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

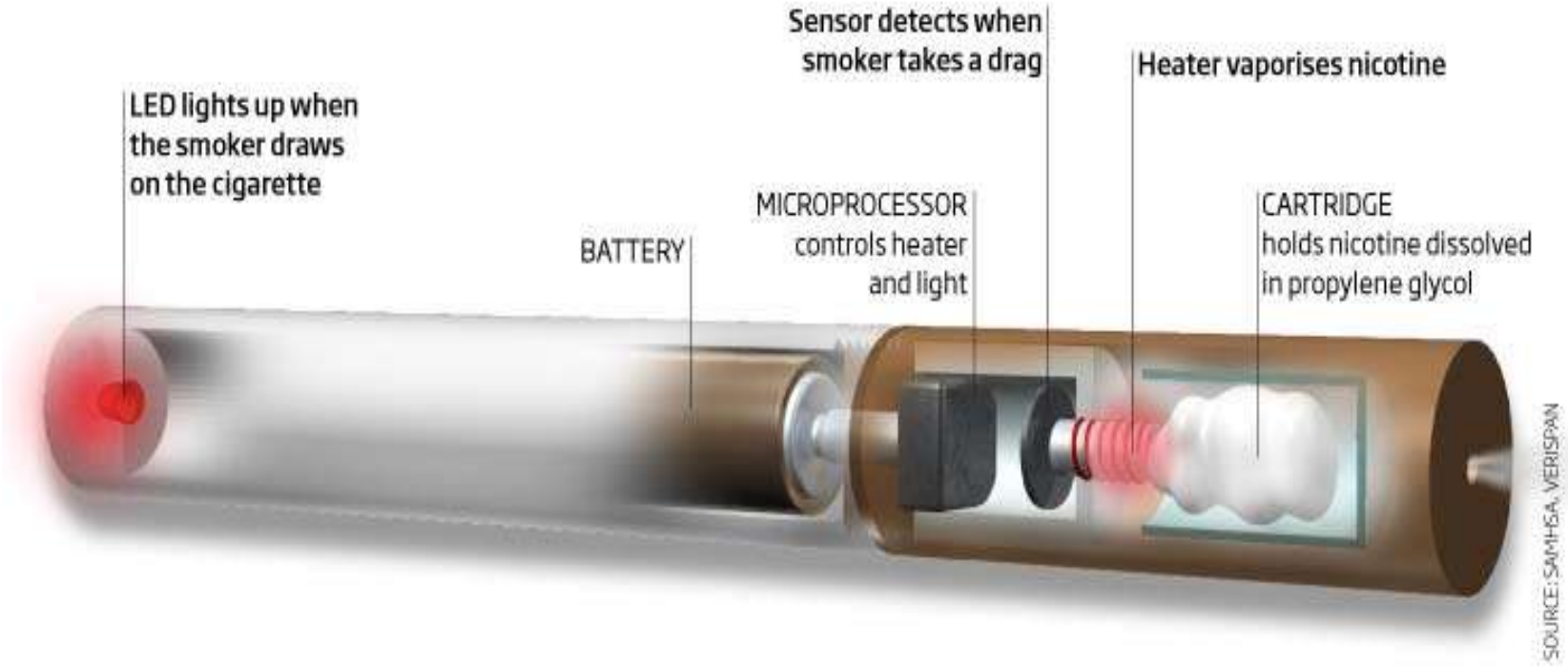
ENDS, ENNDS and HTPs

- 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]

An *END* to ENDS

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




VUSE
rejuve
WATERMELON BLAST
eGo-T


iQOS

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**

Cardiovascular system

- 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)

Stroke

- Alter physiological haemostasis and increase the risk of thrombogenic events
- 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.
- Platelets were also found to be resistant to inhibition by prostacyclin, relative to clean air
- Shortened thrombosis occlusion and bleeding time
- Hence, negative health outcomes

Respiratory System

- 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.

Seizures

- 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

Accidental

- Poisoning
- Fire and Explosions

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