Hoge Gezondheidsraad

Elektronische sigaret: beperking van smaken

November 2025
Nr. 9863

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Hoge Gezondheidsraad. Elektronische sigaret: beperking van smaken. Brussel: HGR; 2025. Advies n° 9863.

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Met de steun van :
Federale Overheidsdienst Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu.

Hoge Gezondheidsraad

ADVIES VAN DE HOGE GEZONDHEIDSRAAD nr. 9863

Elektronische sigaret: beperking van smaken

In this scientific advisory report, which offers guidance to public health policy-makers, the Superior Health Council of Belgium provides recommendations for a drastic and urgent restriction on e-cigarette flavours, aiming to reduce their appeal—particularly among young people—without increasing the threshold for smokers who use e-cigarettes as a smoking cessation aid.

Versie gevalideerd op het College van
05/11/2025[1]

SAMENVATTING

In dit wetenschappelijk adviesrapport geeft de Hoge Gezondheidsraad (HGR) van België een uitgebreide beoordeling van de gevolgen van e-sigaretten met smaken voor de volksgezondheid en formuleert aanbevelingen voor regelgevende maatregelen. Het rapport gaat in op twee belangrijke bezorgdheden: het onzekere toxicologische profiel van smaakstoffen bij inademing en de toenemende aantrekkelijkheid van e-sigaretten voor jongeren, mede vanwege de beschikbare verscheidenheid aan smaken. Ook wordt gekeken naar de mogelijke rol van e-sigaretten met smaken bij het stoppen met roken onder volwassen rokers. De conclusies en aanbevelingen zijn gebaseerd op een narratieve literatuurstudie van de wetenschappelijke literatuur, waaronder toxicologische, gedrags-, epidemiologische en regelgevende bronnen.

Het aantal beschikbare e-vloeistof smaken is uitzonderlijk hoog. In 2017 werden bijna 20 000 e-vloeistoffen met 250 verschillende smaakbeschrijvingen geïdentificeerd op de Nederlandse markt. Wereldwijd worden er naar schatting meer dan 7 000 unieke e-vloeistofsmaken onderscheiden. Deze smaken bestaan doorgaans uit complexe en variabele mengsels van talrijke afzonderlijke smaakstoffen. Zo werden bij een analyse in 2020 van 129 op de Belgische markt gekochte e-vloeistoffen in totaal 807 verschillende smaakstoffen geïdentificeerd. De transparantie over de samenstelling van een e-vloeistof wordt nog verder bemoeilijkt door het gebruik van plantenextracten die in samenstelling variëren, en door het feit dat volgens Uitvoeringsbesluit (EU) 2015/2183 van de Commissie ingrediënten die in hoeveelheden van minder dan 0,1 % van de uiteindelijke samenstelling van de e-vloeistof worden gebruikt, als vertrouwelijk of als bedrijfsgeheim mogen worden beschouwd.
Veel smaakstoffen die in e-vloeistoffen worden gebruikt, zijn weliswaar toegestaan voor orale consumptie, maar zijn niet voldoende beoordeeld op inhalatietoxiciteit. Het bekendste voorbeeld

[1] De Raad behoudt zich het recht voor om in dit document op elk moment kleine typografische verbeteringen aan te brengen. Verbeteringen die de betekenis wijzigen, worden echter automatisch in een erratum opgenomen. In dergelijk geval wordt een nieuwe versie van het advies uitgebracht.

van smaakstoffen die veilig zijn voor oraal gebruik maar inhalatietoxiciteit veroorzaken, zijn de diketonen diacetyl en acetylpropionyl. Experimentele studies tonen aan dat verschillende smaakstoffen oxidatieve stress veroorzaken en cytotoxische, genotoxische en pro-inflammatoire effecten hebben op onder andere menselijke respiratoire epitheelcellen. Zo is bekend dat diacetyl, 2,3-pentandion en ethylvanilline de productie van reactieve zuurstofspecies (ROS) en interleukine-8 (IL-8) induceren, wat leidt tot ontstekingen en een negatief effect op de longfunctie. Bovendien kan diacetyl *bronchiolitis obliterans* (popcornlong) veroorzaken. Menthol wordt in verband gebracht met een verminderde longfunctie, terwijl het irritatiewerende effect ervan kan leiden tot langere inhalatie en retentie van andere cytotoxische stoffen. Bovendien vormen romige aroma's met cinnamaldehyde een groter risico, omdat ze de immuunrespons tegen ziekteverwekkers aantasten, de mucociliaire klaring verminderen (waardoor het risico op luchtweginfecties toeneemt) en oxidatieve stress versterken. Van veel andere smaakstoffen is weinig bekend over hun inhalatietoxiciteit, terwijl ook hun cumulatieve “mengsel”-effecten niet goed kunnen worden beoordeeld. De toxicologische onzekerheid wordt nog vergroot doordat verhitting en chemische interacties tijdens het vapen schadelijke bijproducten kunnen genereren, waaronder aldehyden (bijv. kankerverwekkend formaldehyde, acetaldehyde), furanen en aldehyde-propyleenglycol acetalen, waarvan de toxicologische eigenschappen grotendeels onbekend blijven.

Meerdere studies hebben aangetoond dat het gebruik van e-sigaretten (met nicotine) bepaalde ademhalingsklachten en -aandoeningen verergert en de kans daarop vergroot, van kortademigheid tot bronchitisachtige symptomen, astma, chronische obstructieve longziekte (COPD) en astma-COPD-overlap-syndroom (ACOS). Bovendien suggereren gepoolde *odds ratio*'s in één studie dat het gelijktijdig gebruik van sigaretten en e-sigaretten risicovoller is dan het gebruik van alleen sigaretten (hart- en vaatziekten, beroerte, metabole stoornissen, astma, COPD, mondziekten).

In silico-, in vitro- en *in vivo*-studies naar verschillende smaakhoudende aerosolen of specifieke smaakstoffen hebben genotoxische effecten aangetoond in zowel dierlijke als menselijke cellen (bijv. DNA-schade, breuken en adductvorming, mutagenese, inductie van DNA-reparatie-enzymen). Samenvattend is het duidelijk dat smaakstoffen in e-sigaretten genotoxische effecten kunnen hebben, maar we weten niet in hoeverre deze effecten zich voordoen bij gebruikers van e-sigaretten. Hoewel epidemiologische studies geen uitsluitsel geven over het directe verband tussen het gebruik van e-sigaretten en longkanker, moet dit in de toekomst verder worden onderzocht, gezien de lange latentieperiode voor de ontwikkeling van longkanker en het verband met biomarkers die verband houden met het risico op kanker, zoals DNA-schade en oxidatieve stress. In 2025 heeft de *Clinical Oncology Society of Australia* echter na een kwalitatieve risicobeoordeling de volgende conclusie getrokken: “*Nicotine-based e-cigarettes are likely to be carcinogenic to humans who use them. E-cigarettes are likely to cause lung cancer and oral cancer.*".

De beoordeling van smaakstoffen is een complex en tijdrovend proces dat geavanceerde chemische analyses en toxicologische evaluaties vereist, met veel onzekerheden, meerdere mogelijke eindpunten en onderzoeksstrategieën. Risicobeoordeling wordt momenteel bemoeilijkt door onzekerheden in de blootstellingsbeoordeling, een gebrek aan betrouwbare strategieën voor cumulatieve risicobeoordeling en omdat geen rekening wordt gehouden met de chemische afbraak van e-vloeistoffen als gevolg van verhitting. Hoewel het nog steeds de verantwoordelijkheid van de fabrikanten is om de veiligheid van de producten te garanderen voordat ze deze op de markt brengen, wordt deze logica in de praktijk vandaag de dag zeker niet gevolgd door e-sigaretten op

de markt, waar de onzekerheid over de toxiciteit en veiligheid van de vele stoffen groot blijft en steeds meer wetenschappelijk bewijs wijst op gezondheidsrisico's.

De toenemende prevalentie van vapen onder jongeren is alarmerend. Volgens de meest recente VAD Vlaamse Leerlingenenquête (2023 - 2024[2]) onder 12- tot 18-jarigen heeft 29 % ooit e-sigaretten gebruikt, 24 % heeft dat het afgelopen jaar gedaan en 9 % heeft dat minstens één keer per week gedaan. Het aandeel regelmatige gebruikers is nu meer dan vier keer zo hoog als in 2018 - 2019. De effecten van het recente Belgische verbod op wegwerpvapes en het displayverbod (beide in 2025) zijn nog onbekend. Hoewel nieuwsgierigheid de belangrijkste drijfveer is voor jongeren om te beginnen met vapen, blijkt uit gedragsgegevens uit België en andere landen dat smaken een belangrijke reden zijn voor de aantrekkingskracht van e-sigaretten onder adolescenten en jongeren. Met de introductie van “trendy” en “coole” smaken zoals popcorn, kauwgom en suikerspin probeert de tabaks- en vape-industrie specifiek jongeren te bereiken met haar verslavende producten. Volgens verschillende Belgische en internationale enquêtes voelen jongeren zich vooral aangetrokken tot fruitige smaken, snoep-, drank- en dessertsmaken, wat de perceptie van schade kan verminderen en de gevoeligheid voor experimenteren kan vergroten. Tegelijkertijd kunnen smaken de aantrekkingskracht van e-sigaretten als mogelijk hulpmiddel om te stoppen met roken vergroten. Er is zeer betrouwbaar bewijs dat e-sigaretten met nicotine het aantal mensen dat stopt met roken verhogen (8 - 10 van de 100 mensen stoppen met roken) in vergelijking met bijvoorbeeld nicotinevervangende therapie (NRT) (6 van de 100 mensen stoppen met roken). Hoewel mensen ouder dan 20 jaar ook de voorkeur geven aan fruitsmaken, is het grootste verschil met 10- tot 20-jarigen dat tabaks- en muntsmaken aantrekkelijker zijn voor oudere vapers. Er zijn weinig betrouwbare gegevens zonder financiering door de industrie over de voorkeuren van ex-rokers die met succes zijn gestopt met roken door e-sigaretten te gebruiken als tijdelijk hulpmiddel om te stoppen met roken. Het schaarse bewijs is echter niet doorslaggevend en toont geen duidelijk verband aan tussen het gebruik van e-sigarettensmaken en rookstopresultaten.

Nederland heeft met ingang van 1 januari 2024 alle e-sigaretsmaken verboden. Alleen tabakssmaak is nog toegestaan, op basis van een positieve lijst van 16 smaakstoffen die een toxicologische evaluatie met risicobeoordeling hebben ondergaan. Deze 16 smaakstoffen kunnen worden gebruikt om de tabakssmaak te creëren. De eerste resultaten van een cross-sectioneel onderzoek dat negen maanden na het verbod door het Rijksinstituut voor Volksgezondheid en Milieu (RIVM) is uitgevoerd, zijn bemoedigend: 29,5 % van de respondenten is minder gaan vapen en 22,4 % is gestopt, zonder duidelijke aanwijzingen voor substitutie door sigaretten. Handhaving en inspecties blijven echter essentieel, omdat er op de illegale markt nog steeds producten met smaken worden verkocht. Daarentegen laten de beperkingen op smaken in bepaalde Amerikaanse staten een gemengd beeld zien, met een aanzienlijke daling van het vapen, maar ook aanwijzingen voor ongewenste substitutie bij een minderheid van de vapers die weer zijn gaan roken. De Belgische wetgever moet daarom zorgvuldig afwegen wat de gewenste en ongewenste effecten zijn, om op deze laatste te kunnen anticiperen met begeleidende maatregelen.

[2] https://vad.be/content/uploads/2025/10/Syntheserapport-2023-2024_def_GL.pdf (accessed on 21 October 2025).

Aanbeveling: een drastische en dringende beperking van smaken

Gezien al deze bewijzen en rekening houdend met de principes van fysisch-chemische milieuhygiëne (zie SHC 9404, 2019), **beveelt de Hoge Gezondheidsraad unaniem een dringende en drastische vermindering aan van het aantal smaken dat beschikbaar is voor e-sigaretten**. Binnen de Raad zijn er twee standpunten:

1) **Vanuit toxicologisch en voorzorgsperspectief geeft een deel van de werkgroep de voorkeur aan een smaakverbod naar Nederlands model, waarbij alleen tabakssmaak is toegestaan.** Deze tabakssmaak mag alleen worden samengesteld op basis van een positieve lijst van 16 smaakstoffen, waarvoor momenteel onvoldoende informatie beschikbaar is om schadelijke effecten aan te tonen.

   Verschillende studies bevelen een dergelijk verbod aan. Een voordeel van deze aanpak is de uniformiteit met Nederland en mogelijk andere Europese lidstaten in de toekomst, wat de handhaving vergemakkelijkt. Als voor deze optie wordt gekozen, moet de positieve lijst regelmatig worden geëvalueerd wanneer nieuwe toxicologische en andere gegevens beschikbaar komen.

2) **Vanuit het perspectief van rookstop geeft een ander deel van de werkgroep de voorkeur aan het toestaan van een paar extra smaken naast tabakssmaak (over het algemeen ≤ 3).** Zij stellen deze optie voor uit bezorgdheid dat e-sigaretten hun aantrekkelijkheid zouden kunnen verliezen als potentieel hulpmiddel om bepaalde rokers te helpen stoppen, en om te voorkomen dat sommige vapers terugkeren naar gewone sigaretten, zoals in sommige Amerikaanse staten is gebeurd na smaakbeperkingen. Het huidige bewijs is echter niet sluitend en toont geen duidelijk verband aan tussen het gebruik van e-sigaretsmaken en de resultaten van het stoppen met roken of het langdurig gebruik van e-sigaretten, hoewel er maar weinig studies beschikbaar zijn.

   Als er extra smaken worden toegestaan, moeten deze worden geselecteerd op basis van een enquête onder (Belgische) ex-rokers die met succes zijn gestopt met roken door middel van e-sigaretten en vervolgens zijn gestopt met vapen. De geselecteerde smaken moeten zo onaantrekkelijk mogelijk zijn voor jongeren. Aangezien een dergelijk onderzoek momenteel niet beschikbaar is, zou dit voorafgaand aan de selectie moeten worden uitgevoerd. Na de selectie van smaken moet een positieve lijst van smaakstoffen voor smaakformulering worden opgesteld met behulp van een methodologie die vergelijkbaar is met die welke door het RIVM voor tabakssmaak wordt gebruikt.

Beide standpunten zijn wetenschappelijk onderbouwd, maar worden beperkt door hiaten in de beschikbare gegevens. De beslissing ligt uiteindelijk bij de beleidsmakers. **Het is echter duidelijk dat individuele voorkeuren van volwassenen niet zwaarder wegen dan de bescherming van jongeren op populatieniveau. Het bestaande wetenschappelijke bewijs is voldoende solide om onmiddellijke regelgevende maatregelen te rechtvaardigen.**

Om ervoor te zorgen dat strenge smaakbeperkingen effectief worden toegepast, beveelt de HGR ten zeerste aan om de handhavingsinspanningen aanzienlijk te intensiveren. Op basis van de ervaringen van de Nederlandse Voedsel- en Warenautoriteit (NVWA) zijn de belangrijkste

uitdagingen onder meer het bestrijden van illegale handel, het aantonen van niet-conforme verkoop en het aanpakken van de verkoop van accessoires met smaken (bijv. aromaballen en mondstukken). Inspecties moeten gericht zijn op importeurs en verkooppunten, terwijl onlineplatforms en sociale media nauwlettend in de gaten moeten worden gehouden op illegale verkoop en advertenties, waarbij geconstateerde overtredingen worden gemeld en verwijderd. Bovendien moet de leeftijdsverificatie bij verkooppunten verder worden gecontroleerd door middel van *mystery shoppers*.

Ten slotte pleit de HGR ook voor diplomatieke contacten met buurlanden om het beleid te coördineren en grensoverschrijdende aankopen te voorkomen.

<u>Overige aanbevelingen:</u>

- De HGR beveelt aan om de bestaande nationale en/of Europese wetgeving aan te passen, zodat alle nieuwe nicotineproducten die niet medisch erkend zijn, onderworpen worden aan de bestaande wetgeving inzake tabaksproducten, of volledig verboden worden om op de markt te worden gebracht. Op die manier kunnen beleidsmakers op het gebied van gezondheidszorg de tabaksindustrie voorblijven om “nieuwe” problemen in de toekomst te voorkomen, waarbij de schade “achteraf” moet worden beperkt, zoals het geval is bij e-sigaretten.

- De HGR beveelt aan om de effecten van een smaakverbod of smaakbeperkingen na de invoering nauwlettend te volgen en te monitoren, zodat het beleid achteraf verder kan worden verfijnd. De positieve lijst van toegestane smaakstoffen moet evolutief zijn, zodat snel kan worden gereageerd op nieuwe informatie, in de ene of de andere richting.

- De HGR beveelt aan om rond de ingangsdatum van de smaakbeperkingen een voorlichtingscampagne voor vapers te starten om te voorkomen dat zij terugkeren naar traditionele sigaretten, zoals in sommige Amerikaanse staten is waargenomen.

- De HGR stemt ermee in om de aanwezigheid van synthetische koelmiddelen (bijv. WS-23) in e-vloeistoffen te verbieden, op grond van artikel 7, lid 6d van Richtlijn 2014/40/EU en artikel 4, § 4, 5°, van het koninklijk besluit van 28/10/2016 (verbod op additieven die de inhalatie of absorptie van nicotine vergemakkelijken). Hun aanwezigheid kan de doeltreffendheid van smaakverboden ondermijnen. Deze moeten expliciet worden verboden.

- De HGR beveelt aan om alle accessoires met smaken, zoals aromaballen en mondstukken, te verbieden, aangezien het gebruik ervan de doeltreffendheid van smaakbeperkingen kan ondermijnen.

- De HGR beveelt aan om doe-het-zelf (DIY) e-vloeistoffen te verbieden, aangezien deze nog minder gestandaardiseerd zijn en daarom ernstige gezondheidsrisico's kunnen inhouden. Bij DIY-bereiding maakt de vaper zijn eigen vloeistof door geconcentreerde smaakstoffen, een nicotinebooster en een PG/VG-basis te mengen.

- De HGR beveelt (reeds in adviesrapport nr. 9549) aan om een maximale gebruiksduur na opening op *e-liquid*flessen te vermelden, rekening houdend met de stabiliteit en houdbaarheid van *e-liquids* (bijvoorbeeld de gevoeligheid van nicotine voor licht). Het doel is om de vorming van afbraakproducten in e-vloeistoffen tot een minimum te beperken en ervoor te zorgen dat de aangegeven nicotineconcentratie behouden blijft.

- De HGR beveelt aan om de verpakking van e-sigaretten en e-vloeistoffen te standaardiseren en de verpakking zo neutraal mogelijk te maken. Deze maatregelen verminderen de aantrekkingskracht op jongeren.

- De HGR beveelt aan om de strijd tegen de illegale handel en markt in e-sigaretten, ook online, drastisch op te voeren. Dit is essentieel om ervoor te zorgen dat verdere maatregelen ook in de praktijk worden uitgevoerd.

- De HGR beveelt aan om meer preventiecampagnes op te zetten die de gevaren van tabak en vapen benadrukken, specifiek gericht op jongeren. Daarnaast moeten ook ouders worden aangemoedigd om te stoppen met roken en vapen, om zo het goede voorbeeld te geven. Het rook- en vape-gedrag van jongeren hangt sterk samen met het rook- en vape-gedrag van hun ouders.

- De HGR beveelt aan om onafhankelijk onderzoek te stimuleren om de werkelijke, langetermijneffecten van e-sigaretten (zowel gezondheidseffecten als effecten op het stoppen met roken) vast te stellen en te kwantificeren.

- De HGR beveelt aan dat het telefoonnummer van de stoplijn “Tabakstop” ook verplicht op de verpakking van e-sigaretten moet worden vermeld (080011100).

- De HGR beveelt aan dat het woord “nicotine”, de bijbehorende waarschuwing en de nicotineconcentratie duidelijker en in grotere letters op de verpakking van e-sigaretten en alle andere producten die nicotine bevatten, worden vermeld. Bovendien moet naast de waarschuwing over het verslavende karakter van nicotine een andere waarschuwing over het “gevaarlijke” of “giftige” karakter worden toegevoegd.

- De HGR beveelt aan dat het beleid ter bescherming van het milieu ook gericht moet zijn op recycling en bewustwording over e-sigaretten en hun onderdelen in zwerfafval.

Er worden ook enkele specifieke aanbevelingen gedaan met betrekking tot traditionele tabaksproducten:

- De HGR beveelt aan om de promotie van andere, op bewijs gebaseerde hulpmiddelen voor het stoppen met roken voort te zetten. Deze moeten toegankelijker worden gemaakt. Daarom moet worden onderzocht of sommige van deze hulpmiddelen geheel of gedeeltelijk kunnen worden vergoed, met name voor sociaaleconomisch kwetsbare bevolkingsgroepen.

- De e-sigaret baart de HGR zorgen, maar dat mag de aandacht niet wegnemen van de noodzaak om ook de strijd tegen het roken van traditionele tabaksproducten verder op te voeren. Ongeveer 80 tot 90 % van de longkankers en de bijhorende mortaliteit is te wijten aan het roken van tabak, rokers hebben 20 keer meer kans op longkanker dan niet-rokers.

De risico's zijn groter naarmate men langer (aantal jaren) en meer rookt (aantal sigaretten per dag) en hoe jonger men begint. Het overgrote deel van de longkankers kan dus worden voorkomen door niet te beginnen met roken, maar ook door te stoppen met roken. Rookstopinitiatieven dienen dus verder uitgebreid en ondersteund te worden, en de beschikbaarheid en toegankelijkheid van conventionele tabaksigaretten zouden verder moeten worden beperkt .

- De HGR beveelt aan om de verkooppunten van klassieke sigaretten en alle andere niet-medische nicotinehoudende producten (inclusief e-sigaretten) sterk te beperken.

- De HGR beveelt aan om op Europees niveau te blijven werken aan een verbod op sigarettenfilters.

INHOUDSTAFEL

I. INLEIDING EN VRAAGSTELLING

Op 6 december 2024 ontving de Hoge Gezondheidsraad (HGR) een adviesaanvraag namens het DG Dier, Plant en Voeding van de FOD Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu (FOD VVVL) over het verminderen van de aantrekkelijkheid van e-sigaretten, voornamelijk over een mogelijke vermindering van de toegestane smaken/smaakstoffen, en indien een vermindering aangewezen is, hoe dit best kan worden geïmplementeerd.

Deze adviesaanvraag werd op 17 juni 2025 geherformuleerd door de minister van Sociale Zaken en Volksgezondheid, Frank Vandenbroucke. Op basis van de *Wet van 24 januari 1977 betreffende de bescherming van de gezondheid van de verbruikers op het stuk van de voedingsmiddelen en andere produkten*, wordt de HGR gevraagd in hoeverre een smaakverbod voor e-sigaretten naar Nederlands model kan bijdragen aan de bescherming van de volksgezondheid, en meer specifiek de impact van deze smaakbeperkingen op het (beginnen met) gebruik van nicotineproducten door jongeren. Sinds 1 januari 2024 is in Nederland voor e-sigaretten alleen tabakssmaak op basis van een positieve lijst van 16 toegelaten smaakstoffen toegestaan. Als de HGR concludeert dat het Nederlandse model niet de meest geschikte aanpak is, heeft de minister gevraagd om een gedetailleerd alternatief voor te stellen. Het advies werd gevraagd voor 31 oktober 2025.

In het verleden heeft de HGR zich al meerdere malen over het onderwerp e-sigaretten gebogen. De kwestie wordt echter steeds urgenter. De toenemende populariteit van vapen onder jongeren is alarmerend. Volgens de meest recente VAD Vlaamse Leerlingenbevraging (2023 - 2024)[3] onder 12- tot 18-jarigen heeft 29 % ooit e-sigaretten gebruikt, 24 % heeft dat het afgelopen jaar gedaan en 9 % doet dat minstens één keer per week. Het aandeel regelmatige gebruikers is nu meer dan vier keer zo hoog als in 2018 - 2019. De effecten van het recente verbod op wegwerpvapes en het displayverbod (beide in 2025) zijn nog onbekend. Dit advies is dan ook een aanvulling op eerdere rapporten (HGR 9549, 2022; HGR 9827, 2025) en beveelt de invoering aan van drastische beperkingen op het aantal toegestane e-vloeistofsmaken. Daarnaast worden aanvullende maatregelen voorgesteld.

Voorafgaand aan dit rapport benadrukt de HGR het belang van verdere maatregelen in de strijd tegen roken. De literatuur over roken en vapen zal de komende jaren nauwlettend in de gaten moeten worden gehouden, gezien de snelle ontwikkelingen in dit onderzoeksgebied.

[3] https://vad.be/content/uploads/2025/10/Syntheserapport-2023-2024_def_GL.pdf *(accessed on 21 October 2025).*

II. METHODOLOGIE

Na analyse van de vraag hebben het College en de voorzitters van de domeinen Geestelijke Gezondheid en Chemische Omgevingsfactoren de nodige expertises bepaald. Op basis hiervan werd een *ad hoc* werkgroep opgericht met deskundigen in de volgende disciplines: analytische chemie, toxicologie, longziekten, oncologie, kankerpreventie, kankerscreening, carcinogenese, farmacie, huisartsgeneeskunde, verslaving, psychiatrie, psychologie, tabakspreventie, stoppen met roken, communicatie. De experten van de werkgroep hebben een algemene belangenverklaring en een *ad hoc* verklaring ingevuld en de Commissie voor Deontologie heeft het potentieel risico op belangenconflicten beoordeeld.

Het advies berust op een overzicht van de wetenschappelijke literatuur, zowel uit wetenschappelijke tijdschriften als uit rapporten van nationale en internationale organisaties die in deze materie bevoegd zijn (*peer-reviewed*), alsook op het oordeel van de experten.

Na goedkeuring van het advies door de werkgroep werd het advies tenslotte gevalideerd door het College.

Sleutelwoorden en MeSH *descriptor terms*[4]

MeSH terms*	***Keywords***	**Sleutelwoorden**	***Mots clés***	***Schlüsselwörter***
Electronic Nicotine Delivery Systems	*Electronic cigarette*	Electronische sigaret	*Cigarette électronique*	*Zigarette elektronische*
Tobacco	*Tobacco*	Tabak	*Tabac*	*Tabak*
Behavior, addictive	*Addiction*	Verslaving	*Assuétude*	*Sucht*
Smoke	*Smoke*	Roken	*Fumer*	*Rauchen*
Nicotine	*Nicotine*	Nicotine	*Nicotine*	*Nikotin*
Cessation, smokeless tobacco	*Smoking cessation*	Stoppen met roken Tabaksontwenning	*Arrêt tabagisme*	*Raucherentwöhnung*
Cigarettes	*Cigarette*	Sigaret	*Cigarette*	*Zigarette*
	Vaping	Vapen	*Vapoter*	*Dampfen*

MeSH (Medical Subject Headings) is de thesaurus van de *NLM (National Library of Medicine)* met gecontroleerde trefwoorden die worden gebruikt voor het indexeren van artikelen voor PubMed*:* *http://www.ncbi.nlm.nih.gov/mesh*.

[4] De Raad wenst te verduidelijken dat de MeSH-termen en sleutelwoorden worden gebruikt voor referentiedoeleinden en een snelle definitie van de scope van het advies. Voor nadere inlichtingen kunt u het hoofdstuk "methodologie" raadplegen.

Lijst van gebruikte afkortingen (Engels)

ACGIH	*American Conference of Governmental Industrial Hygienists*
ACOS	*Asthma-COPD-Overlap Syndrome*
ALARA	*As Low As Reasonably Achievable*
BMDL	*Benchmark Dose Lower Confidence Limit*
COPD	*Chronic Obstructive Pulmonary Disease*
CI	*Confidence Interval*
CBD	*Cannabidiol*
CLP	*Classification, Labelling, Packaging*
CMR	*Carcinogenic, Mutagenic, Reprotoxic*
CT	*Computed Tomography*
DG	*Directorate-General*
DIY	*Do-It-Yourself*
DNA	*Deoxyribonucleic Acid*
ECHA	*European Chemicals Agency*
EFSA	*European Food Safety Authority*
ENDS	*Electronic Nicotine Delivery System*
EPA	*Environmental Protection Agency*
EU	*European Union*
EU-CEG	*European Union Common Entry Gate*
FARES	*Fonds des Affections Respiratoires*
FCTC	*WHO Framework Convention on Tobacco Control*
FEMA	*Federal Emergency Management Agency*
FEV1/FVC	*Forced Expiratory Volume in 1 second / Forced Vital Capacity*
FOD VVVL	Federale Overheidsdienst Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu
GC-MS	*Gas Chromatography and Mass Spectrometry*
GHS	*Globally Harmonised System*
HS GC-MS	*Headspace Gas Chromatography – Mass Spectrometry*
IARC	*International Agency for Research on Cancer*
IL-8	Interleukin-8
JECFA	*Joint FAO/WHO Expert Committee on Food Additives*
LC	*Liquid Chromatography*
MRI	*Magnetic Resonance Imaging*
MoE	*Margin of Exposure*
NOAEC	*No-Observed Adverse Effect Concentration*
NOAEL	*No-Observed Adverse Effect Level*
NRT	*Nicotine Replacement Therapy*
NVWA	Nederlandse Voedsel- en Warenautoriteit
OR	*Odds Ratio*
PG	*Propylene Glycol*
PoD	*Point of Departure*
pOR	*pooled Odds Ratio*
pRR	*pooled Relative Risk*
(Q)SAR	*(Quantitative) Structure-Activity Relationship*
REACH	*Registration, Evaluation, Authorisation and Restriction of Chemicals*
RCT	*Randomised Controlled Trial*
RD	*Royal Decree*

ROS	*Reactive Oxygen Species*
RIVM	Rijksinstituut voor Volksgezondheid en Milieu
RR	*Relative Risk*
SCHEER	*Scientific Committee on Health, Environmental and Emerging Risks*
SHC	*Superior Health Council*
THC	*Tetrahydrocannabinol*
TTC	*Threshold of Toxicological Concern*
US	*United States of America*
VAD	Vlaams Expertisecentrum Alcohol en andere Drugs
VG	*Vegetable Glycerine*
VOC	*Volatile Organic Compound*
WHO	*World Health Organization*

III. UITWERKING EN ARGUMENTATIE

1. The e-cigarette and the Belgian Superior Health Council

An e-cigarette (Electronic Nicotine Delivery System, ENDS) consists of three basic components:

- a reservoir of e-liquid (cartridge);
- an element that brings the e-liquid into vapor phase by means of heating (atomiser);
- a battery.

A large variety of e-cigarette devices exists (see amongst others Schaap et al., 2023; Petrella et al., 2025).

The e-liquid is typically a mixture of propylene glycol (PG) and (vegetable) glycerin (VG), which act as carriers of nicotine and flavourings in aerosol formation. After heating the e-liquid, the vapour comes into contact with cold air, which the user inhales through the device, and condenses into a visible white aerosol. Small amounts of water or organic solvents such as ethanol are sometimes added, as well as a whole range of possible flavouring chemicals. The range of flavours is very extensive (see e.g. Havermans et al., 2021) and often involves mixtures of different flavourings. In order to classify e-liquid flavours with a shared vocabulary, Krüsemann et al. (2019) distinguished 13 main categories (tobacco, menthol/mint, nuts, spices, coffee/tea, alcohol, other beverages, fruit, dessert, candy, other sweets, other flavours, and unflavoured), and 90 subcategories (Figure 1).

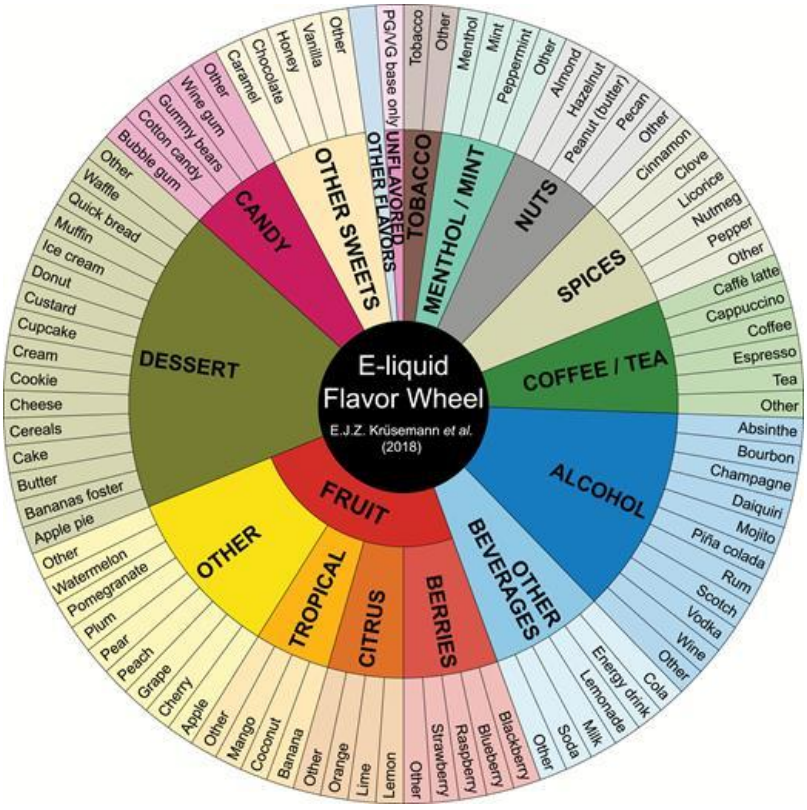

Figure 1. *Flavour wheel, proposed by Krüsemann et al. (2019: fig. 2) for the classification of e-liquid flavours. Copyright Nicotine & Tobacco Research.*

Given the increase of vaping prevalence, especially among youth and young adults, the SHC has provided recommendations on this topic in the past. An extensive advisory report was published in 2022 SHC (9549, 2022). Recently, in 2025, a brief literature overview based on SHC 9549 was updated, and warning messages were developed for inserts that need to be included in the e-cigarette packaging (SHC 9827, 2025).

The general position of the SHC on e-cigarettes, formed after a balanced discussion with experts from various disciplines, can be summarised in the first three warning messages for the package insert:

- A health life = no smoking, no vaping,

- E-cigarettes are strongly discouraged for non-smokers, especially young people and young adults (< 25 years) and pregnant women.

- E-cigarettes can be used as a possible aid for adult smokers to quit smoking, preferably under the supervision of a health professional.

However, the working group is well aware that there are many different products available on the internet. In this advice, we focus specifically on those products on the legal market that are under the control of the legislator and for which further measures can be taken. Appropriate control and enforcement must be stepped up for illegal sales. Especially since illegal e-cigarettes with tetrahydrocannabinol (THC) and even synthetic cannabinoids are also circulating among teenagers in our country [5].

2. E-cigarette flavours: regulation

The composition of e-cigarettes and e-liquids is specifically regulated by the Royal Decree of 28/10/2016 "*betreffende het fabriceren en het in de handel brengen van e-sigaretten*", which transposes Article 20 of Directive 2014/40/EU.

The liquid does not contain any of the following additives:

- vitamins or other additives that give the impression that an e-cigarette offers health benefits or poses fewer health risks. The interpretation of this provision means that the presence of CBD and vitamin E acetate, for example, is prohibited (exclusively in liquids containing nicotine);
- caffeine or taurine or other additives and stimulating chemical compounds associated with energy and vitality;
- additives that color emissions;
- additives that have CMR characteristics in unburned form.
- additives that facilitate the inhalation or absorption of nicotine

Commission Implementing Decision (EU) 2015/2183 stipulates that ingredients used in quantities exceeding 0.1 % of the final composition of the e-liquid shall not be considered confidential or a trade secret.

[5] https://www.vrt.be/vrtnws/nl/2025/04/22/drugs-vapes-synthetische-cannabis-pano-onderzoek-belgie-tieners/ (accessed on 21 October 2025).

3. E-cigarette flavours: toxicity and health effects

Note: This chapter has been partially reproduced and updated from Chapter 2 of SHC (9781, 2025). For the toxicity and effects of nicotine, we refer to this report.

The flavours used in e-cigarettes are usually made of synthetic flavouring chemicals that are allowed in food. Overall, there is not much qualitative research on the clinical effects of inhalation of flavourings via vaping and more studies are needed (Royal College of Physicians, 2024). The largest review on the possible risks of flavours concluded that flavourings may lead to health risks for the user, but that the available evidence for this remains limited for the time being. However, current data on the toxic effects of flavours in particular are mainly from *in vitro* research with limited *in vivo* experiments being performed (Livingstone-Banks et al., 2025). For most of the flavouring chemicals, evaluations are available as food flavourings via EFSA in the EU (Barhdadi et al., 2021) or FEMA in the US (Jabba & Jordt, 2019). However, this does not take into account the inhalation toxicity of these flavourings. In addition, it is not known which potential reaction products can be formed after heating and whether interaction products are formed in the mixture. The effects of all the potentially generated products are also unknown. The evaluations by the official institutions do provide the necessary information on potential CMR properties (carcinogenic, mutagenic, or toxic for reproduction) of the flavourings, as these properties are independent of the route of exposure.

Higher cytotoxic effects have been observed at higher concentrations of aromas (Hua et al., 2019; Omaiye et al., 2020). In addition, it has been found that sweet flavours in particular contain more flavouring chemicals than tobacco and menthol flavours (Czoli et al., 2019) and that creamy flavours and flavours with cinnamaldehyde in particular would pose higher risks (McNeill et al., 2022; Royal College of Physicians, 2024). According to Leigh et al. (2016), flavourings significantly affect inhalation toxicity of aerosol generated from ENDS. In this study, a strawberry-flavoured product appeared to be the most cytotoxic (followed by menthol and coffee flavours), decreasing cell viability, metabolic activity and release of cytokines in H292 human bronchial epithelial cells (Leigh et al., 2016). Flavouring chemicals such as diacetyl, 2,3-pentanedione, ethylvanillin are known to induce the production of ROS and interleukin-8 (IL-8), leading to inflammatory reactions and a negative impact on lung function (Petrella et al., 2025). Free radical formation by dipentene (racemic limonene), ethyl maltol, citral, linalool, and piperonal showed a dose-response relationship in the study by Bitzer et al. (2018), while ethylvanillin inhibited radical formation. The antipruritic effect of the flavouring menthol can lead to longer inhalation of aerosols, which can increase the retention of cytotoxic substances (Petrella et al., 2025).

In addition, attention should also be paid to the heating products of aromas (Royal College of Physicians, 2024). When studying the heating products of flavoured e-cigarettes, Khlystov & Samburova (2016) found a correlation between the formation of toxic aldehydes and the amount of flavouring compounds in e-liquids. The results of these experiments have not been confirmed since then (see e.g. Klager et al., 2017). However, the flavoured formulations tested by Gillman et al. (2020) resulted in an increase of 150 % - 200 % in acetaldehyde. Such studies should be carried out more often in order to gain more insight into the type of flavourings to which this applies. The heating of sucrose and glucose-containing liquids would also lead to the formation of the toxic furans: 5-hydroxymethylfurfural and furfural. In addition to heating products, interaction products are also possible as a result of reaction between the different chemicals in a mixture (Soussy et al., 2016). Erythropel et al. (2019) described the formation of aldehyde-propylene glycol acetal adducts formed in an e-liquid matrix with flavouring chemicals such as benzaldehyde, cinnamaldehyde,

citral, ethylvanillin and vanillin. The toxicological properties of these newly formed products should also be evaluated.

3.1. Genotoxicity/Carcinogenicity

All substances with CMR properties are prohibited in e-liquids, regardless of whether or not they are present in the aerosols. Several evaluations are already available for genotoxicity and carcinogenicity of the different flavourings, in particular the EFSA opinions. Studies show that e-liquids can contain genotoxic components such as: safrole, estragole, furylmethyl ketone, dimethylhydroxyfuranone, and pulegone (Jabba & Jordt, 2019; Barhdadi et al., 2021). For some flavourings, there are indications that they would have CMR properties or there are insufficient data to rule out genotoxicity. These should be further evaluated *a priori* (Liu et al., 2017; Barhdadi et al., 2021b; Kang et al., 2020). It should be noted that there are several weights of evidence for the data used to evaluate whether a chemical can be considered CMR. There is the (harmonized) CLP labelling (classification, labelling and packaging), IARC classification, individual experimental results, etc.

The literature on genotoxic properties of the e-cigarette liquids is rather limited. The study by Tommassi et al. (2017) found no significant increase in the number of mutations in mouse or human cells *in vitro* after exposure to e-cigarette vapour. The increased expression of enzymes activating procarcinogens to carcinogens was observed in human keratinocytes *in vitro* by Sun et al. (2019) and *in vivo* in rats by Canistro et al. (2017). DNA adduct formation by flavouring chemicals was predicted by *in silico* research by Kang et al. (2020). Oxidative stress after exposure to e-cigarette aerosols was observed in mice and is reported in cells of the head, neck, and mouth in humans (Platel et al., 2022; Wilson et al., 2022). Induction of DNA repair enzymes was observed in mice *in vivo* and in human cells *in vitro* (Lee et al., 2018). DNA breaks or other forms of DNA damage were detected on mammalian and human cells *in vitro* (Holliday et al., 2016; Lee et al., 2018) and *in vivo* in animals by Canistro et al. (2017), Platel et al. (2022) and Espinoza-Derout et al. (2022) and in Human Mouth Cells by Cheng et al. (2022). Mutations were observed in mice *in vivo* by Espinoza-Derout et al. (2022) and Platel et al. (2022) and *in vivo* in rats by Canistro et al. (2017). An increase in the number of micronuclei was observed in rats *in vivo* (Canistro et al., 2017). Tommassi et al. (2023) demonstrated a dose-dependent formation of DNA Damage in oral cells from vapers who had never smoked tobacco cigarettes. Moreover, users of sweet-, mint or menthol-, and fruit-flavoured e-liquids showed the highest levels of DNA damage, compared to nonusers. In summary, it is clear that compounds of e-cigarettes can have genotoxic effects, but we do not know to what extent these effects may occur in e-cigarette users.

To date, most studies have not shown a significant association between e-cigarette use and lung cancer (Petrella et al., 2025; Kundu et al., 2025). However, there is substantial evidence that exposure to the e-cigarette is associated with biomarkers related to cancer risk, such as DNA damage and oxidative stress (Allbright et al., 2024; Kundu et al., 2025). The *Scientific Committee on Health, Environmental and Emerging Risks* (SCHEER, 2021) assessed the evidence for carcinogenic effects in the respiratory tract from long-term, cumulative exposure to nitrosamines, acetaldehyde and formaldehyde as weak to moderate. However, in 2025 , after a qualitative risk assessment, the Clinical Oncology Society of Australia made the following assessment: "*Nicotine-based e-cigarettes are likely to be carcinogenic to humans who use them. E-cigarettes are likely to cause lung cancer and oral cancer*" (Stewart, 2025). Given that many experimental studies have shown oxidative stress, inflammation and genotoxicity (see above) and given the long

latency time for the development of lung cancer (often longer than the time in which the e-cigarette has been used to date), this should be further followed up in the future in qualitative, longitudinal epidemiological research. At the moment, preliminary reports from a Korean cohort study found a significant association between smokers who switched to the e-cigarette and a higher risk of lung cancer and associated mortality. This effect was more pronounced in high-risk individuals for whom it is likely recommended to participate in low-dose CT screenings) (Kim et al., 2024). Besides, several preclinical studies have reported that acute exposure to vaping may accelerate the progression of some cancers (e.g., brain tumors, bladder cancer, oral squamous cell carcinoma) (Petrella et al., 2025).

3.2. Inhalation toxicity

Special attention should be paid to the toxicity of flavourings by inhalation and especially to their toxicity on the lung epithelium. It should be noted that exposure limits of different substances set for e.g. occupational exposure should not be directly compared with the inhalation of chemicals through the use of the e-cigarette, as the exposure pattern is different (Hubbs et al., 2015), and heating takes place.

The most well-known example of flavourings that are safe for oral use but cause inhalation toxicity are the diketones: diacetyl and acetylpropionyl. Diacetyl is known to cause bronchiolitis obliterans or "*popcorn lung*" when inhaled (Cao et al., 2020). Furthermore, dose-dependent *in vitro* neurotoxic effects have been observed with both compounds (Das & Smid, 2019). E-cigarette menthol flavouring is associated with decreased lung function (reduced FEV1 % predicted and FEV1/FVC independent of age, gender, race, pack-years of smoking, and use of nicotine or cannabis-containing vaping products) in combustion cigarette smokers (Chandra et al., 2023). Another much-discussed flavouring is cinnamaldehyde. This flavouring chemical was found to be cytotoxic in several *in vitro* experiments. In addition, it would suppress the ciliary motility of the bronchial epithelial cells and therefore increase the risk of respiratory infections (Clapp et al., 2017, 2019). Other examples described in the literature are benzyl alcohol, benzylaldehyde, vanillin, banana oil, 3-hexen-1-ol acetate, 4-methyl-2-phenyl-1,3-dioxolane, 5-heptyldihydro-2(3H)-furanone, 2-propenyl ester hexanoic acid and benzaldehyde propylene glycol acetal (Czoli et al., 2019; Girvalaki et al., 2018). These flavouring substances were also found in e-liquids and contain an indication that inhalation of these aromas would be toxic. The inhalation toxicity was indicated by, in the best case, a harmonised GHS classification (Globally Harmonised System) or, in doubtful cases, by self-notified GHS classification.

In addition to irritation in the upper respiratory tract (see e.g. SCHEER, 2021), vaping has been shown to worsen or increase the likelihood of certain respiratory diseases. Passive exposure to nicotine-containing vape aerosols with different flavouring chemicals is not harmless. In young adults, it is associated with an increased risk of bronchitis-like symptoms and shortness of breath (Islam et al., 2022). Vaping is associated with an increased risk of COPD. A short-term study found that mice exposed to nicotine-containing e-cigarette aerosols were more likely to experience symptoms associated with the onset of COPD than mice that were not exposed (Garcia-Arcos et al., 2016). A large cross-sectional study in 2019 found that e-cigarette use in humans was associated with an odds ratio (OR) of 1.75 (95 % CI: 1,25 - 2,45) on chronic bronchitis, emphysema or COPD (all three) compared to people who had never used e-cigarettes. The OR even increased to 2.64 (95 % CI: 1,43 - 4,89) among daily e-cigarette users (Osei et al., 2020). Another study showed similar results: compared to people who never use e-cigarettes, e-cigarette users had a

significantly increased OR of asthma-COPD-overlap syndrome (ACOS), asthma and COPD (ORs 2.27, 1.26, 1.44, respectively) (Bircan et al., 2021). In 2025, two more meta-analyses were published showing that e-cigarette users have a higher risk of developing COPD, compared to people who do not smoke or vape. The stratified analyses by Song et al. (2025) of cross-sectional studies only (pOR = 1.55, 95 % CI: 1.26 - 1.84) and of prospective cohort studies only (pRR = 1.52, 95 % CI: 0.98-2.06) showed that e-cigarette users are significantly more likely to develop COPD. The meta-analysis by Malvi et al. (2025) distinguished between patterns of use over time. The pooled OR for current users of nicotine-containing e-cigarettes and COPD risk was 1.488 (95 % CI: 1.363 - 1.623), 1.839 for former users (95 % CI: 1.513 - 2.234) and 1.787 (95 % CI: 1.421 - 2.247) for people who have ever used an e-cigarette. Given the corrections made for tobacco use in the various selected studies, these results underline that nicotine-containing vapes contribute to the risk of COPD, regardless of tobacco use. Unfortunately, specific studies for vapes without nicotine seem to be lacking. Compared to the risk of COPD when smoking cigarettes, the risk of COPD with the e-cigarette is lower. In addition, dual use seems to be even riskier: in the study of Glantz et al. (2024), pooled odds ratios for dual use versus cigarettes were increased for all outcomes (range 1.20 to 1.41 for cardiovascular disease, stroke, metabolic dysfunction, asthma, COPD, oral disease).

For more information on the pulmonary effects of vaping (pulmonary cytotoxicity, lung inflammation, anti-pathogen immune response, mucociliary function, oxidative stress and DNA damage, matrix remodeling and emphysema, airway hyperresponsiveness, other lung diseases), we refer the reader to the extensive review by Allbright et al. (2024). Concerning flavours, it was concluded by these authors that cinnamon, tobacco, and mint/menthol flavourings enhance cytotoxicity and induce lung inflammation compared with other flavourings and the absence of flavourings (Allbright et al., 2024):

- cinnamon flavourings (especially cinnamaldehyde) impair anti-pathogen immune responses, reduce mucociliary clearance, and enhance oxidative stress.
- (some) tobacco flavourings induce oxidative stress, airway hyperresponsiveness, and DNA damage.
- mint/menthol flavourings have been associated with increased DNA damage.

3.3. (Cardio)vascular effects

While (cardio)vascular effects linked to nicotine in cigarettes and e-cigarettes are well known (see e.g. Whitehead et al., 2021; McNeill et al., 2022; SCHEER, 2022), there are far fewer studies available on the effects of the flavourings in the e-cigarette itself. An experimental study with MRI images showed acute, adverse effects on endothelial function in healthy non-smokers after inhaling the aerosol of nicotine-free e-cigarettes (Caporale et al., 2019). However, further studies are needed on possible long-term effects (Caporale et al., 2019; McNeill et al., 2022).

3.4. Respiratory sensitisation

"Respiratory sensitisation" is a toxicological endpoint that is currently not being given much attention in e-cigarette research. Nevertheless, cases of allergic reactions were reported after using the e-cigarette (Clapp et al., 2017, 2019). Skin sensitisation, also known as type IV delayed cell-mediated hypersensitivity, would also play a role in exposure to flavours in e-cigarettes. There is already a series of well-known fragrances, used in cosmetics, which are known for their allergenic properties. It is being investigated whether these substances can also induce a sensitisation

process through inhalation. A study by the Dutch National Institute for Public Health and the Environment (RIVM) has shown that iso-eugenol can indeed lead to negative effects in the respiratory system via inhalation (Ter Burg et al., 2014). However, it is unclear whether this applies to all allergenic fragrances (Basketter & Kimber, 2015). In addition to allergenic fragrances, there are other chemicals that have been found in e-liquids with a GHS classification for respiratory sensitisers (H334) such as methyl cyclopentalone and α-ionone (Girvalaki et al., 2018).

4. The evaluation of flavours: difficulties

4.1. Should we evaluate flavours or the flavouring chemicals used to create flavours?

E-cigarette consumers choose the flavours they prefer. The number of flavours is particularly large: nearly 20 000 e-liquids with 250 unique flavour descriptions were identified on the Dutch market in 2017 (Havermans et al., 2021), while more than 7 000 e-liquid flavours exist (Zhu et al., 2014). In general, e-liquid flavours can be divided into 13 main categories and 90 subcategories (Krüsemann et al., 2019) (Figure 1). Therefore, national legislators may want to intervene at this “macro” level. However, the toxicity of a certain flavour is the result of the toxicity of the various chemical flavouring substances in the e-liquid mixture, both individually and cumulatively (where additivity, synergism, or antagonism may occur).

Another disadvantage of regulations on “flavour level” is that the chemical composition of different brands is not necessarily consistent for a particular flavour. Both the mixture of flavouring substances can vary, as well as their respective concentrations. The fact that ingredients present in quantities below 0.1 % can be kept confidential or considered trade secrets (following Commission Implementing Decision (EU) 2015/2183) makes their characterisation and risk assessment increasingly complex. Substances with such low concentrations can still pose risks, depending on their toxicological profile, exposure type, and potential reactions after heating. Furthermore, when herbal extracts are used, their composition is by definition uneven and variable over time.

The chemical analysis of e-cigarette exposure is complex: aerosol analysis uses techniques like headspace static extraction and gas chromatography coupled with mass spectrometry (GC-MS), and liquid analysis uses liquid-liquid extraction techniques and liquid chromatography (LC) systems (Toledo et al., 2025). Using a headspace gas chromatography-mass spectrometry method (HS GC-MS), Barhdadi (2020) identified 807 flavouring substances in 129 liquids purchased on the Belgian market.

It can be deducted from this that the national legislator may act in two phases. On the macro level of the flavours, the decision on whether or not to allow a flavour (e.g. tobacco in the Netherlands) can be based on figures relating to attractiveness, addiction risk, importance for potential smoking cessation and, if applicable, general toxicological assessments. Subsequently, on the micro level of the individual flavouring substances, a positive list of permitted flavourings can be compiled to “create” the permitted flavour. In the Netherlands, the RIVM has outlined a strategy for this purpose (Pennings et al., 2024).

An alternative regulatory approach would be the option for national legislators to prohibit individual substances with a negative list, a mechanism that is particularly effective when new toxicological evidence becomes available. Research initiatives examining the chemical composition of e-liquids

and identifying hazardous constituents are of substantial scientific value and may yield important public health benefits. However, the present regulatory framework—whereby the inhalation toxicity of many substances currently on the market has not been adequately characterised— does not align with the principles applied in comparable chemical legislation. By way of comparison, under the European REACH regulation, manufacturers producing chemical substances in quantities exceeding one tonne per year are required to submit a comprehensive dossier, supported by high-quality scientific evidence, demonstrating that the substance satisfies safety requirements for both human health and the environment under its intended conditions of use, prior to market entry. This logic is definitely not being followed in practice today by e-cigarettes on the market, where uncertainty about the toxicity and safety of the many substances remains high, and increasing scientific evidence points to health risks (see Chapter 3).

4.2. Toxicological evaluations: a time consuming process with multiple potential endpoints and research strategies

The toxicological evaluation of e-liquid flavours and different flavouring chemicals in these flavours is a time consuming process, combining *in vivo*, *in vitro*, and *in silico* data. The results are often not binary and open to interpretation. For example, there are many different *in vitro* tests available for genotoxicity of chemical substances (e.g. Ames, comet, micronucleus), and not every substance reacts positively in each test. Given the significant amount of flavours on the market (> 7 000), Barhdadi et al. (2021) developed a prioritisation strategy to identify potentially genotoxic flavourings:

1) Identification of the chemical substances present in the e-liquids via GC-MS screening.
2) Prediction of the genotoxic potential of the substances using two complementary (quantitative) structure-activity relationship (or (Q)SAR) *in silico* models;
3) Collection of existing *in vitro* and *in vivo* genotoxicity data from public literature sources (harmonized CLP classification, opinions by EFSA via the OpenFoodTox database and by the Scientific Committee on Consumer Safety, ECHA);
4) *In vitro* genotoxicity testing on a selection of commercially available flavourings.

⇨ Based on all collected information, flavourings of high concern were identified.

The study of Barhdadi et al. (2021) shows that a full evaluation of flavourings is a complex, time consuming process that requires the use multiple techniques and the integration of a lot of scientific data. In addition, besides genotoxicity, there are numerous other health endpoints that can be evaluated, from the cellular level to the highest levels: e.g. cytotoxicity, ROS formation, irritation, pulmonary inflammation, lung function, endocrine disruption, immune responses. For the legislator, the question then arises: which endpoints (apart from CMR properties, which must lead to exclusion in any case) should be used to classify substances for a ban in e-liquids, and how much evidence is needed to justify legislative action? The precautionary principle is essential here, especially if insufficient toxicological data is available to demonstrate safety.

4.3. Hazard, exposure and risk assessment in the context of e-cigarettes

Every chemical substance has its intrinsic hazards. However, the risk formed by a substance is the product of its hazard and the degree of exposure within a given period. To perform a risk assessment, the exposure can be evaluated with existing health-based exposure limit values for inhalation, derived by (inter)national scientific institutes and health authorities. There is a double

difficulty in performing risk assessments of e-cigarettes: sufficient knowledge on hazard and exposure is not available for every substance to establish a consolidated limit value, while exposure cannot be simulated unambiguously due to factors such as variation between individuals (different puffing patterns; safety/uncertainty factors are applied for this purpose), devices and e-liquids.

Klager et al. (2017) studied aldehydes in the aerosols of 24 e-cigarette flavours. Exposure was simulated by connecting the e-cigarettes to a pump drawing air for 2 second puffs with 30 second intervals between each puff. For formaldehyde, a known IARC Group 1 carcinogen, the median concentration (626 µg/m³) in the e-cigarette vapour exceeded the American Conference of Governmental Industrial Hygienists (ACGIH) maximum concentration for workers (370 µg/m³). Hence, health risks could not be excluded.

Three years later, Barhdadi (2020) performed a risk assessment for the inhalation of diacetyl.
For local inhalation toxicity, the concentration in the aerosol was estimated to calculate the maximum alveolar concentration to which the respiratory tract is exposed after inhalation. A point of departure (PoD) was determined based on the NOAEC. The risk was calculated by the Margin of Exposure (MoE), which must be higher or equal than the default value 100 (assessment factor 10 for intra-species differences, and another 10 for inter-species extrapolation). The MoE is the ratio between the dose or concentration obtained from animal studies at which no harmful effect was observed (NOAEL/NOAEC, BMDL) and the estimated exposure level for humans (calculated using the exposure scenarios). It was concluded that a risk for local lung toxicity, being lung tissue lesions associated with chronic pulmonary bronchiolitis obliterans, could not be excluded in case of repeated exposure to diacetyl through e-cigarette use. Besides, a similar MoE-based assessment showed no risk for systemic toxicity related to diacetyl vapours.

The Dutch RIVM evaluated the safety of 23 of flavouring chemicals that can be used in e-liquids to make them taste like tobacco (RIVM, 2022; Pennings et al., 2024). For substances where a point of departure (PoD) could be determined, the risk assessment calculated a Margin of Exposure (MoE), with 4 different exposure scenarios. If not sufficient information was available to determine a PoD, the threshold of toxicological concern approach was used (TTC). Chemicals were removed from the list (1) if a substance has CMR toxic properties or properties that did not allow determination of a safe level of exposure; (2) if the calculated MoE for a substance was lower for one or more exposure scenarios than the minimum MoE that was considered; and (3) if the TTC approach resulted in a possible concern for a substance (RIVM, 2022; Pennings et al., 2024). A total of 7 chemicals was excluded, resulting in a ‘positive list’ of 16 substances.

A drawback in the current risk assessment process, is that it generally focuses on one single substance, which ignores the actual combined exposure to different substances at once. Certain chemicals may interact, potentially resulting in antagonistic, additive and synergistic effects. This is particularly relevant for substances with a similar mode of action. Unfortunately, the latter is often insufficiently known for each substance in a mixture. Reliable and reproduceable Cumulative Risk Assessments are therefore highly needed, but are not currently available for e-cigarettes (and many other situations). In addition, the SHC also aware of the issue of low-dose effects (SHC 8915, 2013; SHC 9404, 2019). The significance of this for the diversity of e-liquids and flavourings is currently unknown, but cannot be ruled out *a priori*. Another major drawback is that the risk assessment process does not account for chemical degradation of the e-liquid substances due to heating.

5. Flavour attractiveness and e-cigarette addiction among young persons

The most important motivators for youth to start vaping are curiosity, the desire for social acceptance, a predisposition for taking risks, peer influence and sibling modelling (Petrella et al., 2025). In the most recent Flemish Pupil Survey (VAD-Vlaamse Leerlingenbevraging, 2023 - 2024[6]), curiosity was (one of) the reason(s) for starting to use e-cigarettes among 80.9 % of the pupils who have ever vaped. Flavours attract both young persons and adults to use e-cigarettes, but their appeal is especially relevant for young people. They may increase the product appeal, willingness to use e-cigarettes, susceptibility to use and initiation, and may decrease the harm perception on vaping products (Meernik et al., 2019; Petrella et al., 2025; Livingstone-Banks et al., 2025).

With the introduction of "trendy" and "cool" flavours such as popcorn, bubble gum and candyfloss, the tobacco and vape industry is specifically trying to reach young people with its addictive products. According to the systematic review of Meernik et al. (2019), banning non-menthol flavours in e-cigarettes may reduce e-cigarette use among young persons. It was stated that youth prefer non-tobacco-flavoured e-cigarette flavours, especially sweet flavours like fruit and candy, which was also described by Harrell et al. (2016) in Texas. Concerning fruit and candy flavours, Romijnders et al. (2018) concluded that these specific flavours are considered less harmful than other (tobacco) flavours among both youth and adult scenarios.

Among 1 549 young people (13 - 18 years) in the US who ever tried ENDS, Groom et al. (2020) found that flavour is one of the primary reasons for experimentation with ENDS among youth, while fruit flavour is strongly associated with the use of ENDS as the first tobacco product. These authors recommended to stop the sale of all e-cigarette flavours other than tobacco, a similar recommendation was made in a Dutch study by Krüsemann et al. (2021). In the latter study, it was found that that sweet- and minty-flavoured e-liquids are liked equally by young nonsmokers and adult smokers, and more than tobacco flavours.

In a consumption study among vaping youth in Canada, England, New Zealand and the USA, young people who use fruit flavours reported the highest e-liquid consumption, while some evidence exists of higher consumption levels for sweet/drinks/other flavours (Gomes et al., 2025). Also in a recent study on 598 e-cigarettes confiscated from public and private high schools in Australia, it was found that students prefer fruity flavours with high concentrations of nicotine. Worryingly, most of them contained the coolant WS-23, which was potentially added to reduce throat irritation from nicotine and other chemicals (Jenkins et al., 2025).

In a 2023 study by the Belgian Cancer Foundation (*Stichting tegen Kanker*)[7] on vaping among Belgian youth, both 15- to 20-year-olds (n=682), teaching staff (n=258) and parents of 12- to 20-year-old children (n=1097) were surveyed. The results showed that 38 % of 15- to 20-year-olds had used an e-cigarette at least once, and 16 % said they currently used them. Young people also had a different attitude towards e-cigarettes than older people: 33 % of 15- to 20-year-olds who smoke said they had used an e-cigarette at least once, compared to only 4 % of older respondents. For those over 20, vaping was a way to quit smoking for almost 9 out of 10 (88 %). Among young people aged 15 to 20, this was only 1 in 5 (20 %), indicating that vaping is a practice in itself for the youngest generation. Among the 15- to 20-year-olds and vapers, the pleasant taste, together with

[6] https://vad.be/content/uploads/2025/10/Syntheserapport-2023-2024_def_GL.pdf (accessed on 21 October 2025).
[7] https://cancer.be/wp-content/uploads/2024/01/stichting_tegen_kanker_-_rapport_jongeren_en_vapen_2023_-_nl_voor_publicatie.pdf (accessed on 21 October 2025).

stress relief and relaxation, are the most important reasons to use e-cigarettes, compared to older people and persons who do not vape. 38 % of the 15- to 20-year-old vapers indicated that they had started vaping out of curiosity about new flavours (compared to 32 % of the respondents), while 26 % indicated that they might stop vaping if their favourite flavour were no longer available. The fact that there are always new flavours to discover is also a significantly more important reason for young people and vapers to use than for older people and those who do not vape. In addition, peer pressure ("*my friends do it too*") and the feeling that using together creates a bond are also more important in the youngest age category, compared to older vapers. The fact that products are easy to obtain is also more of a reason for 15- to 20-year-olds compared to older people. According to the 2023 survey, fruit flavours are the most popular, but this is even more pronounced among people aged 15 - 20 (Figures 2 - 3). Berry flavours (59 %), tropical fruit flavours (36 %) and other fruit flavours (38 %; with watermelon being the most popular) are particularly popular among 15 - 20-year-olds. Candy flavours are also preferred by 16 %.

A recent study by "*Kom op tegen Kanker*"[8] in 2024 among 12 - 26 years olds states that curiosity is the main motivator to try smoking (61 %, n=894) or vaping (58 %, n=1294). When thinking back to the first moment of use, "'*It seemed tasty*" scored noticeably higher with e-cigarettes than with traditional tobacco products (35 % versus 16 %). This is not surprising, because while traditional tobacco products only have tobacco flavour, vapes offer an almost endless range of flavours. "*I was curious about the different flavours*" was answered by 36 % of respondents. Just like with smoking, destressing (43 %) and calming down (43 %) are important motivators to continue vaping. The pleasant taste (42 %) and the variety of flavours (28 %) were additional reasons for young people to use e-cigarettes (n=656). One in three also regarded vaping as a moment for themselves (31 %), a habit (27 %), and something that friends also do (28 %).
In 2024, the *Fonds des Affections Respiratoires* (FARES) conducted its second survey[9] on vaping among 293 young people aged 11 to 24. The results show growing popularity: 92 % of the young people surveyed said they were familiar with vaping, which is a clear increase from the 65 % recorded in the first survey in 2022. This growing popularity is also reflected in an increase in use, with 39 % of young people saying they used e-cigarettes in 2024, compared to 24 % in 2022. The main motivations for consumption are varied tastes (75 %), followed by nicotine (10 %) and the feeling of relaxation (9 %). 49.2 % of young people said they used it primarily because of the flavours. As for the most popular flavours, 61 % said they preferred fruity flavours, 10 % candy flavours, 9 % menthol flavours, and 8 % flavours associated with beverages (cola, lemonade, energy drinks, etc.).

Overall, it can be concluded that flavours are an important reason for the appeal of e-cigarettes among adolescents and young people.

[8] https://www.komoptegenkanker.be/sites/default/files/media/2024-07/Rapport%20_%20jongeren_en_vapen_juli_2024.pdf (accessed on 21 October 2025).
[9] https://www.aideauxfumeurs.be/la-puff-une-cigarette-electronique-qui-seduit-toujours-les-jeunes/ (accessed on 21 October 2025).

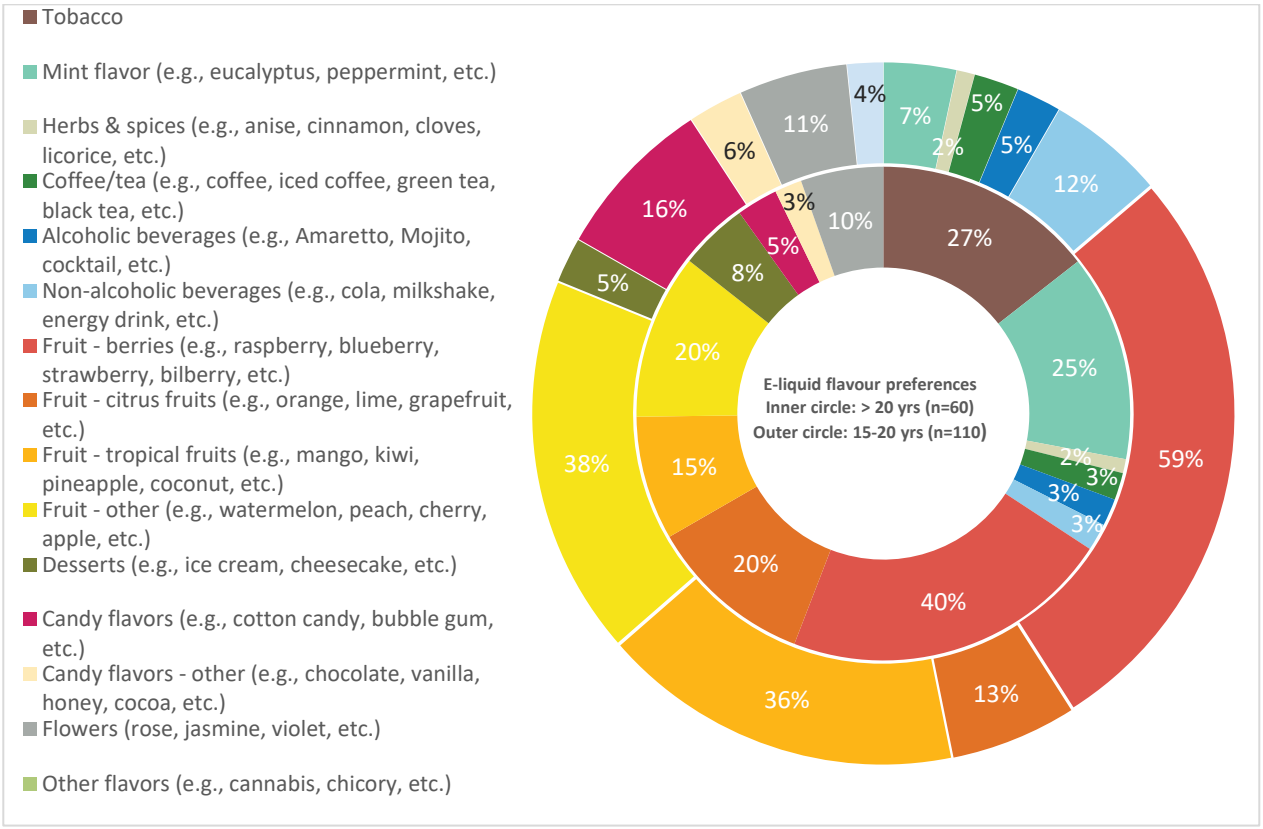

Figure 2. *Preferences for e-liquid flavours among people aged 15–20 (outer circle) and those aged over 20 (inner circle). Based on the question: "Which three flavours do you prefer to use in your e-cigarette?". Source: Stichting tegen Kanker, Indiville survey (2023)*[10].

[10] https://cancer.be/wp-content/uploads/2024/01/stichting_tegen_kanker_-_rapport_jongeren_en_vapen_2023_-_nl_voor_publicatie.pdf (accessed on 21 October 2025).

Figure 3. *Preferences for e-liquid flavours among people aged 15 – 20 (above) and those aged over 20 (below). Based on the question: "Which specific flavours do you use the most in your e-cigarettes?". Source: Stichting tegen Kanker, Indiville survey (2023).*

6. Flavour attractiveness and tobacco smoking cessation

According to the Cochrane Review of Lindson et al. (2025a), high-certainty evidence exists that e-cigarettes with nicotine increase quit rates compared to for example nicotine replacement therapy (NRT). It was found that out of every 100 people using nicotine e-cigarettes to quit smoking, 8 - 10 might successfully stop, compared with 6 of 100 people using NRT, 7 of 100 using non-nicotine e-cigarettes, and 4 of 100 having no support or behavioural support only (Lindson et al., 2025a). In practice, according to the health survey of Sciensano in Belgium (2023 - 2024)[11], 36.0 % of daily Belgian smokers tried to quit smoking in the year before the survey. Of this group, 23.7 % used e-cigarettes, while 58.5 % did not use any aids, and 12.2 % used nicotine replacement therapies (NRT). Only 2.3 % consulted a doctor. It is preferable that the use of e-cigarettes for smoking cessation takes place under the supervision of a health professional. Given the relative success of e-cigarettes as a smoking cessation tool and their growing popularity as a smoking cessation aid among (daily) smokers in Belgium, it is also important to consider the relative importance of flavours to this group of users.

According to the systematic review of Meernik et al. (2019), non-menthol flavours increase appeal, enjoyment and are the main reason many adults want to use e-cigarettes. The evidence on whether non-menthol-flavoured e-cigarettes promote or disrupt cessation among adult smokers remained

[11] https://www.sciensano.be/sites/default/files/ta_report_2023_nl.pdf (accessed on 21 October 2025).

unclear (Meernik et al., 2019). According to the RIVM factsheet (RIVM, 2021), smokers are particularly interested in trying e-cigarettes with a tobacco or menthol/mint flavour. People who have never smoked or vaped before mainly prefer sweet and menthol/mint flavours. Smoking adults find e-liquids with sweet flavours and e-liquids with menthol/mint flavours just as tasty as non-smoking young people (up to 18 years old) and young adults (20 - 15 years old). They also all find these sweet and minty flavours much tastier than tobacco flavours. In the 2023 survey of *Stichting tegen Kanker*, berry flavours are also the most popular (40 %) among vapers aged > 20, followed by tobacco flavour (27 %) and mint/menthol flavours (25 %) (Figures 2 - 3). The biggest difference with the 15 - 20 year olds who were surveyed is the proportion of tobacco and mint flavours among the older group.

It can be noted that the results from the 2023 *Stichting tegen Kanker* survey do not necessarily say anything about the flavours used by people who have successfully quit smoking by using e-cigarettes as temporary smoking cessation tool. Reliable data on this subject appears to be scarce in the scientific literature, and the available behavioural studies are often industry funded. A study by Russell et al. (2019), funded by an e-cigarette company, found that users of non-tobacco flavours were 30 % more likely to report smoking abstinence during the past 30 days compared to users of tobacco flavour. In the largest cross-sectional survey ever performed on patterns of flavoured e-cigarette use among adult vapers in the US (n=69,233), fruit and dessert/pastry/bakery flavours were considered particularly important among those who formerly smoked in their effort to quit smoking and to prevent relapse to smoking (Farsalinos et al., 2023). Tobacco flavours were only used by a minority of the study participants. Unfortunately, also in this study, some authors declared competing interests, including industry funding for behavioural research during the past three years. As a result, the evidence remains unreliable.

A systematic review by Lindson et al. (2023) concluded that there does not appear to be a clear association between e-cigarette flavours and smoking cessation or longer-term e-cigarette use, possibly due to a paucity of data. However, evidence exists that people using e-sigarettes to quit smoking switch between e-cigarette flavours. Similar findings were reported in the systematic review of Liber et al. (2023). These authors state that the evidence about the role of different flavored ENDS use and smoking cessation outcomes is inconclusive, reflecting highly heterogeneous study definitions and methodological limitations (Liber et al., 2023). The review by Lindson et al. (2023) was updated in 2024: Lindson et al. (2025b) concluded that smokers using e-cigarettes to quit smoking generally prefer sweet flavours, but preferences depend on the context. Based on intervention studies, no clear association was found between the use of e-cigarette flavours and smoking cessation or longer-term use of e-cigarettes (Lindson et al., 2025b). In an overview of systematic reviews, Livingstone-Banks et al. (2025) concluded that the impacts of e-cigarette flavours on e-cigarette and cigarette use are inconclusive.

7. The Dutch model

7.1. Outline

Based on scientific research into e-cigarettes and the factors that contribute to their appeal, the Dutch government has concluded that regulating e-cigarette flavours could reduce the appeal of e-cigarettes to young people. Therefore, the Netherlands banned selling e-liquids or vapes with flavours other than tobacco flavour on 1 January 2024. One year later, the packaging of vapes or e-liquids may no longer contain any reference to flavour, including the word “tobacco”.

In order to implement the flavour ban, a positive “limitative” list was created with flavouring substances necessary to compose e-liquids with tobacco flavour. The methodology followed by the RIVM to create this positive list is outlined by Pennings et al. (2024). E-liquid ingredient data was extracted from the European Common Entry Gate (EU-CEG) System, a database in which manufacturers/importers need to provide information about the composition and properties of tobacco and related products marketed in the EU. Only the set of flavourings used in tobacco flavours was selected (n=503). A restrictive list was compiled based on five selection criteria:

1) The flavouring must be prevalent in more than 0.5 % of all tobacco-flavoured e-liquids.
2) The flavouring must be used more frequently (higher %) in e-liquids with tobacco flavour compared with all e-liquids.
3) Flavourings that are mixtures defined as a distillation or extraction product from plant material are excluded, given the inconsistent composition of such mixtures, rendering monitoring difficult.
4) Flavourings associated with tobacco flavour were selected.
    - A. Flavourings with a flavour description containing the word ‘tobacco’ or related terms like “roll-your-own” were added to the proposed list, based on the descriptions in the Leffingwell database.
    - B. Flavourings (not added in A.) with a flavour description with one of the following words were excluded: “sweet”, “honey”, “vanilla”, “caramel”, “chocolate”, “fruit(y)”, “butter(y)”, “popcorn”. Also derived words or fruit types were excluded.
    - C. For the flavourings not added in A. or excluded in B., it was determined if their flavour is part of tobacco aroma or whether they are present in tobacco or smoke. All remaining flavourings were excluded.
5) Health Risk Assessment. Flavourings with health hazards known from public databases (IARC, ECHA, US EPA, JECFA) were excluded.
    - A. Exposure: four exposure scenarios were defined from low to high exposure, for the median and maximum concentrations found for the 23 selected flavourings. For a person of 70 kg, the systemic dose was calculated, assuming that 70 % of the inhaled dose reaches the alveoli, and is totally absorbed there.
    - B. Hazard: substances with CMR properties were excluded. For non-CMR substances, dose-response information was collected (preferentially from inhalation studies) to determine a PoD, after which a MoE was derived. For substances with insufficient information to determine a PoD, the threshold of toxicological concern (TTC) approach was used.
    - C. Risk Assessment: Exposure was compared with hazard.

This finally resulted in a restrictive list of 16 substances (Pennings et al., 2024; Table 1).

Table 1. *The Dutch positive list of allowed flavourings for tobacco-flavoured e-liquids, compiled by the RIVM (Pennings et al., 2024: table 2).*

CAS No	Flavouring name	Flavour description	Association with tobacco
35044-68-9	beta-Damascone	Complex odour of blackcurrant, plum, rose, honey and **tobacco**	Tobacco-like flavour
23726-91-2	(E)-beta-Damascone	Complex odour of blackcurrant, plum, rose, honey and **tobacco**	Tobacco-like flavour
23726-92-3	(Z)-beta-Damascone	Complex odour of blackcurrant, plum, rose, honey and **tobacco**	Tobacco-like flavour
23696-85-7	Damascenone	Fruity floral with apple-plum-raisin-prune, tea, rose, **tobacco notes**	Tobacco-like flavour
23726-93-4	(E)-beta-Damascenone	Fruity floral with apple-plum-raisin-prune, tea, rose, **tobacco notes**	Tobacco-like flavour
1125-21-9	Ketoisophorone	**Tobacco-like**, hay straw, tea notes, honey	Tobacco-like flavour
4883-60-7	2-Hydroxy-3,5,5-trimethyl-2-cyclohexenone	Sweet, musty tea, caramellic odour; musty, tea, nutty, **tobacco taste**	Tobacco-like flavour
536-78-7	3-Ethylpyridine	Strong **tobacco**, roasted, nutty, smoky notes odour; **tobacco-like flavour**	Tobacco-like flavour
350-03-8	3-Acetylpyridine	Strong, burnt roasted, nutty, **cigar tobacco-like**	Tobacco-like flavour
91-10-1	2,6-Dimethoxyphenol	Phenolic-**woody**-medicinal, smoky odour; a tarry, spicy, **smoky** (bacon) taste	Attribute of tobacco aroma
67-47-0	5-(Hydroxymethyl)-2-furfural	Herbaceous winey hay-like odour, sweet herbaceous hay and **tobacco-like** taste	Tobacco-like flavour
591-12-8	alpha-Angelica lactone	Sweet, bread, molasses, coumarin, **tobacco odour**; nut-like taste	Tobacco-like flavour
503-74-2	Isovaleric acid	Very sour, 'sweaty', **cheesy**, odour; fruity on dilution	Attribute of tobacco aroma
1139-30-6	(–)-Caryophyllene oxide	Dry, woody, faint cedar, **tobacco-like notes**	Tobacco-like flavour
3738-00-9	Ambroxide	Intense velvety ambergris notes	Present in tobacco smoke
564-20-5	(3aR)-(+)-Sclareolide	Cedary; **impact compound of certain tobaccos**; fish and berry flavour improver	Tobacco-like flavour

Terms associated with tobacco or tobacco smoke are indicated in bold.

7.2. Effects and perspectives

In a first press communication on the effects of the flavour ban (19/03/2025), a survey by the Dutch RIVM[12] among ca. 500 adolescents and young adults and 450 adults about their e-cigarette use showed 40 % of the respondents reduced their e-cigarette use, while 22 % indicated that they had completely stopped vaping. Daily use of vapes in these groups dropped from 29 to 18 %. Weekly use dropped from 30 to 14 % and monthly use from 42 to 16 %. The unintended side effects of the flavour ban were also investigated by the RIVM: purchase of flavours through the illegal market or people switching to other harmful products. Most consumers who quit because of the ban did not switch to a substitute.

More scientific details on this survey were provided in by the researchers from the RIVM and Wageningen University in an abstract for the World Conference on Tobacco Control 2025 (Hellmich et al., 2025)[13]. Nine months (September 2024) after the implementation of the Dutch flavour ban, a retrospective cross-sectional survey was performed among 548 adolescents and young adults (aged 13 - 24 years) and 457 adults (aged > 25 years), all of whom used e-cigarettes at least monthly before the flavour ban. The following results were reported (quotation):

> *"As a result of the ban, 39.5 % ± 1.7 % of respondents reported reduced vaping, and 22.4 % ± 1.4 % reported quitting. These outcomes did not differ between the two age groups (p = 0.48 and p = 0.06, respectively). The use of flavorless e-cigarettes among younger users increased (from 1.9 % to 3.7 %, p = 0.01), but there was no shift to tobacco flavors. The use of now-banned flavors declined from 91.4 % ± 0.9 % before the ban to 47.0 % ± 1.6 % after (p < 0.01). Among those continuing to use banned flavors, the majority (35.6 % ± 2.2 %) purchased them abroad. The use of related products (e.g., nicotine pouches/snus) remained stable pre to post-ban, while the use of other products (e.g., cigarettes) decreased, suggesting no major substitution of e-cigarettes with alternative products."* (Hellmich et al., 2025).

[12] https://www.rivm.nl/en/news/two-in-five-reduced-use-of-e-cigarettes-after-introduction-of-flavour-ban (accessed on 21 October 2025).
[13] https://www.tobaccoinduceddiseases.org/A-comprehensive-evaluation-of-an-e-cigarette-flavor-ban-on-consumer-behavior-and,206322,0,2.html (accessed on 21 October 2025).

Based on these data, the authors concluded that the Dutch flavour ban effectively reduced the e-cigarette use, potentially benefiting public health. However, they recommended that similar bans should be adopted on the international level, to attain maximum effectiveness (Hellmich et al., 2025).

Enforcement remains essential to uphold this ban. Since the introduction of the flavour ban on 1 January 2024, the Dutch Food and Consumer Product Safety Authority (NVWA) has removed millions of sweet-flavoured products from the Dutch market, including 1.7 million vapes with a market value of 12 million euros[14]. In January 2025, the NVWA seized nearly 66,000 illegal vapes and e-liquids, found at seven locations in Amsterdam, Rotterdam, Almere, and Eindhoven. The sellers were fined, and have to pay the costs of destroying the vapes and other prohibited products[15]. According to Van Mourik et al. (2025), NVWA inspections at importers blocked 3.5 million flavoured products and led to the recall of 800 000 more in 2024. Over 1 200 inspections were conducted, in 17 % of the cases a violation of the favour ban was found. These authors concluded that stronger and consistent legislation is needed at the European level, to close gaps in enforcement and prevent cross-border trade in flavoured products.

8. Effects of flavour restrictions in US states

Flavour restriction policies have different and mixed outcomes, which are also affected by other accompanying measures. While the preliminary results of the Dutch flavour ban show favourable trends (after nine months, 29.5 % reduced vaping, 22.4 % reported quitting) without indications of substitution towards cigarettes (Hellmich et al., 2025), other observations were described from the US, where a mixed picture is seen, sometimes with undesirable substitution:

- Tam et al. (2023): An online, national survey of young adults aged 18 - 34 in the US was conducted in 2021 (n = 1523). Mixed responses to e-cigarette flavour bans were registered. Most young adults would continue vaping following flavour restrictions (80.9 %), while 7.8 % of those who exclusively vaped responded to switch completely to combustible tobacco, highlighting a potential negative implication of flavour restrictions.
- Friedman et al. (2024a): In the US, balanced panel analyses of 242 154 individuals (18 - 29 years) consistently found that results in states with flavour restrictions were associated with statistically significant reductions in daily vaping (-3.6 %, 95 % CI: -5.0 to -2.1), but increases in daily cigarette smoking (+2.2 %, 95 % 1.0 to 3.4), compared to changes in states without these restrictions.
- Friedman et al. (2024b): By matching new flavour policy data in 7 US states to retail sales data, these authors concluded that any public health benefits of reducing ENDS sales via flavour restrictions may be offset by public health costs from the increased sales of cigarettes.
- Cheng et al. (2025): Flavour restrictions in 7 US states were associated with reduced e-cigarette use, but also with unintended increases in traditional cigarette use.
- Buckell et al. (2025): US state cigarette and e-cigarette flavour bans were associated with reduced vaping among those who dual use. In Massachusetts, a higher proportion of quitting all tobacco products was observed, because smokers in this state could not substitute with flavoured e-cigarettes which had been banned.

[14] https://www.nvwa.nl/nieuws-en-media/nieuws/2024/04/23/nvwa-weert-miljoenen-vapes-met-smaakjes-van-nederlandse-markt (accessed on 21 October 2025).
[15] https://www.nvwa.nl/nieuws-en-media/nieuws/2025/02/04/nvwa-neemt-in-maand-tijd-tienduizenden-vapes-in-beslag (accessed on 21 October 2025).

- Cotti et al. (2025): Using data from a variety of US surveys (Youth Risk Behavior Surveys, Behavioral Risk Factor Surveillance Survey, and Population Assessment of Tobacco and Health), robust evidence was found that the adoption of an ENDS flavour restriction reduced short-term frequent and everyday ENDS use among youths by ca. 2 - 3 %. However, substitution from flavoured ENDS to unflavoured ENDS and traditional cigarettes was observed among adolescents and young adults. For adults aged 31-and-older, little support exists for the hypothesis that ENDS flavour restrictions increase cigarette smoking.
- Saffer et al. (2025): Based on four national US data sets, evidence was found that young adults (18 - 24 year olds) decreased e-cigarette use by about 2.5 % after the flavour bans, while increasing cigarette participation by 3.5 % (probably an even swap, based on the standard errors of these estimates). For youth, the evidence is less clear. No effect on e-cigarette and smoking participation was found in people aged > 25.

9. Position of the Belgian Superior Health Council

9.1. Earlier position (SHC 9543, 2022)

In the Advisory report SHC (9543, 2022: p. 31-35), a first evaluation was made of possible policy measures to tackle the flavour issue:

> *"- Geen wijziging aan de huidige regelgeving. Dit voorstel werd door de experten niet aanvaardbaar bevonden.*
>
> *- Totaal of drastisch verbod op aroma's in e-vloeistoffen. Sommige parlementsleden hebben wetsvoorstellen ingediend waarin wordt gepleit voor een totaal verbod op aroma's of voor een drastische vermindering van het aantal aroma's. Zo'n totaal of drastisch verbod is volgens de experten niet de oplossing. Deze optie dreigt niet verenigbaar te zijn met de noden van de gebruikers en zou daarom bij hen kunnen leiden tot frustratie; het risico bestaat dan dat zij stoppen met de e-sigaret en weer klassiek gaan roken. Men mag ook niet uit het oog verliezen dat er een aanzienlijke markt is voor aroma's (meer bepaald toegelaten aroma's voor voedingswaren), die men kan kopen en aan e-vloeistoffen toevoegen.*
>
> *- Verbod op kenmerkende aroma's zoals dit in de richtlijn wordt voorgesteld voor tabaksproducten. Dit concept is evenwel moeilijk toe te passen op e-sigaretten: hoe bepaalt men of een product een kenmerkend aroma bevat, welk product moet worden toegestaan of verboden? Sommige landen (Hongarije, Finland; Nederland overweegt het) hebben het geprobeerd, maar stuitten op diverse problemen. Deze optie blijft dus niet overeind, deels omdat zij geen controle van de markt mogelijk maakt en in de praktijk de keuze van de ingrediënten overlaat aan de producenten in de landen die deze optie hebben toegepast.*
>
> *- Opstellen van een negatieve lijst van additieven die verboden zijn omdat ze toxicologisch gezien een onaanvaardbaar risico inhouden versus het opstellen van een positieve lijst van additieven die toegestaan zijn omdat ze toxicologisch gezien een aanvaardbaar risico inhouden.*
>
> *Zoals in het hoofdstuk V over aroma's wordt vermeld, is het onderzoek naar de toxiciteit ervan momenteel beperkt tot bepaalde aroma's. Studies naar de interacties tussen verschillende smaakstoffen en de vorming van toxische verhittingsproducten zijn schaars.*
>
> *Een negatieve lijst zou dan ook beperkt blijven tot producten waarvan men over gegevens beschikt, maar zou geen enkele garantie bieden wat het aanvaardbare risico van e-sigaretmengsels op de markt betreft.*

De experten zijn van mening dat een (beperkte) positieve lijst van onschadelijke stoffen moet opgesteld worden waarvan de aanwezigheid als additieven toegelaten kan worden in e-sigaretten, dit in de plaats van de meer dan 1 800 stoffen die op dit ogenblik toegelaten zijn. De toxicologische eigenschappen van de overgrote meerderheid van deze stoffen is onvoldoende gekend. Het gaat vooral om smaakstoffen of aroma's. Enkel deze additieven mogen toegelaten worden waarvan redelijkerwijze vaststaat dat ze onschadelijk zijn voor de gezondheid. Hierbij kan in de eerste plaats gekeken worden naar een beperkt aantal toxicologische eindpunten zoals genotoxische, hormoonverstorende of kankerverwekkende werking. Echter willen de experten benadrukken dat een correcte positieve lijst enkel kan opgesteld worden op basis van een volledige risicobeoordeling op wetenschappelijke basis. Verschillende noodzakelijke gegevens zijn hier echter niet beschikbaar zoals blootstellingsgegevens (intensiteit van het vapen, gehalte aan additieven, enz.) en toxicologische referentiewaarden. Bovendien moeten om het toxicologisch aanvaardbare risiconiveau te evalueren de toelaatbare doseringen/concentraties en eventueel de mogelijke wisselwerkingen tussen ingrediënten worden bepaald.

…

Het samenstellen van een dergelijke lijst zou evenwel, net als een klassieke positieve of negatieve lijst, de consument de indruk kunnen geven dat de gezondheidsautoriteiten verzekeren dat de verschillende additieven op de markt risicoloos zijn en dat dit ook geldt voor de consumptie van e-sigaretten. Dat zal uiteraard niet het geval zijn en daarom zal bijzondere aandacht moeten gaan naar de overheidscommunicatie daaromtrent."

It should be noted that the SHC's 2022 recommendation for a limited positive list is therefore very similar to the Dutch approach by the RIVM (Pennings et al., 2024), that has since been implemented.

9.2. Objective and possible negative impact of measures

The Belgian legislator must therefore carefully consider the desired and undesired effects in order to be able to anticipate the latter with accompanying measures. With measures restricting the use of flavourings in e-cigarettes, the following favourable outcomes are aimed:

- Objective 1: Reduce the overall (sensory) appeal of e-cigarettes.
- Objective 2 : Protect young people from the design and appeal of e-cigarettes targeted at this age group.
- Objective 3: Reduce the number of non-smoking persons who start vaping.
- Objective 4: Reduce the number of (long-term) dual users.

On the other hand, negative side effects may emerge, and should be taken into account when developing new policies:

- Negative side effect 1: Decreasing the appeal of vaping as a possible smoking cessation aid, causing smoking persons to return to traditional tobacco products.
- Negative side effect 2: The increase in illegal sales on the black market and the internet.

- Negative side effect 3: The purchase of prohibited flavours abroad where they are still permitted.

- Negative side effect 4: People may add inappropriate flavourings to e-liquids themselves, with potentially serious (acute) toxic effects.

9.3. Physical-Chemical Environmental Hygiene and the precautionary principle

While acknowledging that chemistry and technical progress have greatly improved life expectancy and living conditions, the Superior Health Council expressed serious concerns in its advisory report SHC (9402; 2019) about the ever-increasing complex exposure of people to chemicals throughout their lives, and the emergence of civilisation diseases. Real life exposures do not occur to single agents but instead involve complex mixtures of many chemicals and other hazards, with possible interactions between them explaining adverse effects. Sufficient mechanistic insights and molecular-epidemiological data are available indicating that a series of chemical substances contribute importantly to many diseases of civilisation, even if definite epidemiological proof is not yet available. Mutagenic agents, endocrine disruptors, substances binding to hormone receptors, and substances binding to nuclear receptors functioning as transcription factors (which thus can affect gene expression and/or have epigenetic effects) are important, especially with relation to cancer, and contribute also to the risk of other diseases of civilization. Exposures early in life can interfere with an optimal development and can result in disease later in life. An important aspect of the problem is the huge number of chemical substances, among which probably a few percent have mutagenic, carcinogenic, endocrine disrupting or receptor binding properties. Assessing the toxicological properties for humans of a chemical is time consuming and costly, only a very small minority of the chemicals have been adequately studied so far. Therefore a holistic approach involving avoidance or reduction of exposure to many different agents is desirable along the precautionary principle. Hence, the SHC proposed a particular form of hygiene, “physical chemical environmental hygiene” (SHC, 9404; 2019 and Bourguignon et al., 2018). This strategy should act at both the regulatory level (restricting exposure and authorisation of substances if their safety cannot be sufficiently demonstrated, and extending the ALARA principle: exposures should not only be as low as possible, but also as late in life as possible, as short as possible and as few as possible) and at the individual level (international scientific panels should developing preventive measures for target groups, especially pregnant women and children, followed up with human biomonitoring and longitudinal evaluation of health endpoints in the offspring).

The matter of e-cigarette flavourings exemplifies this concern. Individuals may be variably exposed to a myriad of flavourings, many of which have undergone toxicological evaluation solely for oral ingestion rather than inhalation, with substantial uncertainties regarding long-term health effects, potential chemical interactions, low-dose and mixture effects. This unsafe and uncertain exposure is unacceptable to the SHC and justifies an urgent restriction based on the precautionary principle. The pronounced, specific appeal of the extensive range of flavours to young people further augments the urgency of intervention (see Belgian survey data by *Stichting tegen Kanker, Kom op tegen Kanker, Fonds des Affections Respiratoires* between 2023 and 2024; Meernik et al., 2019; Petrella et al., 2025). The growing prevalence of vaping among young people is alarming. According to the most recent Flemish Pupil Survey (*VAD-Vlaamse Leerlingenbevraging*, 2023 -

2024[16]) among 7 522 pupils between 12 - 18 years, 29 % have ever used e-cigarettes, 2 % have done so in the past year, and 9 % have done so at least once a week. The proportion of regular users is now more than four times higher than in 2018 - 2019.

9.4. Recommendation: a drastic restriction of flavours

Considering all scientific arguments, including:

- the increasing prevalence of vaping among young people, who are particularly vulnerable to chemical exposure.
- the specific appeal of the many flavours to young people, including flavours specifically targeted at young people (e.g. chewing gum, popcorn, etc.).
- the uncertainty surrounding the toxicological profile and health effects of thousands of flavourings in complex mixtures.
- the growing evidence of adverse health effects due to flavoured e-cigarettes, observed in both *in vitro*, *in vivo* and epidemiological studies (Short-term: increased risk of, among others, irritation of the throat, eyes, and respiratory tract; respiratory symptoms including coughing and conditions resembling pneumonia; asthma attacks and exacerbation of existing asthma; certain cardiovascular effects. Long-term: damage to the respiratory tract, increased risk of serious pulmonary diseases such as COPD; genotoxicity that may contribute to the development of cancers; adverse effects on foetal development and birth outcomes; and other still unknown effects. See SHC 9827, 2025; SHC 9549, 2022; Allbright et al., 2024 and Petrella et al., 2025).
- favourable preliminary results (after nine months) of the Dutch flavour ban, showing a reduction of vaping among 29.5 % of the respondents, and quitting among 22.4 %, without clear indications of substitution towards cigarettes (Hellmich et al., 2025).
- the principles of physical-chemical environmental hygiene (see SHC 9404, 2019).

The Superior Health Council unanimously recommends an urgent and drastic reduction in the number of flavours available for e-cigarettes. There are two positions within the Council:

1) **From a toxicological and precautionary perspective, part of the working group prefers a flavour ban based on the Dutch model, whereby only tobacco flavour is permitted.** This tobacco flavour may only be composed on the basis of a positive list of 16 flavourings, for which there is currently insufficient information to demonstrate harmful effects (Pennings et al., 2024).

   Several studies recommend such a ban ban (e.g. Groom et al., 2020; Krüsemann et al., 2021). An advantage of this approach is uniformity with the Netherlands, and possibly other European Member States in the future, which facilitates enforcement (see Van Mourik et al., 2025). If this option is opted for, the positive list must be regularly re-evaluated when new toxicological and other data become available.

2) **From a smoking cessation perspective, another part of the working group prefers to allow a few additional flavours besides tobacco flavour (generally ≤ 3).** They propose this option out of concern that e-cigarettes could lose their attractiveness as a potential tool

[16] https://vad.be/content/uploads/2025/10/Syntheserapport-2023-2024_def_GL.pdf (accessed on 21 October 2025).

to help certain smokers quit (Lindson et al., 2025a), and to prevent any return of some vapers to regular cigarettes, as seen in some US states after flavour restrictions (Tam et al., 2023; Friedman et al., 2024a, 2024b; Cheng et al., 2025; Cotti et al., 2025, Saffer et al., 2025). However, the current evidence is inconclusive and shows no clear association between the use of e-cigarette flavours and smoking cessation outcomes or longer-term use of e-cigarettes, although few studies are available (Liber et al., 2023; Lindson et al., 2023, 2025b; Livingstone-Banks et al., 2025).

If additional flavours are to be permitted, they should be selected based on a survey of (Belgian) ex-smokers who successfully quit smoking using e-cigarettes and subsequently ceased vaping. The selected flavours should be as unappealing as possible to young people. As such a study is currently unavailable, it would need to be conducted prior to selection. After flavour selection, a positive list of flavouring substances for flavour formulation should be established using a methodology comparable to that employed by the RIVM for tobacco flavour (Pennings et al., 2024).

For some flavours, it is already clear that they are not eligible. For example, watermelon is the most popular flavour among youths aged between 15 and 20, according to the 2023 survey by *Stichting tegen Kanker*. While not popular among adolescents, mint/menthol flavour cannot be allowed anymore under Article 7.6d of Directive 2014/40/EU and Article 4, § 4, 5° of the Royal Decree of 28/10/2016 (prohibiting additives that facilitate the inhalation or absorption of nicotine). The anti-irritant effect of the flavouring menthol can lead to longer inhalation of aerosols, which can increase the retention of cytotoxic substances (Petrella et al., 2025). A recent randomised crossover clinical trial showed that menthol-flavoured e-cigarettes enhanced e-cigarette use experience compared with tobacco flavour (Chowdhury et al., 2025). This study suggests that menthol in e-cigarettes poses a risk to nicotine-naïve youth to initiate e-cigarette use and keep those young people currently using, addicted (Chowdhury et al., 2025). In a study by Leigh et al. (2016), menthol, coffee and strawberry-flavored aerosol significantly reduced both cell viability and metabolic activity. Besides, multiple studies indicate that creamy flavours and flavours with cinnamaldehyde in particular pose higher risks (McNeill et al., 2022; Royal College of Physicians, 2024). Cinnamon flavourings can impair anti-pathogen immune responses, reduce mucociliary clearance, and enhance oxidative stress (Allbright et al., 2024).

Both positions are scientifically substantiated but are constrained by gaps in the available data. The decision ultimately lies with the policymakers. **However, it is evident that individual adult preferences cannot trump population-level youth protection. The existing body of scientific evidence is sufficiently robust to justify immediate regulatory action.**

To ensure that strict flavour restrictions are effectively implemented, the SHC strongly recommends significantly intensifying enforcement efforts. Drawing on the experience of the *Nederlandse Voedsel- en Warenautoriteit* (NVWA) in the Netherlands (Van Mourik et al., 2025), key challenges include combating illegal trade, proving non-compliant sales, and addressing the sale of flavoured accessories (e.g. aroma balls and mouthpieces). Inspections should target importers and retail points of sale, while online platforms and social media must be closely monitored for illegal sales and advertisements, with identified violations reported and removed (Van

Mourik et al., 2025). Besides, age verifications at points of sale should be further controlled by means of mystery shoppers.

Finally, the SHC also advocates diplomacy with neighbouring countries to coordinate policies, to prevent cross-border purchases.

9.5. Other recommendations

- The SHC recommends to amend the existing national and/or European legislation, so that all new nicotine products that are not medically recognised are subject to the existing laws on tobacco products, or completely banned from market introduction. In this way, healthcare policymakers can stay ahead of the tobacco industry in order to prevent 'new' problems in the future where the damage must be limited 'post hoc', as is the case with e-cigarettes.

- The SHC recommends closely monitoring and tracking the effects of a flavour ban or flavour restrictions after implementation, so that the policy can be further refined afterwards. The positive list of permitted flavourings must be evolutionary so that new information can be responded to quickly, in one direction or the other.

- The SHC recommends launching an information campaign for vapers around the start date of flavour restrictions to prevent them from returning to traditional cigarettes, as observed in some US states.

- The SHC agrees to prohibit the presence of synthetic cooling agents (e.g. WS-23) in e-liquids, under Article 7.6d of Directive 2014/40/EU and Article 4, § 4, 5° of the Royal Decree of 28/10/2016 (prohibiting additives that facilitate the inhalation or absorption of nicotine). Their presence may undermine the efficacy of flavour bans (Jenkins et al., 2025, Minetti et al., 2025). These should be explicitly prohibited.

- The SHC recommends to prohibit all flavoured accessories such as aroma balls and mouthpieces, as their use may undermine the efficacy of flavour restrictions.

- The SHC recommends to ban Do-It-Yourself (DIY) e-liquids, as they are even less standardised and may therefore pose serious health risks. In DIY preparation, the vaper creates their own liquid by mixing concentrated flavourings, a nicotine booster, and a PG/VG base.

- The SHC recommends (already in advisory report no. 9549) the inclusion of a maximum period of use after opening on e-liquid bottles, taking into account the stability and durability of e-liquids (for example, the sensitivity of nicotine to light). The purpose is to minimise the formation of degradation products in e-liquids and to ensure that the declared nicotine concentration is maintained.

- The SHC recommends to standardise the packaging of e-cigarettes and e-liquids and to make the packaging as neutral as possible. These measures reduce the appeal to young people (see e.g. Taylor et al., 2025).

- The SHC recommends drastically stepping up the fight against the illegal trade and market in e-cigarettes, also online. This is essential in order to ensure that further measures are also implemented in practice.

- The SHC recommends setting up more prevention campaigns that highlight the dangers of tobacco and vapes, specifically targeting young people. Besides, also parents should be encouraged to quit smoking and vaping, to set a good example. Smoking and vaping behaviour in young people is strongly linked to their parents' smoking and vaping behaviour.

- The SHC recommends encouraging independent research to determine and quantify the real world, long-term impact of e-cigarettes (both health effects and impact on smoking cessation).

- The SHC recommends that the telephone number of the quitline "*Tabakstop*" should also be mandatory on the packaging of e-cigarettes (080011100).

- The SHC recommends that the word 'nicotine', the accompanying warning message and the nicotine concentration should be stated more clearly and in larger print on the packaging of e-cigarettes and all other products containing nicotine. Besides, in addition to the warning message on the addictive nature of nicotine, another warning on the 'hazardous' or 'toxic' character should be added.

- The SHC recommends that, to protect the environment, policy should also focus on recycling and raising awareness about e-cigarettes and their components in litter.

Some specific recommendations are also made regarding traditional tobacco products:

- The SHC recommends to continue the promotion of other evidence-based smoking cessation aids. These should be made more accessible. It should therefore be investigated whether some of these aids can be reimbursed, either in full or in part, especially for socio-economically vulnerable populations.

- The e-cigarette is a cause for concern for the SHC, but that should not detract from the need to further step up the fight against smoking traditional tobacco products. Approximately 80 to 90 % of lung cancers and associated mortality are attributable to tobacco smoking, and smokers are 20 times more likely to develop lung cancer than non-smokers (Boyle & Maisonneuve, 1995; Cislaghi & Nimis, 1997; IARC, 2004; Jemal et al, 2008; Wood et al, 2018; Surgeon General, 2004; All.Can Belgium, 2024). The risks increase with the length of time (number of years) and amount smoked (number of cigarettes per day) and the younger the age at which smoking starts. The vast majority of lung cancers can therefore be avoided by not starting to smoke, but also by quitting smoking. Smoking cessation initiatives should therefore be further expanded and supported, and the availability and accessibility of conventional tobacco cigarettes should be further restricted.

- The SHC recommends to strongly restrict the points of sales for the classical cigarette and all other non-medical nicotine containing products (including the e-cigarette).

- The SHC recommends continuing to work at European level to ban cigarette filters (SHC 9726, 2023; Everaert et al., 2023).

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V. SAMENSTELLING VAN DE WERKGROEP

De samenstelling van het Bureau en het College alsook de lijst met de bij KB benoemde experten is beschikbaar op de website van de HGR: wie zijn we?.

Al de experten hebben ***op persoonlijke titel*** aan de werkgroep deelgenomen. Hun algemene belangenverklaringen alsook die van de leden van het Bureau en het College kunnen worden geraadpleegd op de website van de HGR (belangenconflicten).

De volgende experten hebben hun medewerking en goedkeuring verleend bij het opstellen van het advies. Het voorzitterschap werd waargenomen door **Filip LARDON** en **Frieda MATTHYS** en het wetenschappelijk secretariaat door **Stijn EVERAERT**.

BARHDADI Sophia	Farmacie, e-sigaretten, analytische chemie	Sciensano
CATALDO Didier	Pulmonologie, moleculaire biologie	*ULiège*, BeRS
CRUNELLE Cléo	Neurowetenschappen, verslaving	VUB, UZ Brussel
DECONINCK Eric	Analytische chemie, additieven, contaminanten	Sciensano
EGER Katrien	Pulmonologie	UZA, BeRS
FRAEYMAN Norbert	Farmacie, toxicologie	UGent
GABRIELS Suzanne	Tabakspreventie, rookstop, psychologie	Stichting tegen Kanker
GODDERIS Lode	Arbeidsgeneeskunde, preventie, toxicologie	KU Leuven, IDEWE
GOEMINNE Pieter	Pulmonologie	VITAZ, BeRS
HAFID Imane	Huisartsgeneeskunde	SSMG
JANSSENS Annelies	Thorax oncologie	UZA
LARDON Filip	Oncologie, medische fysiologie	UAntwerpen
MATTHYS Frieda	Psychiatrie	VUB
MAES Veerle	Kankerpreventie	Kom op tegen Kanker
MEUNIER Adrien	Rookstop	*Hôpital de la Citadelle*
MICHEL Olivier	Pulmonologie	ULB
POCHET Sophie	Marketing, communicatie	*Haute École Galillee*
SCHOETERS Greet	Milieugezondheid, toxicologie	UAntwerpen
VAN HAL Guido	Tabakspreventie, medische sociologie, kankerscreening	UAntwerpen
VAN LAREBEKE Nicolas	Carcinogenese, kankerpreventie	UGent, VUB
VERHEYEN Marc	Tabakspreventie, opleiding en deskundigheidsbevordering	VRGT
WILLAME Elise	Tabakspreventie	FARES

De volgende expert werd gehoord maar was niet betrokken bij de goedkeuring van het advies.

HENDRICKX Stefaan	Tabakspreventie, rookstop, gezondheidsongelijkheid	Vlaams Instituut Gezond Leven

Over de Hoge Gezondheidsraad (HGR)

De Hoge Gezondheidsraad is een federaal adviesorgaan waarvan de FOD Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu het secretariaat verzekert. Hij werd opgericht in 1849 en geeft wetenschappelijke adviezen i.v.m. de volksgezondheid aan de ministers van Volksgezondheid en van Leefmilieu, aan hun administraties en aan enkele agentschappen. Hij doet dit op vraag of op eigen initiatief. De HGR probeert het beleid inzake volksgezondheid de weg te wijzen op basis van de recentste wetenschappelijke kennis.

Naast een intern secretariaat van een 25-tal medewerkers, doet de Raad beroep op een uitgebreid netwerk van meer dan 500 experten (universiteitsprofessoren, medewerkers van wetenschappelijke instellingen, praktijkbeoefenaars, enz.), waarvan er 300 tot expert van de Raad zijn benoemd bij KB; de experts komen in multidisciplinaire werkgroepen samen om de adviezen uit te werken.

Als officieel orgaan vindt de Hoge Gezondheidsraad het van fundamenteel belang de neutraliteit en onpartijdigheid te garanderen van de wetenschappelijke adviezen die hij aflevert. Daartoe heeft hij zich voorzien van een structuur, regels en procedures die toelaten doeltreffend tegemoet te komen aan deze behoeften bij iedere stap van het tot stand komen van de adviezen. De sleutelmomenten hierin zijn de voorafgaande analyse van de aanvraag, de aanduiding van de deskundigen voor de werkgroepen, het instellen van een systeem van beheer van mogelijke belangenconflicten (gebaseerd op belangenverklaringen, onderzoek van mogelijke belangenconflicten en een Commissie voor Deontologie) en de uiteindelijke validatie van de adviezen door het College (eindbeslissingsorgaan van de HGR, samengesteld uit 30 leden van de pool van benoemde experten). Dit coherent geheel moet toelaten adviezen af te leveren die gesteund zijn op de hoogst mogelijke beschikbare wetenschappelijke expertise binnen de grootst mogelijke onpartijdigheid.

Na validatie door het College worden de adviezen overgemaakt aan de aanvrager en aan de minister van Volksgezondheid en worden ze gepubliceerd op de website (www.hgr-css.be). Daarnaast wordt een aantal onder hen gecommuniceerd naar de pers en naar bepaalde doelgroepen (beroepsbeoefenaars in de gezondheidssector, universiteiten, politiek, consumentenorganisaties, enz.).

Indien u op de hoogte wilt blijven van de activiteiten en publicaties van de HGR kunt u een mail sturen naar info.hgr-css@health.belgium.be.

www.hogegezondheidsraad.be

Met administratieve steun van de FOD
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