Approaches to Tobacco Harm Reduction via a Tobacco Heating Products Case Study

Jenna Guynn, PhD, DABT

June 22, 2022

REYNOLDS
A BETTER TOMORROW

Reynolds American Inc. and its affiliates are independent subsidiaries of the British American Tobacco Group

Disclaimer

This material was prepared to facilitate discussion regarding government policy and tobacco harm reduction. Without limitation, the topics, proposals, concepts and other matters discussed or described herein are not final, are subject to change and/or cancellation and may be for illustrative or theoretical purposes only. No definitive plans or commitments should be inferred from these materials, and any proposed plans or commitments are subject in all respects to applicable internal reviews and governance requirements.

Reynolds does not make health claims regarding its brands, which are not cessation products. Nothing contained here should be misconstrued to the contrary. The views expressed in this presentation are those of the presenter and may not represent the views of Reynolds. To the extent that third-party sources are referenced, Reynolds is not responsible for the content of referenced sources and the views expressed may not represent the views of Reynolds. No tobacco product is safe, all tobacco products containing nicotine are addictive. Youth should never use tobacco. Smokers who are concerned about their health should quit.

Reynolds American Inc. and its affiliates are independent subsidiaries of the British American Tobacco Group.

© 2022 RAI Services Company

Agenda

Tobacco Harm Reduction

Tobacco Heating Products:
Principles and Background

Assessing the Risk Profiles of Tobacco Heating Products

Smoker Migration to Tobacco Heating Products

Regulatory Approaches in the US

Tobacco Harm Reduction is Central to Our Company's Vision

Our Purpose

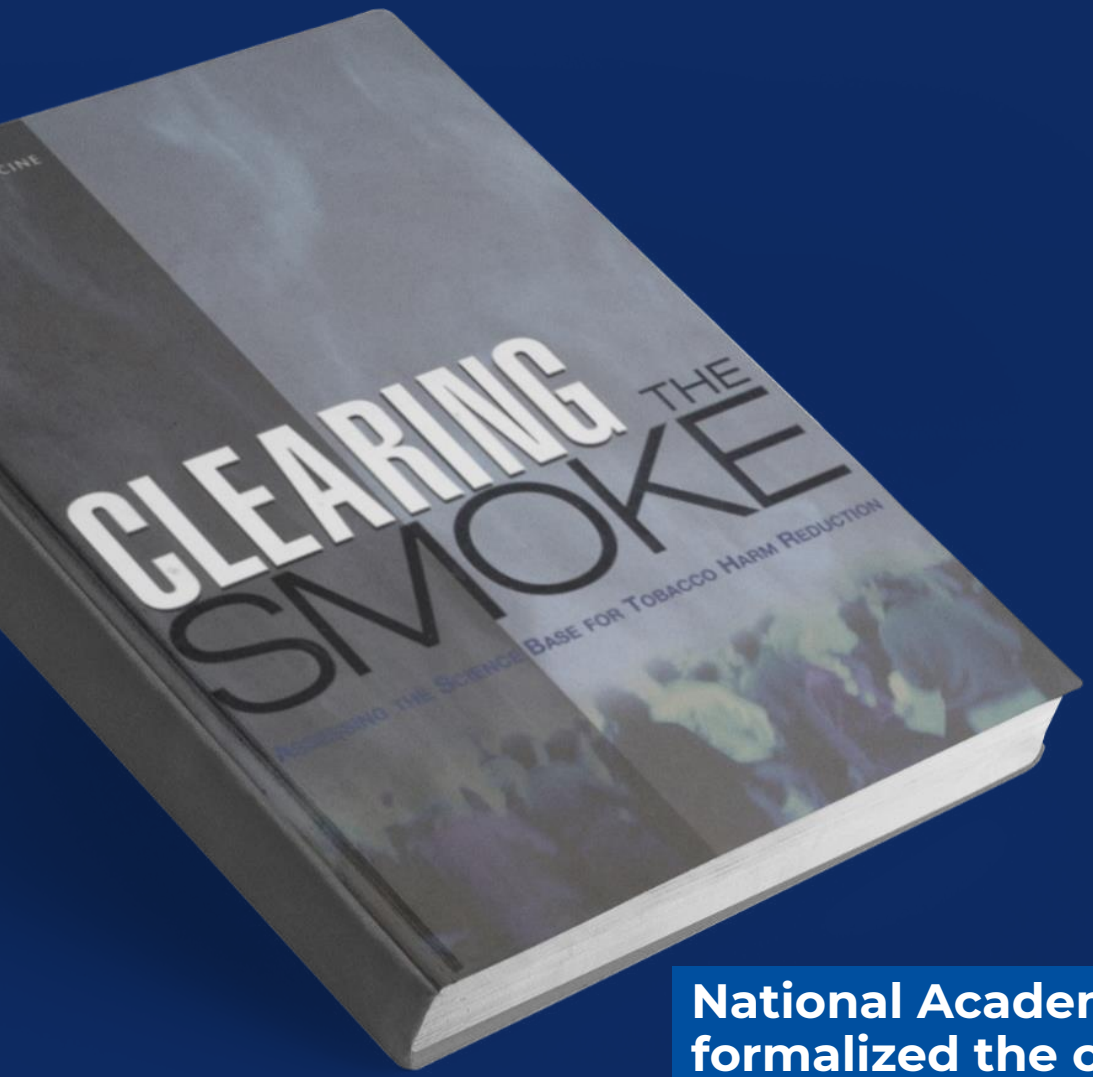
*To **reduce** the **health impact*** of our business*

Our Commitment

*To provide **adult consumers** with a wide range of enjoyable and **potentially less risky alternatives***

* Based on the weight of evidence and assuming a complete switch from cigarette smoking. These products are not risk free and are addictive.

Core Principles of Tobacco Harm Reduction



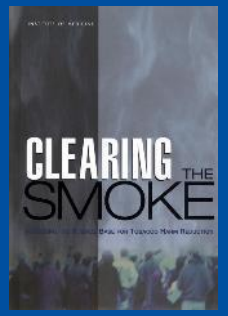
"...[tobacco] harm reduction refers to minimizing harms, decreasing total morbidity and mortality, without completely eliminating tobacco and nicotine use."(i)

National Academies of Science, Engineering, & Medicine (formerly Institute of Medicine) formalized the concept of Tobacco Harm Reduction

(i) US Institute of Medicine, 2001

Global Perspectives on Tobacco Harm Reduction

"The **closer** the **risks** and **exposures** from the **Reduced Risk Products** are **to cessation** ...the more confident a regulator can be in the chances for net **public health benefit**"(iii)



2001(i)

2007(ii)

2012(iii)

Science is informing policy and regulation globally

- Food and Drug Administration
- Public Health England*
- National Institute for Public Health & the Environment
- & others

Tobacco Harm Reduction globally recognized in policy and regulation

(i) US Institute of Medicine (IOM), 2001; (ii) US IOM, 2007; (iii) US IOM, 2012

* Public Health England was replaced by the Office for Health Improvement & Disparities in October 2021.

Growing Consensus on Reduced-risk Potential of Tobacco Heating Products*

REYNOLDS
A BETTER TOMORROW

Public Health England**

Compared to cigarette smoke, **heated tobacco** products are likely to expose users and bystanders to **lower levels** of **particulate matter** and **harmful** and potentially harmful **compounds**

Food and Drug Administration

These particular products could **help** addicted adult **smokers transition away** from combusted **cigarettes** and **reduce** their exposure to **harmful chemicals**

2017 — 2018 — 2019 — 2020

UK Committee on Toxicology

It is **likely** there is a **reduction in risk**, though not to zero, for health for smokers who switch completely to **heat-not-burn** tobacco products

Federal Institute for Risk Assessment

The herein confirmed **reductions** of **relevant toxicants** by about **80-99%** are substantial

National Institute for Public Health & the Environment

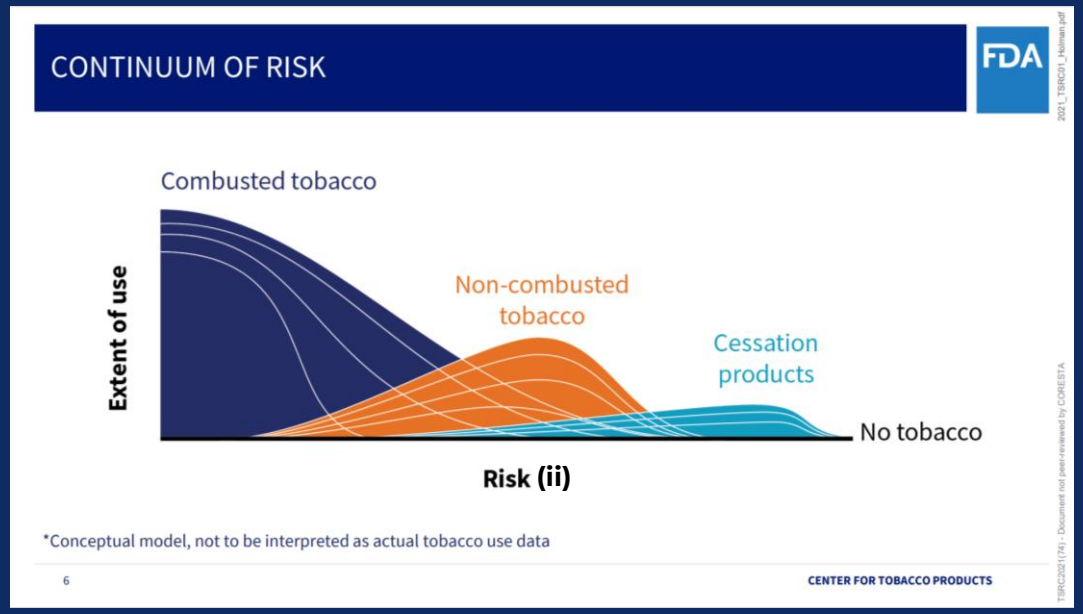
The use of **Heated Tobacco Products** is harmful to health, but **probably less harmful** than **smoking** tobacco cigarettes

*Based on the weight of evidence and assuming a complete switch from cigarette smoking. These products are not risk free and are addictive.
**Public Health England was replaced by the Office for Health Improvement & Disparities in October 2021

Tobacco Harm Reduction Strategy: Migrating Adult Smokers Down the Risk Continuum

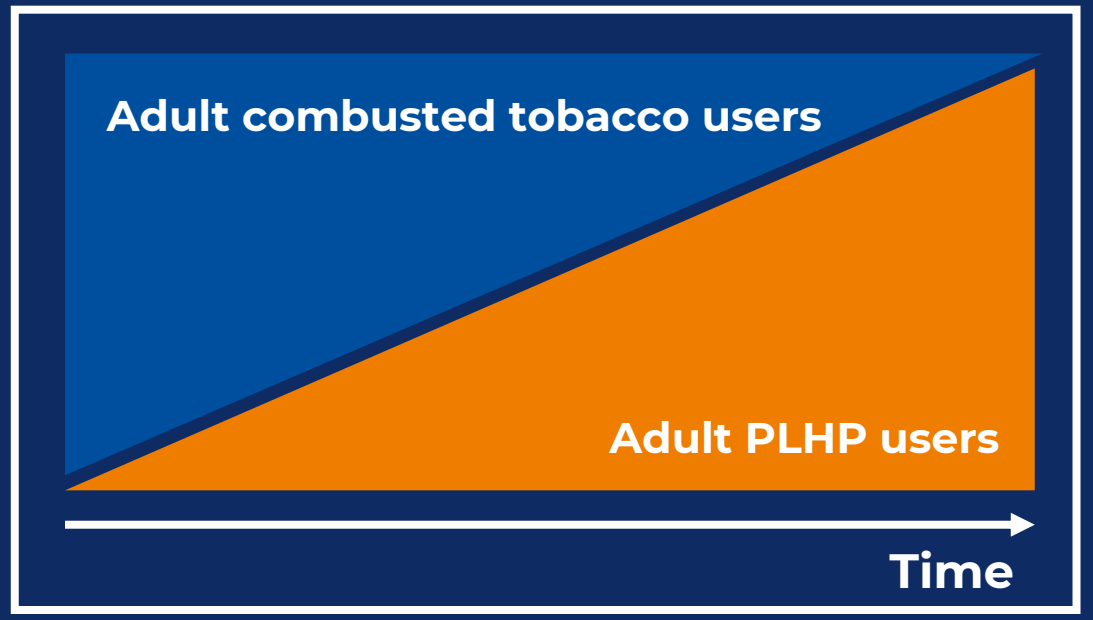
REYNOLDS
A BETTER TOMORROW

Potentially Less Harmful Products[(i)]



X

Number of adult smokers who switch[(iii)]



(i) Terminology 'Potentially Less Harmful Products' (PLHPs) taken from Gottlieb and Zeller, 2017; (ii) Holman, M (2021); (iii) Reynolds internal data, 2021

What are Tobacco Heating Products?

Tobacco is heated and not burned to generate an aerosol

The tobacco can be heated by:

- Lighting a carbon tip
- An electronic handheld device

A standard cigarette reaches over 900°C when tobacco burns. This combustion is responsible for the thousands of toxicants released

The consumable in glo is heated to temperatures ~240°C which releases nicotine and glycerol via evaporation and distillation

glo

REYNOLDS
A BETTER TOMORROW

2016 1st launch in Japan (>5 years of usage)

23 Countries where glo is currently marketed

6.7M Current number of glo users globally

How glo works

REYNOLDS
A BETTER TOMORROW

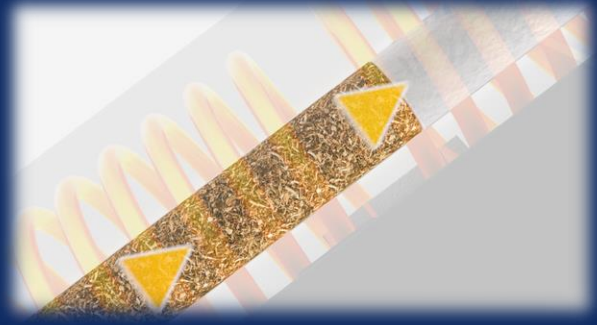
neo stick is inserted

Press the ‘heat’ button

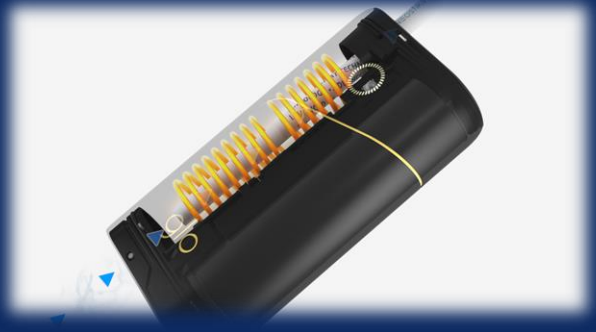
Device heats up

Nicotine and flavor are ready for delivery

Air passes through



The user draws and inhalers the nicotine and flavor



Evaluation of glo Using a Multi-Disciplinary Risk Assessment Framework

REYNOLDS
A BETTER TOMORROW

Emissions
What is in the vapour/aerosol?

Exposure
What happens when exposed to these emissions?

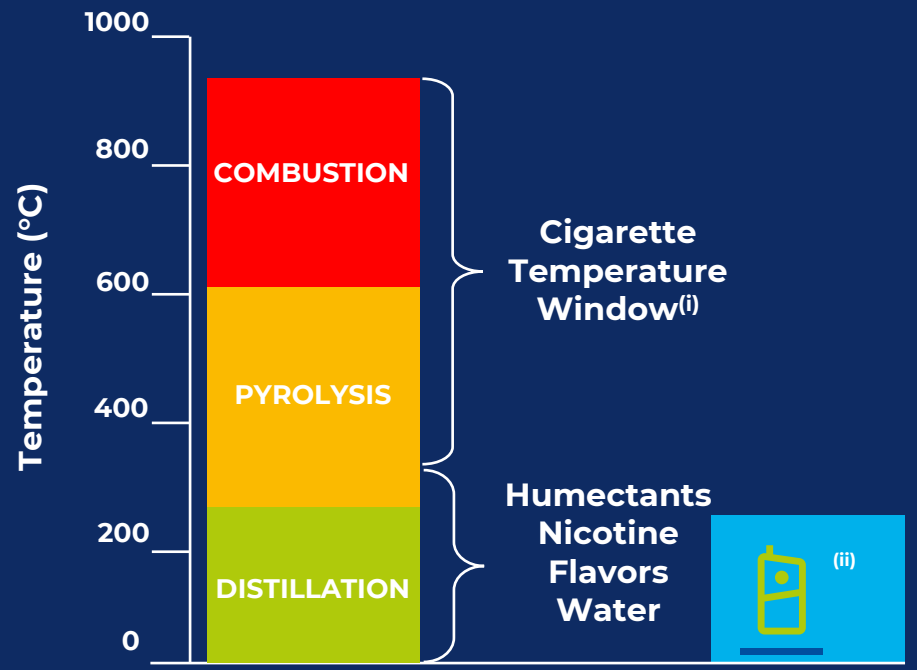
Risk
What is the long-term health risk?

Behavioural Sciences → **Chemistry** → **Biological Sciences** → **Clinical Studies** → **Population Studies**

Data published in 75 peer-reviewed publications

Scientific Assessment – Emissions Studies

Combustion



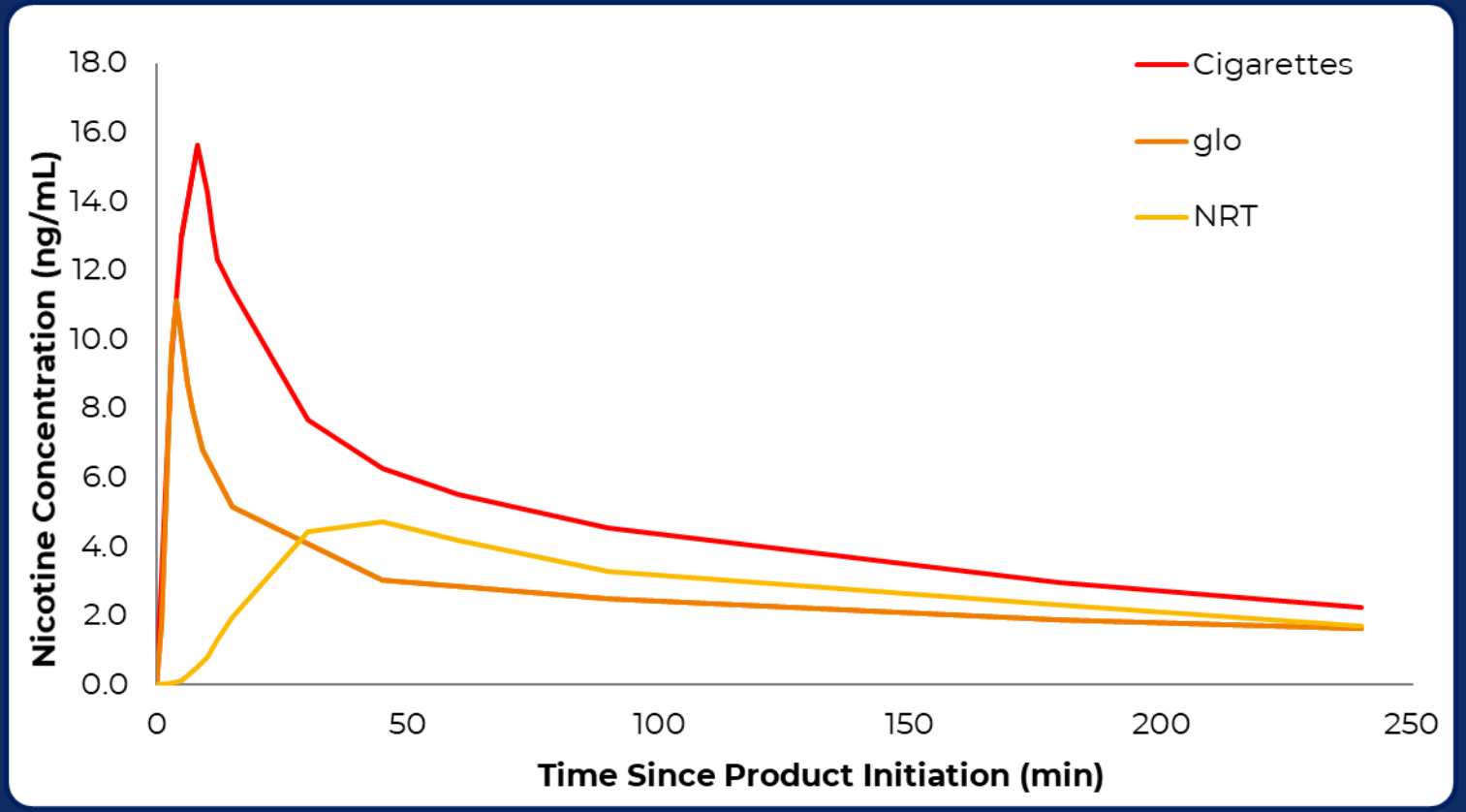
Chemistry & Toxicology

Many Harmful & Potentially Harmful Compounds in combustible cigarettes are absent and >90% reduction in those that are present

>95-100% reduction in mutagenicity, cytotoxicity, tumor promotion, oxidative stress

(i) Baker, 2006; (ii) Eaton et al., 2018

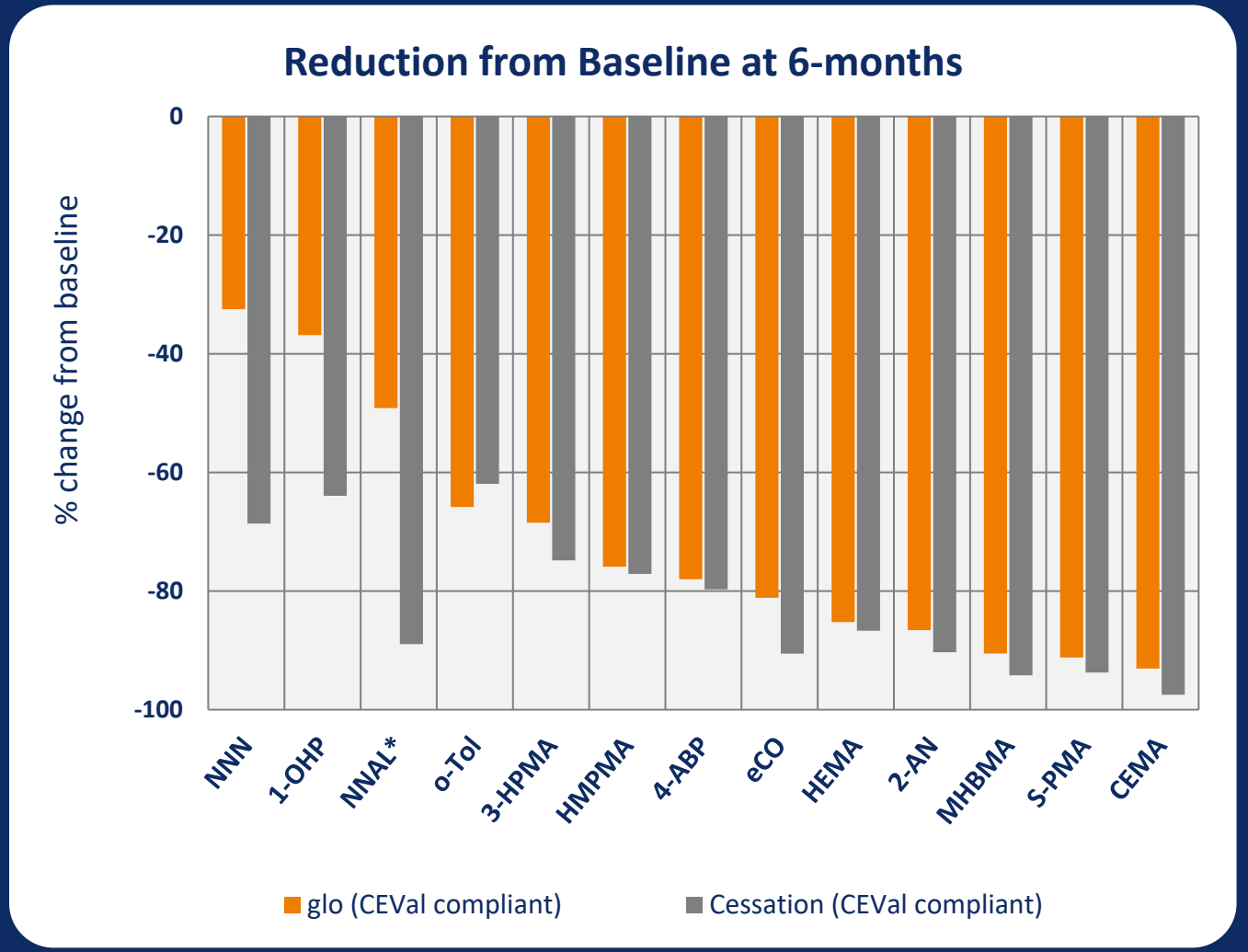
Nicotine Pharmacokinetic (PK) Profiles



PK profile of glo suggests reduced abuse liability relative to smoking

Biomarker of Exposure (BoE) Responses Similar to Cessation

- Switching to glo completely resulted in a statistically significant reduction in toxicant exposure compared to continuing to smoking*
- Most of these markers assessed reached levels similar to complete cessation
- Reductions were rapid and sustained for the 6-month period



*Based on the weight of evidence and assuming a complete switch from cigarette smoking. These products are not risk free and are addictive

Biomarkers of Potential Harm (BoPH)

- Switching completely to glo resulted in statistically significant changes in several BoPHs compared to continuing to smoking*
- For the majority of the markers the effect size was similar to that seen for smoking cessation
- Favorable directional trends in sICAM-1, HDL and FEV1 were also seen in solus glo users, with unfavorable trends in continued smokers

BoPH	Favourable change vs smoking	Change comparable to cessation?
HDL	✓	✓
WBC	✓	✓
FEV1%pred	✓	✓
FeNO	✓	
sICAM	✓	✓
11-dTx B2	✓	✓
8-epi-PGF	✓	✓
NNAL	✓	

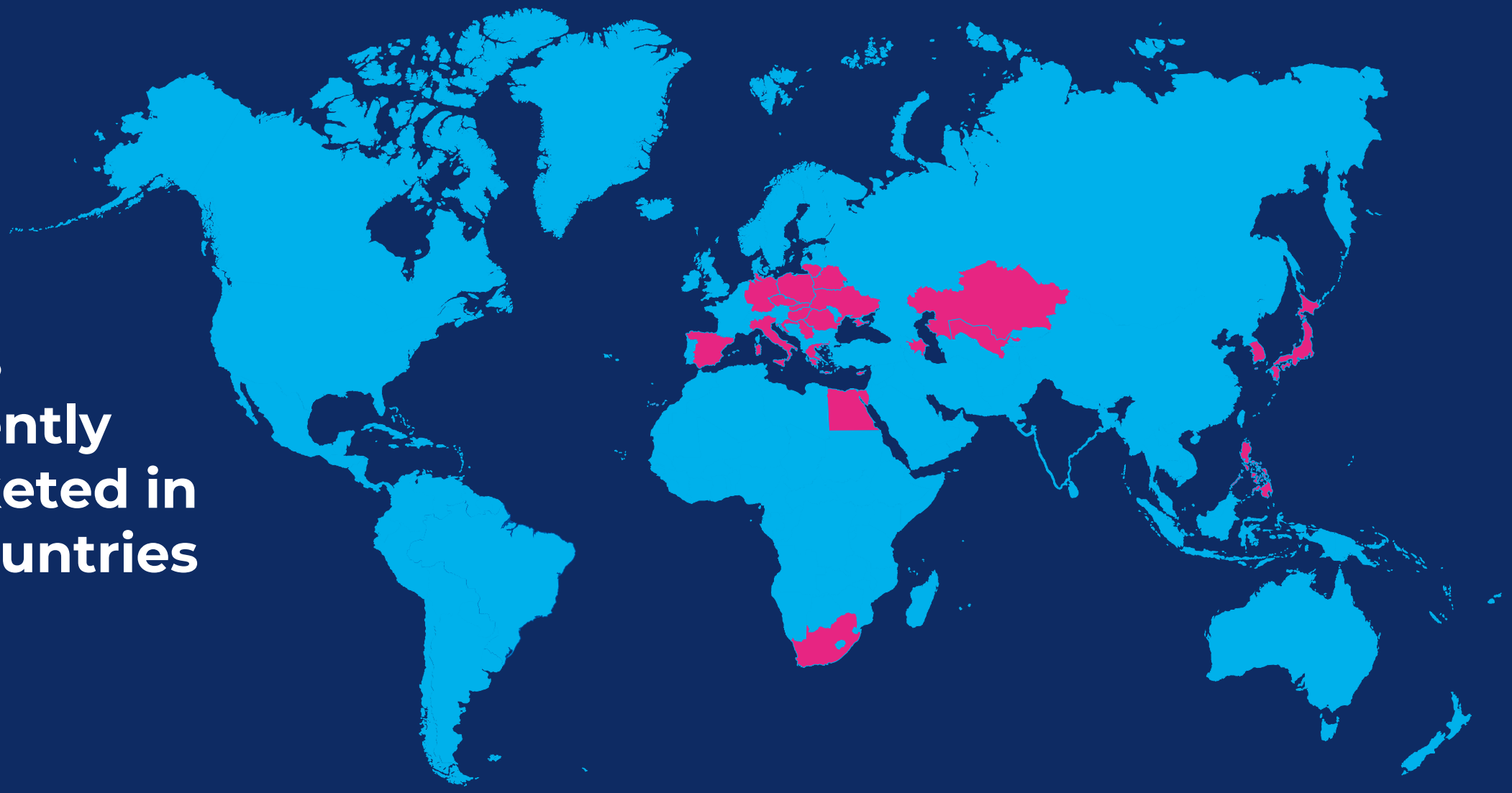
Conclusion

Collectively these data on BoPH and BoE strongly suggest that the negative health impacts of cigarette smoking may be reduced in smokers who completely switch to using glo*

*Based on the weight of evidence and assuming a complete switch from cigarette smoking. These products are not risk free and are addictive

glo Markets

REYNOLDS
A BETTER TOMORROW

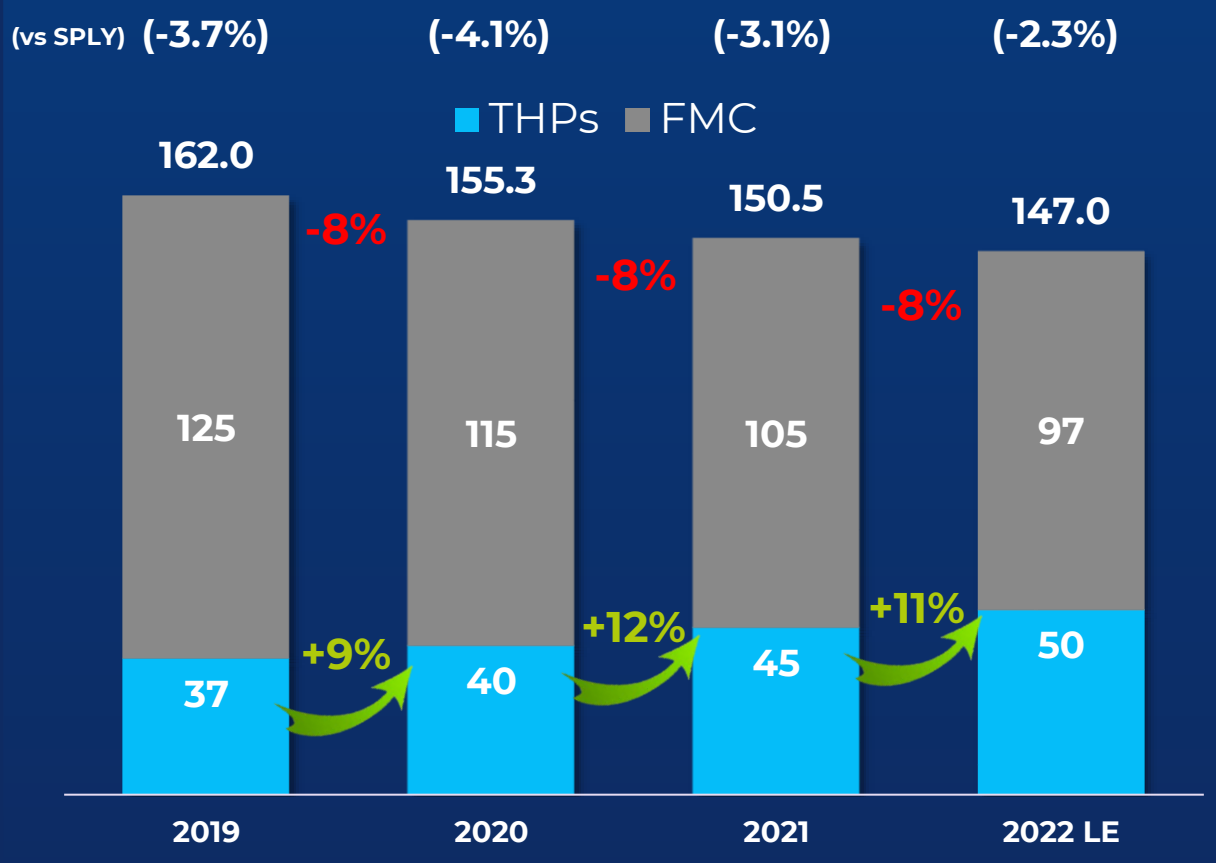


glo is currently marketed in 23 countries

Japan: THP Growth

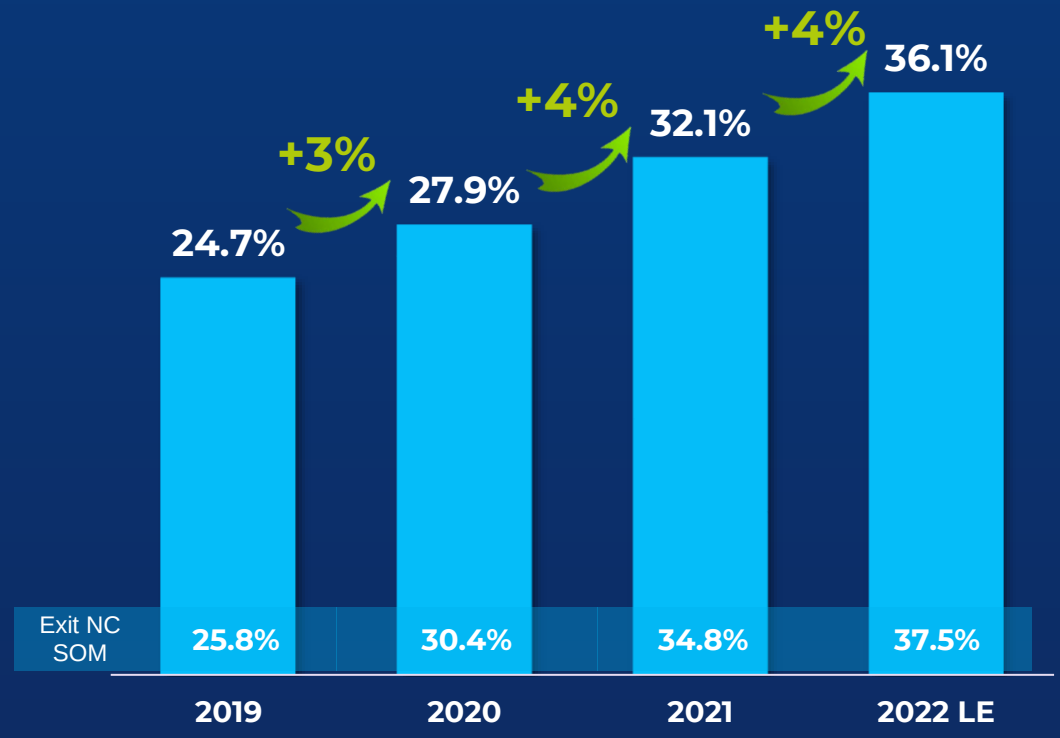
BAT ASIA PACIFIC & MIDDLE EAST

Total Nicotine Volume



Declining Cigarette trend continues

THP Total Share of Market



THPs continue to accelerate

* Target market for acquisition is existing adult smokers/nicotine users.

Source: CVS BC offtake | FY '21 Dec MTD till Dec 19th

Insights on US Regulatory Approaches

REYNOLDS
A BETTER TOMORROW

Scientifically-Based Submissions

Youth Access & Usage Prevention

Appropriate for the Protection of Public Health

REYNOLDS

A BETTER TOMORROW

Visit us at
ReynoldsScience.com

SCAN ME