times more likely to be admitted to an ICU, need mechanical ventilation or die compared to non-smokers (RR=2.4, 95% CI: 1.43–4.04)
 - Progression of Covid-19 was more likely to occur in smokers, and smokers were 14 times more likely than nonsmokers to progress to pneumonia.

Smoking is a risk factor for COVID 19 progression

- Study on 1099 patients with COVID 19:
 - Severe symptoms(16.9 % smokers; 5.2 former), Mild symptoms (11.8% current smokers; 1.3% former smokers)
 - ICU or death: 25.5% current smokers and 7.6% former smokers.
 - No statistical analysis for evaluating the association between the severity of the disease outcome and smoking status was conducted in that study
- Study on 78 patients with COVID-19:
 - Severe disease(27.3 smokers); mild (3 % smokers)
 - Multivariate logistic regression analysis, the history of smoking was a risk factor of disease progression (OR=14.28; 95% CI: 1.58–25.00; p= 0.018)

Limitations of the studies

- China: lower than expected number of hospital admissions among the smoking population
- Most of patients are ICU during an emerging pandemic: maybe smoking data collection was not considered a priority
- Patients with severe COVID-19 symptoms may have stopped smoking prior to hospitalization and may not be recorded as current smokers
- If smoking was protective against hospitalization, we would expect the percentage of females admitted to the hospital to be higher

What about the French study claiming smoking is protective against COVID 19?

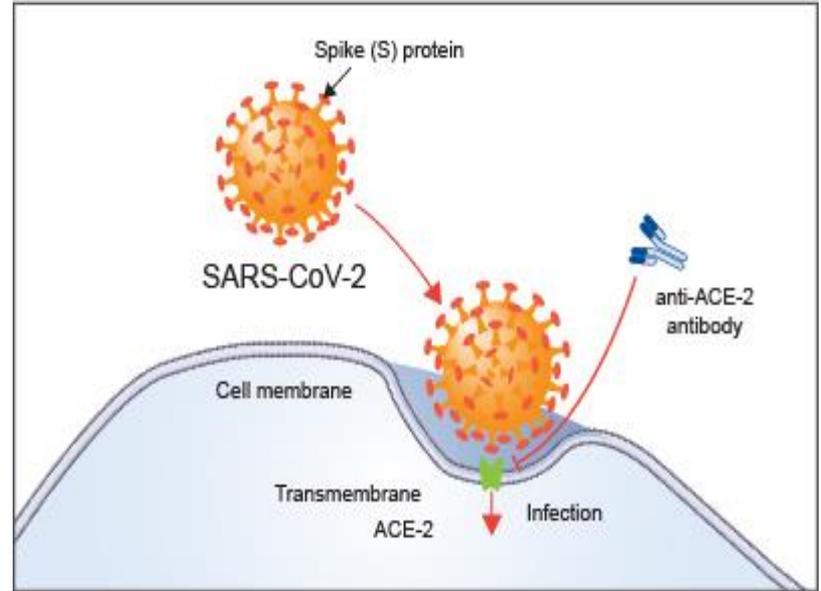
Title: Low incidence of daily active tobacco smoking in patients with symptomatic COVID-19

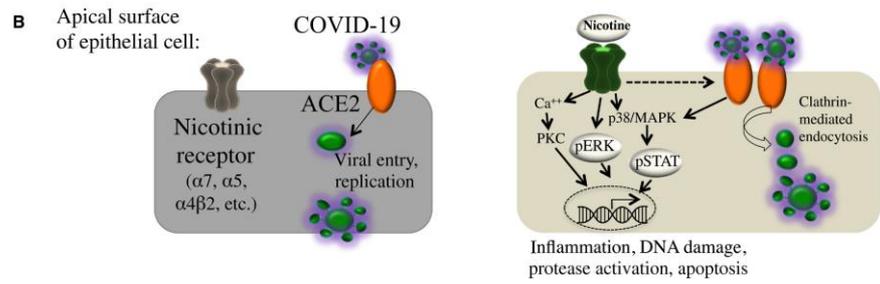
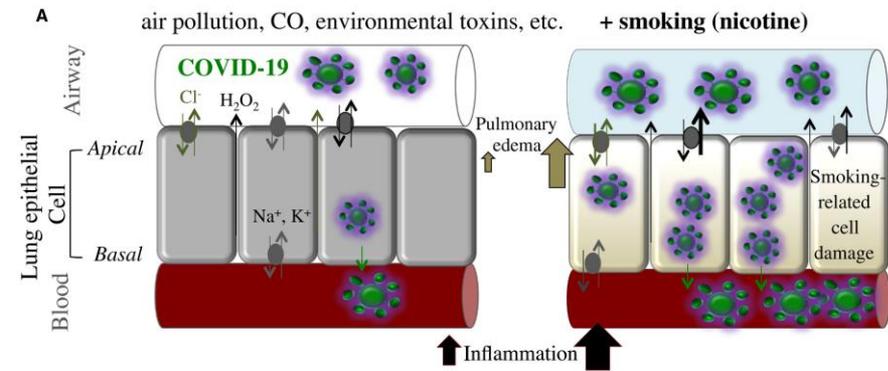
Published: April 21, 2020; Qeios

- Non-peer review
- Small sample size
- Severe cases, ICU cases were excluded
- Most patients are healthcare workers
- Smokers not clearly defined

Smoking and ACE 2

- SARS-CoV-2 has been shown to enter epithelial cells through the Angiotensin-converting enzyme-2 (ACE2) receptor
- Immunohistochemical evidence: Smoking upregulates (ACE2) receptor in small airway epithelium including brush borders, type-2 pneumocytes and alveolar macrophages
- This is more pronounced in patients with COPD
- ACE2 gene and protein expression increases in the airway epithelium obtained from cytologic brushings of sixth to eighth generation airways in individuals with and without COPD





A schematic model for how nicotine exposure augments risk of COVID-19 entry into the human host lung

- (A) Pulmonary and immune responses to COVID-19 infection in epithelial cells of smokers (right) and nonsmokers (left)
- (B) Cellular mechanisms of nicotinic receptor activity that promotes COVID-19 entry and proliferation in epithelial cells through co-expression of ACE2

Nicotine activation of nicotinic receptors can lead to enhanced protease activation, cell death (apoptosis), and inflammatory signaling through mechanisms that converge on ACE2 regulation and signaling

Smoking and ACE 2

- Significant inverse relationship between ACE2 gene expression and FEV1% of predicted, indicating implications for lung function decline
- This put smokers at higher risk of contracting SARS-CoV-2
- Nicotine downregulates the ACE2 receptor!
- Joshua et al:
 - Nicotine alters the homeostasis of the RAS by upregulating the angiotensin-converting enzyme /angiotensin (ANG)-II/ANG II type 1 receptor axis
 - Downregulating the compensatory ACE2/ANG-(1-7)/Mas receptor axis, contributing to the development of cardiovascular pulmonary diseases
 - **It may be possible to break down the ACE2-Covid19 receptor interaction with nicotine**

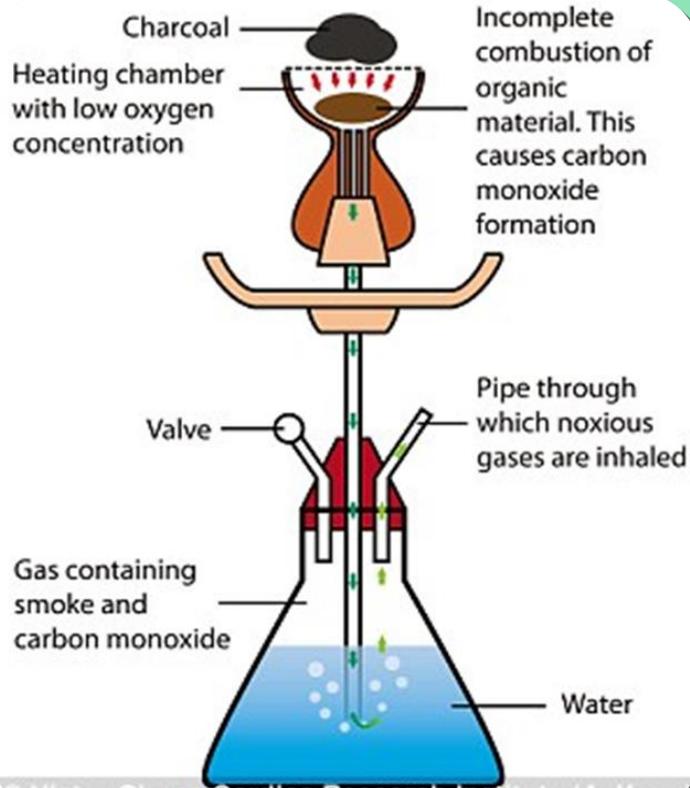
Let us not to forget!

- Nicotine is protective is unproven theory!
- Smoking is not only Nicotine! One cigarette contains > 7000 toxic and carcinogenic substances
- Tobacco smoking kills 8 million people yearly of smoking related diseases



- **Can nicotine replacement therapies be used in the treatment of covid-19?**

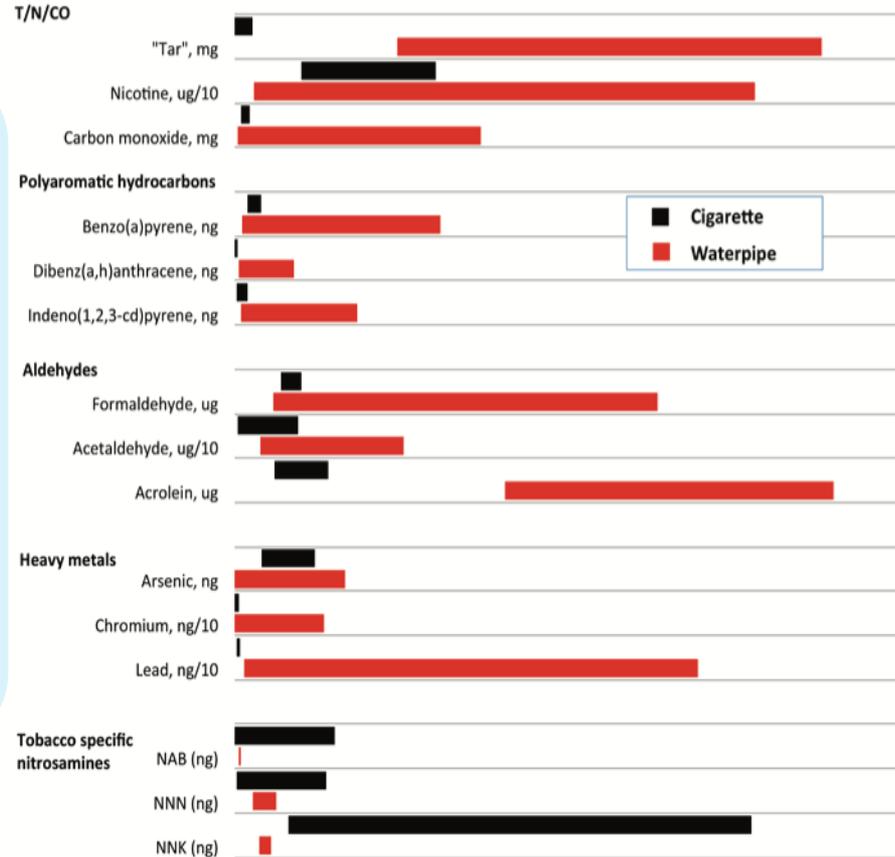
Toxins of waterpipe smoke



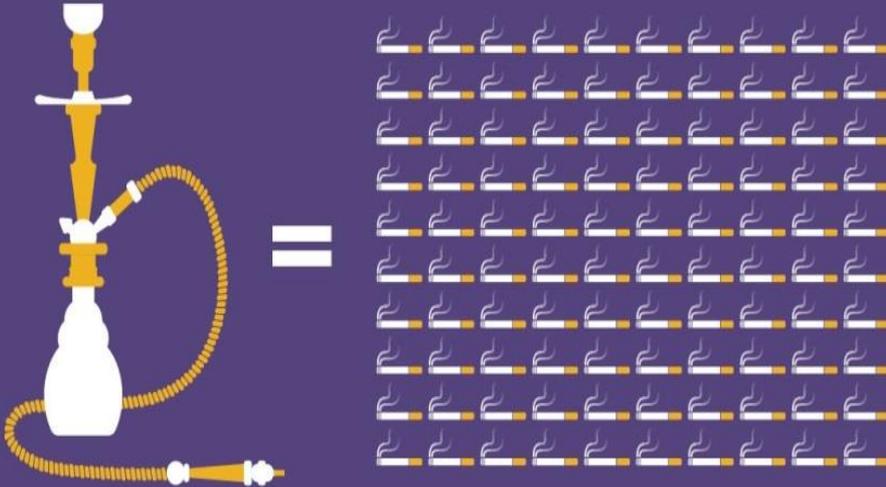
- Charcoal: CO and carcinogen polycyclic aromatic hydrocarbons
- Tobacco-specific:
 - Nitrosamines
 - Polycyclic aromatic hydrocarbons
 - Volatile aldehydes (e.g. formaldehyde, acetaldehyde, acrolein)
 - Benzene
 - Nitric oxide
 - Heavy metals (arsenic, chromium, lead)

Toxicants produced during a single 1-h session of waterpipe use (red) and from a single cigarette (black)

The nicotine in waterpipe products is responsible for their dependence potential (addictiveness). For a single smoking session of 10 g of *maassel* tobacco with 1.5 quick-lighting charcoal discs applied to the waterpipe head, 2.94 mg nicotine, 802 mg “tar” and 145 mg CO were measured in the mainstream smoke.



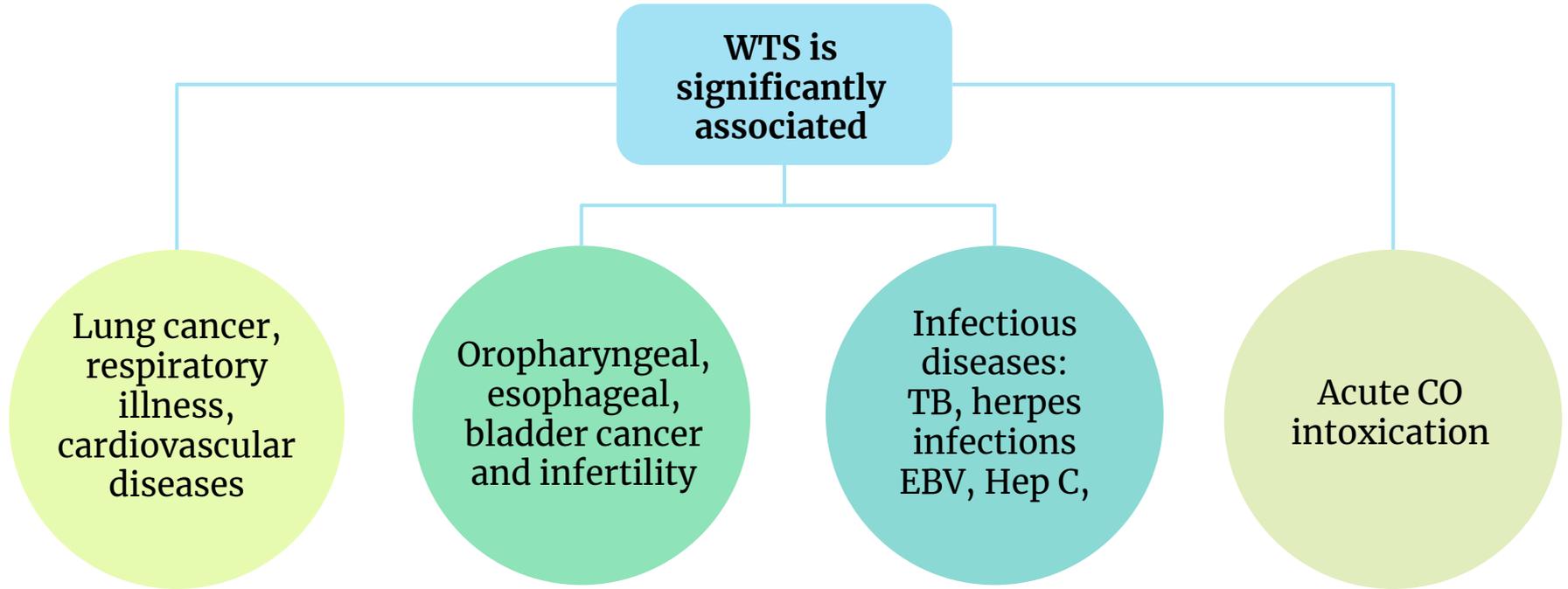
Smoking a hookah is the equivalent
of smoking **100 cigarettes**



Source: World Health Organization (2005); mentioned in the
October 2015 issue of *The Journal of the American Dental Association*

Single waterpipe
session typically
lasts for 45 min and
may produce 50–
100 times the smoke
volume inhaled
from a single
cigarette

Waterpipe smoking health outcomes



What about WTS second-hand smoking?



Mixture of the smoke that comes from the burning end of a cigarette and the smoke breathed out by the smoker.

Health effects:

- Asthma and ear infections in children
- Heart disease and lung cancer in adults who have never smoked
- Even low levels of it can be harmful

Waterpipe and COVID-19: Risk of getting the virus

- Ideal mode of transmission:
 - Waterpipe is practiced in groups in close environments that increase virus transmission
 - Even if the mouthpiece is disposable, tubing, hose and bowl are re-used by different people
 - Long tubes make it difficult to clean
 - No sanitation measures on when to clean the bowl or change the water
 - The use of cold water in the bowl may facilitate the survival of viruses and bacteria

CAN CORONAVIRUS "COVID19" BE TRANSMITTED BY THE WATERPIPE?

Sick patients can contaminate the hose with COVID-19 that can be passed on to other waterpipe mates by inhalation or contact.



Waterpipe and COVID-19: Risk of getting complications!

- Increase risk of COVID 19 complications
 - The main ingredient used in waterpipe is tobacco
 - Tobacco has acute and long-term harmful effects on the respiratory and cardiovascular systems
 - Increasing the risk of diseases including coronary artery disease and COPD

Does waterpipe smoke transmit the virus?

- No data to date proves that the smoker exhales vapor droplets, which would carry SARS-Cov-2
- When breathing, sneezing or coughing out, aerosols containing SARS-CoV-2 have been proven to travel in the air
- NIH study: SARS COV-2 was detectable in aerosols for up to three hours after emission
- Smoking indoors increase the risk



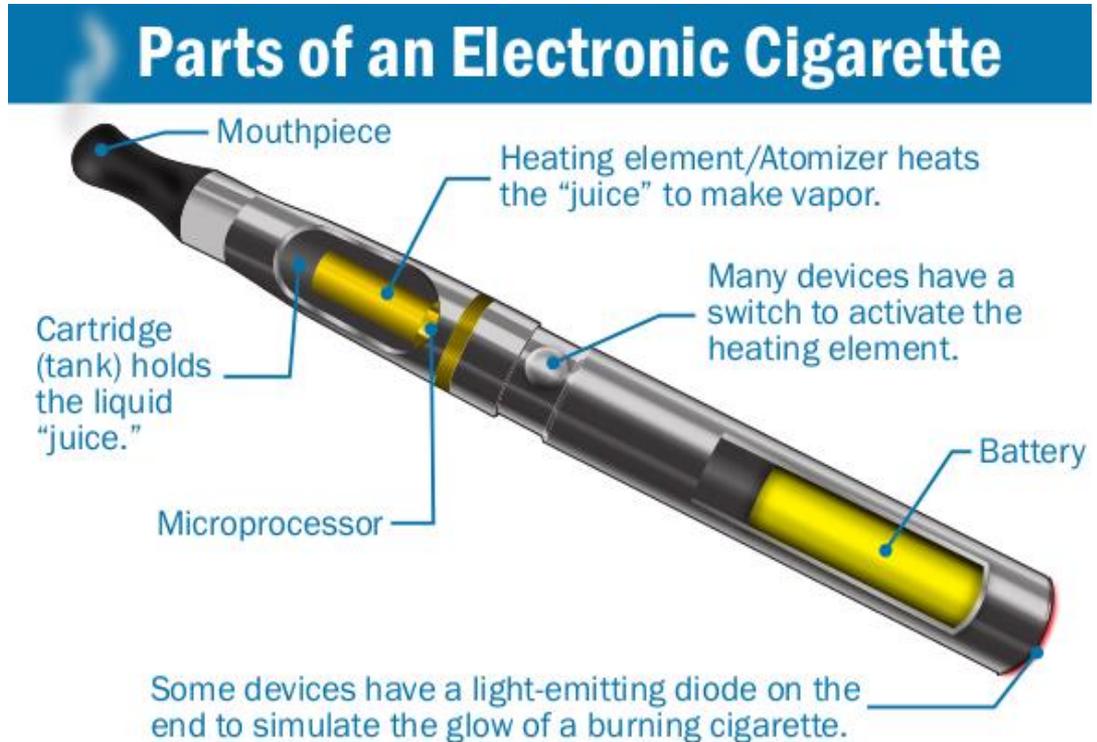
Smokeless tobacco

Chewing smokeless tobacco increases the production of saliva followed by a very strong urge to spit which could enhance the spread of COVID-19



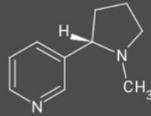
What about electronic cigarettes: vape?

- **Cartridge:** holds *e-liquid* containing varying amounts of propylene glycol, nicotine, flavorings, and other chemicals
- **Heating element (atomizer)**
- **Power source (usually a battery)**
- Puffing activates heating device, which vaporizes the liquid in the cartridge.



Beyond Nicotine

**VOLATILE
ORGANIC
COMPOUNDS**



NICOTINE

**ULTRAFINE
PARTICLES**



**HEAVY METALS SUCH AS
NICKEL, TIN, AND LEAD**



**CANCER-CAUSING
CHEMICALS**



**FLAVORING SUCH AS
DIACETYL, A CHEMICAL
LINKED TO A SERIOUS
LUNG DISEASE**



Electronic nicotine delivery systems: risk of getting the virus

- Currently no evidence supporting a direct connection between e-cigarette use and contracting COVID-19.
- E-cigarettes increases risk of getting SARS-COV-2:
 - ENDS suppresses immune and inflammatory-response genes in nasal epithelial cells in a similar way to cigarette smoke
 - Hot gases involved in vaping may also have a negative effect on the cilia and overall lungs function
 - Hand-to-mouth action by e-cigarette users

Electronic nicotine delivery systems:risk of severe COVID 19

- Little direct evidence that e-cigarette use affects COVID-19 outcomes
- E-cigarette emissions typically contain nicotine and other toxic substances that are harmful to both users and non-users who have been exposed to the aerosols
- Increases the risk of getting a severe COVID 19 illness:
 - COVID-19 virus affects the respiratory tract
 - ENDS cause heart disease and lung disorders
 - ENDS causes EVALI disease
- Small study of mice: vaping mice were less likely to recover from influenza than non-vaping mice

I-QOS

- Heat-not burn
- Heats tobacco to generate an inhaled nicotine aerosol
- Releases toxicants
- Not safer than cigarettes
- Same damage to lungs
- Causes cancer



Second-hand smoking

- During quarantine or lock down measures more people are exposed to second-hand smoking
- Second-hand smokers are exposed to respiratory viruses
- Exposure to low levels is associated with modification in the lung cell biology similar to that seen in current smokers
- SHS increases risk for developing lung cancer, heart disease and/or stroke
- Children exposed to second-hand smoke exposure are at risk: lower respiratory tract infections, asthma, middle ear disease and other debilitating health conditions
- Increase the risk of getting SARSCOV-2 and severe COVID 19

https://www.who.int/gho/phe/secondhand_smoke/en/

Kang et al. Cigarette smoke selectively enhances viral PAMP- and virus-induced pulmonary innate immune and remodeling responses in mice. *Journal of Clinical Investigation*, 2008



Third hand smoking and COVID-19

- Residual tobacco smoke pollutants adhere to the clothing and hair of smokers, furniture, and dust
- They are reemitted into the gas phase or react with oxidants to form toxicants
- Adults and children are exposed via inhalation, ingestion, and dermal transfer
- Lock down and quarantine expose people more to third hand smoking

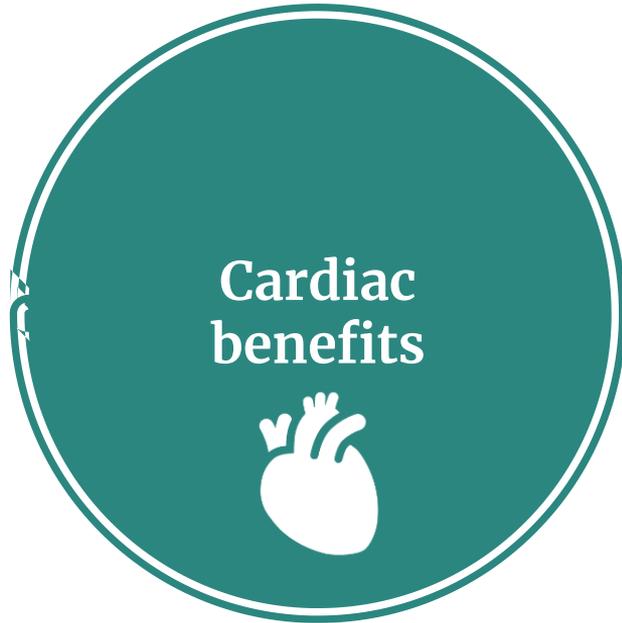


The right time to quit!



- It is always right to quit!
- There is high quality evidence that smoking cessation leads to significant health benefits
- Smoking cessation at any time represents a huge opportunity to improve people's life expectancy
- Emphasizing quitting is essential now to decrease the risk of getting the virus and its complications

Cardiovascular benefits of cessation



20 min: Blood pressure better control

24 h: Restoration of normal vasodilation

48h: Less risk of MI

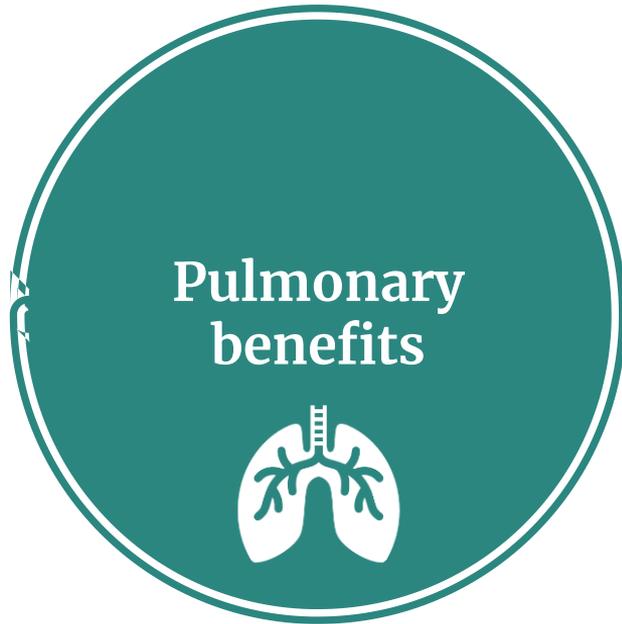
2 weeks: Better platelets aggregation

2 months: Higher HDL

6 months: Improved Coronary endothelial
dysfunction

2 years: Risk of MI or stroke decreases by 50%

Pulmonary benefits of cessation



8 hours: CO is reduced by half

72 hours: Bronchial tubes relax

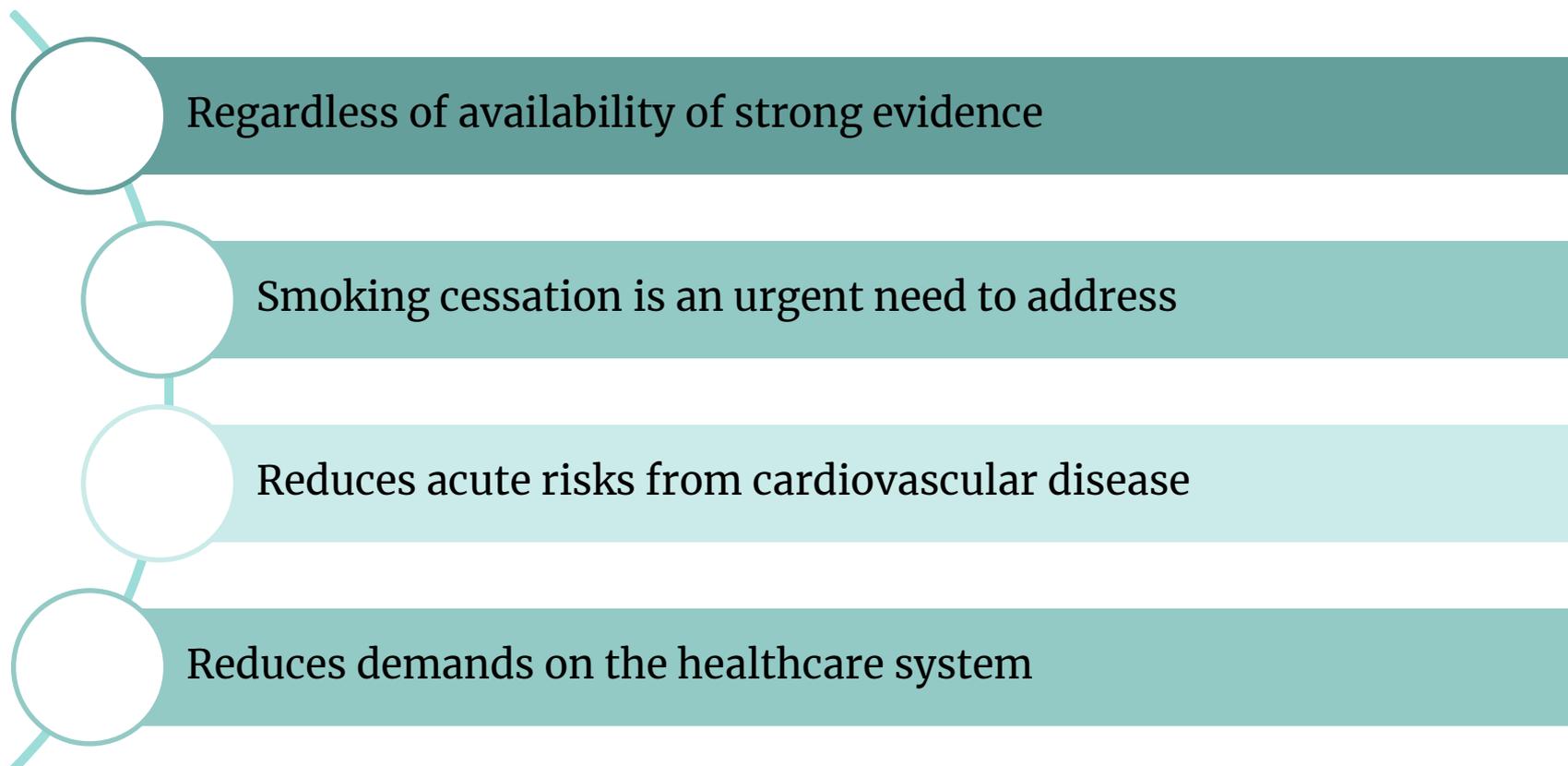
**3-9 months: better lung capacity,
less cough and wheezing**

**10 years: Risk of lung cancer same
as non-smoker, less risk of oral,
esophageal, laryngeal cancer**

Smoking cessation benefits

- If patients with COVID 19' will quit smoking, they will have immediate positive effect on their hearts and lungs
- Help the body fight the infection and potentially reduce the risk of developing severe symptoms
- After quitting, there are rapid improvements in carbon monoxide levels and the function of respiratory tract cilia, and slightly slower improvements over time in immune function

Smoking cessation during COVID- 19



Regardless of availability of strong evidence

Smoking cessation is an urgent need to address

Reduces acute risks from cardiovascular disease

Reduces demands on the healthcare system

Smoking cessation ways



Behavioral counseling
(individual, group, or telephone)



Nicotine replacement therapy



Medications



Complementary approaches



Follow-up plans
(phone, mobile applications)

Smoking cessation during COVID-19

- Evidence suggests that people who smoke should use a combination of ‘stop smoking medicines’ and behavioral support to give them the best chances of success
- Challenges:
 - Physically attending a smoking cessation clinic
 - Unavailability of hotlines in most healthcare systems
 - Reaching out to doctors for Bupropion or varenicline prescriptions

Nicotine Replacement Therapy

- Safe, effective medication
- Over the counter
- Long acting: patches
- Short acting: gums, lozenges
- Evidence: use combination (long and short acting)
- increase the rate of quitting by 50% to 60% regardless of the settings
- Works with or without counseling
- Side effects: localized irritation, palpitations, non-ischemic chest pain
- It does not increase the risk of myocardial infarction



Nicotine Replacement Therapy: Gums

- Increase the chance of successfully quitting
- Use combination long and short acting
- 4 mg gum instead of 2 mg
- Gums alone are as effective as patches alone
- Starting gum before the quit date increases the chances of quitting

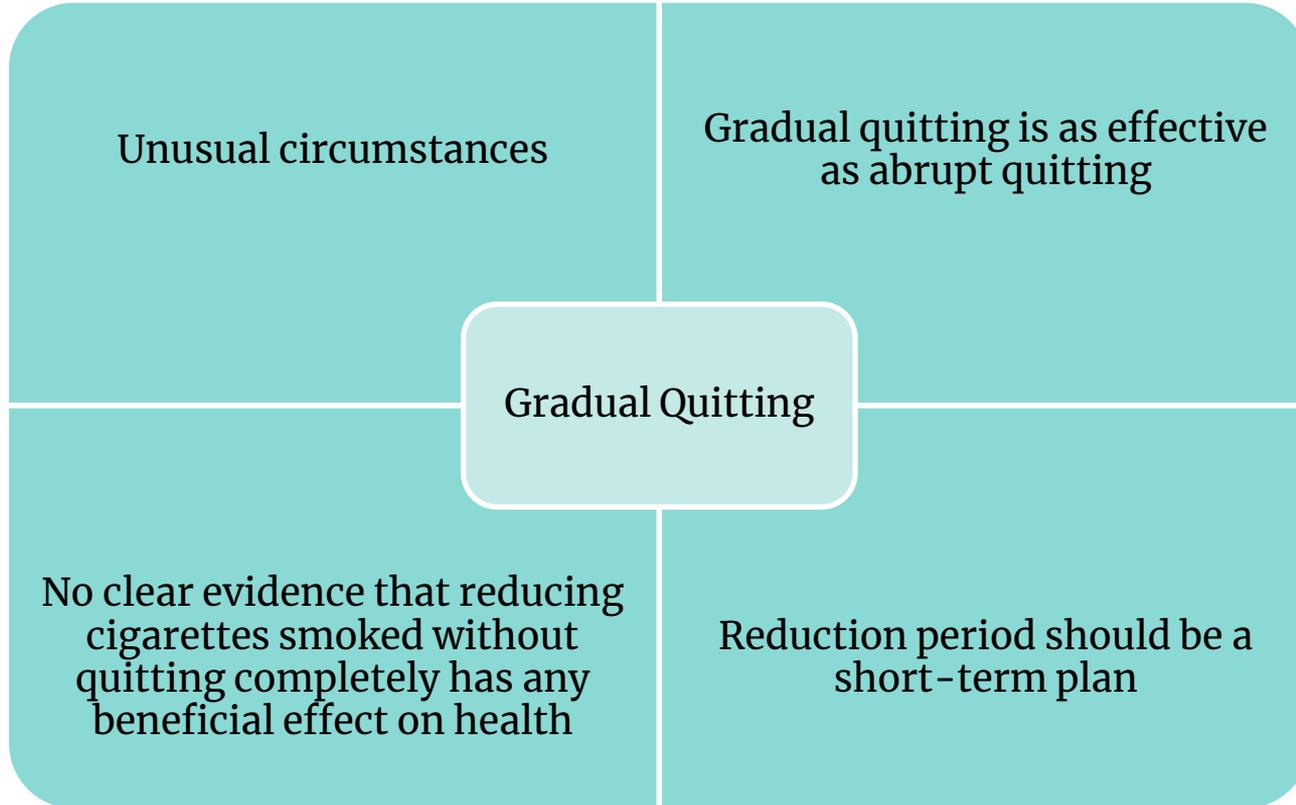


Behavioral counseling

- Printed materials telephone, internet programs, and text-messaging: positive effect on quit rates
- Many countries have quit-lines support
- Interactive and tailored Internet-based interventions with or without additional behavioral support are moderately more effective than non-active controls at six months
- Automated text message-based smoking cessation interventions result in greater quit rates than minimal smoking cessation support
- Proactive telephone counselling increases quit rates in smokers



Gradual quitting



E-Cigarettes are not smoking cessation tools

- E-cigarettes are not safe
- The effectiveness of ENDS as a smoking cessation aid is still being debated
- Smokers should not switch to e-cigarettes



**No
smoking
including
e-cigarettes**

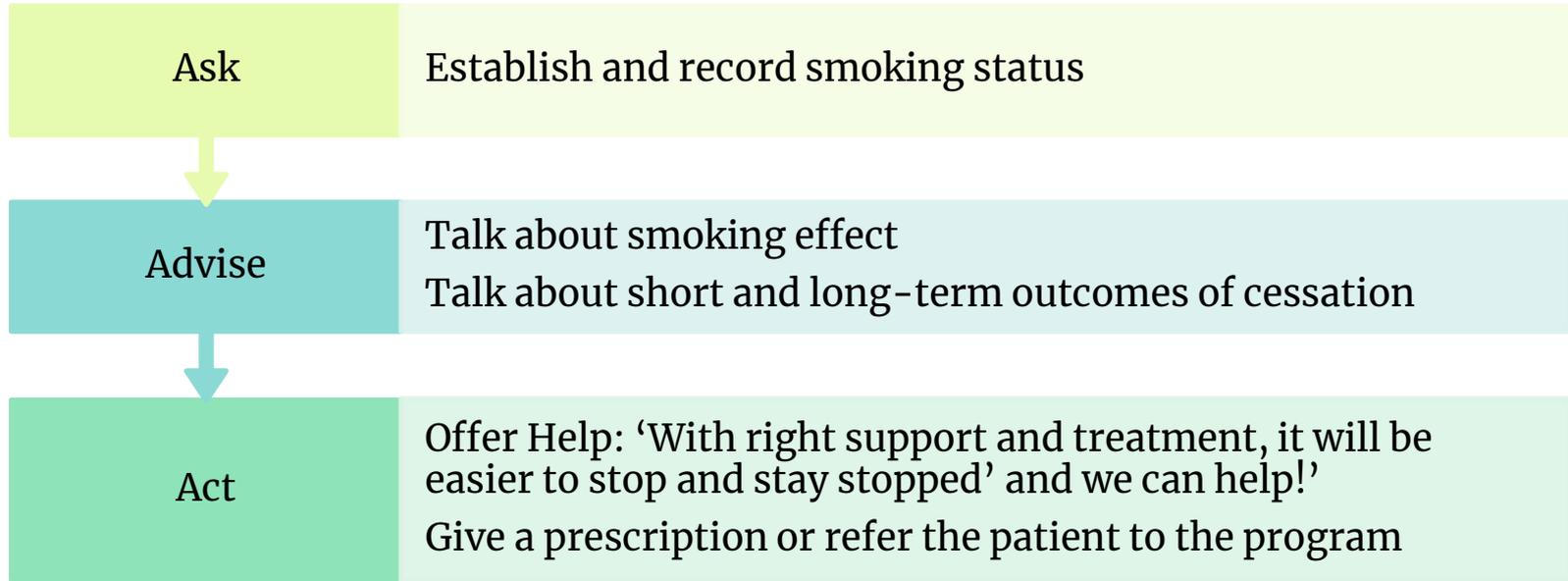
How you can help if you don't have time or you are not trained?

Very brief intervention

Opt-out approach



Very brief intervention: simply!



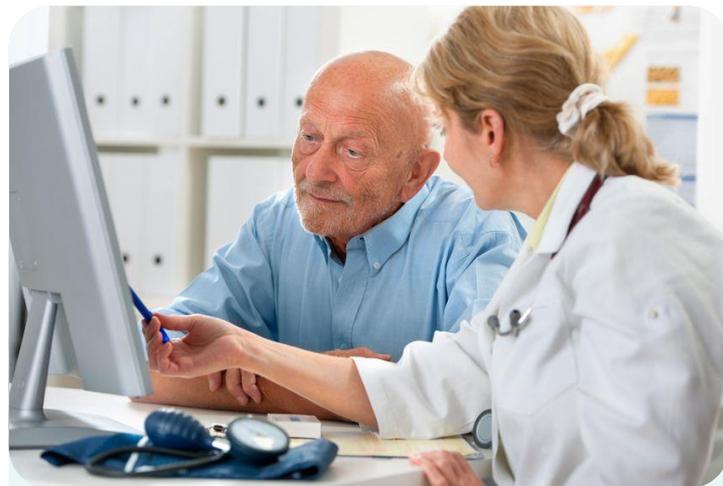
- ❖ Smokers are **24% more likely to quit** if offered brief physician advice compared to no advice
- ❖ Takes less than one minute - Use it with all smokers - make it routine

New evidence: opt-out approach

- Patient presenting with pre-cancerous oral lesion? What do we say?
- This lesion may become cancer, do you want to be treated?

OR

- This lesion may become cancer, we will start treatment!
- Offer evidence-based smoking cessation treatment to **every smoking patient, regardless of their readiness to quit**



Just refer your patient!

Suggested recommendations- Individual and institutional levels

- Address Healthcare workers working in COVID 19 units
 - PPE hard to take breaks and smoke
 - Nicotine replacement therapy (cravings, withdrawal)
- Address COVID 19 smokers admitted to the hospital
 - Ask everyone about all forms of tobacco and document
 - Advise all patients to quit in a strong and personalized way
 - Act: Prescribe Nicotine Replacement Therapy or connect with a SCP, quitline

Suggested recommendations - Individual and institutional levels

- Doctors and health care workers:
 - Take the opportunity and counsel all patients
 - Smoking Cessation programs/Clinics
 - Online consultations

Suggested recommendations- Governmental level

- Ministries : Include smoking status in registries
- Force law implementations
- New laws: waterpipe smoking in cafes and restaurants
- Plan and implement a quit line as a smoking cessation support

Suggested recommendations – Countries level MPOWER WHO technical package

- In 2008, WHO introduced the evidenced-based MPOWER technical package, which is based on the tobacco demand-reduction articles of the WHO Framework Convention on Tobacco Control
 - **Monitor tobacco use and prevention policies**
 - **Protect people from tobacco use**
 - **Offer help to quit tobacco use**
 - **Warn about the dangers of tobacco**
 - **Enforce bans on tobacco advertising, promotion and sponsorship**
 - **Raise taxes on tobacco**

MPOWER WHO technical package

- Comprehensive ban on all forms of tobacco use
- All indoor
- Public places (cafes and restaurants)
- Countries should ensure that this ban is in place and fully enforced

WHO **MPOWER** package: Six measures to assist in country-level implementation of WHO FCTC

Monitor tobacco use and prevention policies

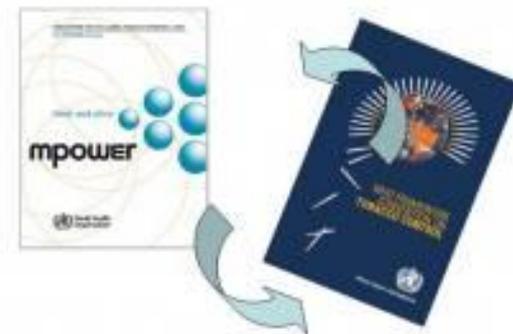
Protect people from tobacco smoke

Offer help to quit tobacco use

Warn about the dangers of tobacco

Enforce bans on tobacco advertising, promotion and sponsorship

Raise taxes on tobacco



Will strengthened tobacco control measures help in this context?

- Reducing the risk of suffering from severe symptoms
- Reducing the rates of many respiratory and cardiovascular conditions that are associated with more serious COVID-19 symptoms and mortality
- Reducing the demand for tobacco products, including waterpipe products, will discourage the social gatherings
- Less demands on health systems
- Golden opportunity for positive health outcomes
- Countries can adopt MPOWER policy package to support their formulation and implementation of tobacco control measures to protect public health

Take Home Messages

- All types of tobacco smoking could, directly or indirectly, contribute to an increased risk, poor prognosis and/or mortality for respiratory infections
- Tobacco use may increase the risk of getting SARS COV2 virus
- Early studies: compared to non-smokers, having a history of smoking may increase the chance of adverse health outcomes for COVID-19 patients (hospitalization, ICU, deaths)

- The World Health Organization urges people to stop smoking tobacco to minimize the risks in both people who smoke and those exposed to second-hand smoke
- Governments should advance their efforts to reduce smoking, vaping and waterpipe use
- Additional research into the relationship of smoking to infection, transmission and progression of COVID-19 is required

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Questions ?

Thank you!