Health effects of ENDS and the like devices
Known common Industry Tactics

- Usual initial denials of addiction or harmful effects
- Advertise products as newer products: less harmful or safer
- Advertise with glamours increasing attractiveness
- Use design features: attractiveness and addictiveness
- Always on the look out for new consumers to replace dying customers or those who quit
- Lawsuits; create confusion
- Tries to retain their image of a responsible company
What increases addiction potential?

- Age at which it is first introduced
- Dosage of nicotine: the higher the nicotine dose, the greater the chance of addiction
- Manner it is introduced: inhalation—leads to nicotine in the blood and brain in seconds
- Smell of smoke or vape, flavours, taste, hand movements of smoking, company of friends— all add to addiction potential
- Need to break these if one desires to quit
- Exponential growth of ENDS in the developed countries in very short time period
• Devices which have a system or a mechanism to heat a solution or a mixture to generate an aerosol which the user inhales
• Nicotine and flavours dissolved in a solvent
• Solvent: Propylene Glycol or/and Glycerol
• Solutions and emissions/aerosol: chemicals of known toxicity and several others of unknown toxicity including heavy metals like nickel, copper, cadmium
• ENDS in different shapes and sizes: First, second and third generations; open or closed systems
• ENNDS and HTPs [iQOS]
Smoke without fire
Suck on an e-cigarette and it produces a cloud of nicotine-carrying vapour with none of the toxic by-products of burning tobacco.
Harmful Effects

- Harmful Effects of Nicotine
- Harmful Effects of the solvents
- Harmful Effects due to flavours and other chemicals
- Harmful Effects due to design features
- Harmful effects to non-users: second hand and explosions

- Harmful Effects discussed in terms of the body systems affected
Adversely impact the cardiovascular system
Increased systemic oxidative stress
Increase in Low-density lipoprotein oxidisability, indicative of the susceptibility of apolipoprotein B–containing lipoproteins to oxidation
Daily e-cigarette use, adjusted for smoking conventional cigarettes as well as other risk factors, was found to be associated with increased risk of myocardial infarction (commonly called heart attacks)
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<th><strong>Stroke</strong></th>
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<td>• Alter physiological haemostasis and increase the risk of thrombogenic events</td>
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<td>• Platelets: hyperactive, with enhanced aggregation, dense and α granule secretion, activation of the αIIbβ3 integrin, phosphatidylserine expression, and Akt and ERK activation, when compared with clean air–exposed platelets.</td>
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<td>• Platelets were also found to be resistant to inhibition by prostacyclin, relative to clean air</td>
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<td>• Shortened thrombosis occlusion and bleeding time</td>
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<td>• Hence, negative health outcomes</td>
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Repeated exposure to acrolein: causes chronic pulmonary inflammation, reduction of host defence, neutrophil inflammation, and mucus

Risk of bronchitic symptoms was increased by almost twofold

Diacetyl and acetyl propylene are found in a large proportion of sweet-flavoured e-cigarette liquids

These chemicals are associated with “popcorn lungs”, thus increasing the risk of having this disease among vapers
Effect on Adolescent Brain

- The part of the brain that is responsible for decision-making and impulse control is not fully developed during adolescence.
- Nicotine changes the way synapses are formed, which can harm the parts of the brain that control attention and learning.
- Use of e-cigarettes in adolescents and youth poses a unique risk for long-term, long-lasting effects of exposing their developing brains to nicotine.
- Gateway product: prime the brain’s reward system, putting vapers at risk for addiction to other drugs.
• Reports of youth and young adults experiencing seizures: suspected to be nicotine-induced seizures.
• Nicotine has proconvulsive actions and, when overdosed, induces convulsive seizures.
• Nicotine at doses from 1 to 4 mg/kg, dose-dependently produced motor excitement.
• In humans, acute exposure to E-cig aerosol with nicotine in humans, even after 30 minutes of exposure, significantly increased arterial stiffness.
• Worsened the stroke injury.
Cancers

- Heating release carcinogenic carbonyl compounds, such as formaldehyde, acetaldehyde, and acrolein.
- Studies showed that e-cigarette-exposed cells showed significantly reduced cell viability and clonogenic survival, along with increased rates of apoptosis and necrosis.
- E-cigarettes exposure induces a 5-fold increase in cell death without nicotine and a 10-fold increase with nicotine as compared to the untreated control.
- Presence of increased compounds in urine of users.
Pregnancy Outcomes

- Not a safe alternative to cigarette smoking during pregnancy; nicotine crossing the barrier easier
- Low birth weight, abnormal corpus callosum, and alterations in appetite, attention, and cognition
- Neurological and behavioural changes that occur in the offspring because of nicotine exposure throughout pregnancy
- Nicotine exposure is indeed deleterious to the offspring: increase proneness to various metabolic disorders in later life
Effects on Oral Tissue

- Lichenoid reactions
- Effect on Periodontium
- Effect on dental implants
- E-cigarettes and Oral submucous fibrosis
- Accidents
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<td>- Poisoning</td>
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<td>- Fire and Explosions</td>
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Other public health effects

- ENDS as gateway product
- ENDS for dual use
- Use of ENDS for cessation
- ENDS adversely contributing to the tobacco epidemic
Conclusion

• ENDS and the like products, including HTPs and HnBs, are harmful for health of their users.

• Presence of these products in their current form has a net negative impact on Public Health.

• Potential to derail the progress made in tobacco control.