International Pharmaceutical Aerosol Consortium

IPAC-RS International Pharmaceutical Aerosol Consortium on Regulation & Science

PRELIMINARY JOINT COMMENTS TO ECHA REACH ON PROPOSAL TO RESTRICT PFAS

The undersigned organizations appreciate the opportunity to share preliminary considerations and information relevant to the Proposal's impact on hydrofluorocarbons (HFCs) used in pressurised metered dose inhalers (MDIs). IPAC and IPAC-RS are gathering data and information to support the RAC and SEAC consultations with regard to the availability of alternatives and potential impacts to patients. A thoughtful approach is needed to avoid abrupt changes in the availability of MDIs which would put patients' care at risk. We share below initial comments and resources to inform the process and outline the key considerations relevant to MDIs. The focus of these comments is the information documented within the ECHA Annex XV restriction report as summarised in Attachment I.

Summary of Asks:

- We respectfully request a lengthier derogation for the two medical propellants currently used in MDIs: HFC-134a and HFC-227ea consistent with the one granted to other medical device sectors. The proposed timeframe – 18 months after finalizing the proposal – is not technically or economically feasible and would risk the health of patients in Europe and around the world. Prematurely banning these essential products could lead to drug shortages of essential, life-saving medicines. A significant proportion of medicines manufactured in Europe are exported around the world. Adequate time must be provided to allow replacement products to be developed, tested, and approved by medicines regulators and for patients to be safely and seamlessly transitioned. Companies are developing next generation more sustainable propellants to mitigate climate impact. One of these propellants, HFC 152a, is not classified as a PFAS. The current proposal recommends a 12-year derogation for MDI coatings given "the lack of technically feasible alternatives and the high societal value of the medicinal products indicates that a full ban would be associated with high socio-economic costs." The precise same rationale applies to the existing medical propellants for MDIs.

- We respectfully request a permanent exemption for HFO 1234ze as a medical propellant for MDIs. As outlined below (and to be supplemented in future), HFO 1234ze represents an important alternative option to accomplish the phase down of the existing medical propellants and will have a long-term future role as a potential option for transitioning MDIs away from the existing medical propellants, HFC-134a and HFC-227ea.

- Any proposals to ban essential medications must take a patient-centric approach and we urge governments to proactively consult closely with patients, clinicians, and relevant government

authorities (including the European Medicines Agency) ***before*** removing products from the market. Advance planning and full understanding of implications is critical. The experience with the phase out of CFC MDIs under the Montreal Protocol is informative and lessons learned from this process should be understood and adopted.

Overview of Key Considerations

- Asthma and chronic obstructive pulmonary disease (COPD) are serious, potentially life-threatening illnesses. Inhaled therapies, including MDIs, Dry Powder Inhalers (DPIs) and Soft Mist Inhalers (SMIs), are the standard of care to treat asthma and COPD. Asthma and COPD impact millions of patients in the EU and worldwide.

- To propel medication from an MDI canister and generate a "puff" inhalable by a patient, hydrofluorocarbons (HFCs) are currently used, and to date only two types have been approved by pertinent regulatory authorities such as the European Medicines Agency (EMA) – namely HFC 134a and HFC 227ea. MDIs remain an essential treatment for an important subset of asthma and COPD patients. All human exposure of substances in MDIs is tested and approved in accordance with pharmaceutical regulations. The industry is working to develop next generation propellants for MDIs that will have a significantly lower carbon footprint than HFC-134a and HFC-227ea. Replacements will have to obtain global regulatory clearance on a product-by-product basis. There are currently two next generation propellants under development: HFC 152a and HFO 1234ze. HFC 152a is not within the scope of the PFAS consultation.

- It is not possible to simply "drop in" an alternative medical propellant to MDIs. Propellants for medical uses must be non-toxic and must have specific physico-chemical characteristics to enable appropriate performance, meeting high standards of safety and efficacy; they cannot be replaced easily. Ensuring that a new propellant is safe for patients, compatible with the device components and formulation, and supports required particle size distributions and delivered dose uniformity, is an extensive, resource-intensive process. The change in propellants also impacts many elements of the supply chain, including elastomers, valves, and any other device components in the drug delivery pathway. Many of these must be tested and/or redesigned with the new propellant for compatibility and final product tested for leachables. New manufacturing equipment must be developed and built to adapt to the characteristics of any new medical propellants (e.g., flammability). It is also important to understand that these changes involve regulatory assessment, and depend on regulatory approval, by the European Medicines Agency (EMA) and national regulatory authorities.

- Given the challenges to identify alternative propellants, it is important to maintain options for next generation MDIs, including HFO 1234ze. It should also be noted that if this option is eliminated as a medical propellant, it would leave only a single option available for long-term use (i.e., HFC-152a). There have always been at least two options (three for CFCs) and this is important for compatibility with medicines and to mitigate supply chain risks. IPAC and IPAC-RS

will supplement these comments with data and information related to the chemical properties of HFO 1234ze in future submissions.

- The existing European F-Gas regulation (517/2014) already regulates HFCs in a comprehensive manner. It is currently under review and revision with associated stakeholder consultations. It is robust and will ensure that HFC 134a and HFC 227ea are phased down consistent with the Kigali Amendment to the Montreal Protocol. It is important that any PFAS restrictions are coherent with the F-gas regulation.

- Non-fluorinated hydrocarbon propellant gases are not suitable alternatives for MDIs as they are very flammable and thus pose an inherent safety risk, and they do not have clinical studies establishing safety in humans. MDI propellants are required to be toxicologically safe, minimally flammable, and chemically inert with appropriate boiling points and densities. Hydrocarbon propellants have been explored and rejected, namely, propane, n-butane, isobutane, n-pentane, isopentane, neopentane, and dimethylether.

- Transitioning patients to next generation MDIs – **when available** – and DPIs or SMIs must be managed cautiously with a focus on effectively managing an individual patient's disease. There may also be cost considerations for patients and health care systems.

- Care should be used to ensure a robust understanding of impacts to supply of MDIs for patients across Europe. It is also important to consider the impacts for patients *outside* of Europe as manufacturers produce a substantial quantity of MDIs within the EU for export to patients globally. A stable supply for all patients should be ensured, worldwide.

Information Resources and References:

1. The EMA recently launched a public consultation: *Questions and answers on data requirements when replacing hydrofluorocarbons as propellants in oral pressurised metered dose inhalers (EMA/CHMP/83033/2023).* The EMA document notes that "[P]ropellant replacement constitutes a major change to the finished product formulation with potential impact also on the construction of the inhaler; therefore, data confirming maintenance of adequate finished product performance need to be provided for each modified product. In addition, data addressing possible toxicity and local tolerance of novel propellants need to be provided."

2. IPAC has prepared a set of slides summarising the key elements of the research and development process for MDIs. Please see attached.

3. The Intergovernmental Panel on Climate Change (IPCC) and Technology and Economic Assessment Panel (TEAP) published a comprehensive Special Report on Safeguarding the Ozone Layer and the Global Climate System (2005). Chapter 8 (Medical Aerosols) of the IPPC/TEAP Special Report details the technical performance characteristics for MDIs. The Report notes that an MDI "is a complex system designed to provide a fine mist of medicament for inhalation directly to the airways as treatment for

respiratory diseases." The Report also describes the "exhaustive search" for an appropriate alternative medical propellant. "An inhalation propellant must be safe for human use and meet several additional strict criteria relating to safety and efficacy: (i) liquified gas, (ii) low toxicity, (iii) non-flammable, (iv) chemically stable, (v) acceptable to patients, (vi) appropriate solvency characteristics, and (vii) appropriate density." (p. 355). "It was extremely difficult to identify compounds fulfilling all of these criteria." (p. 355). The IPCC/TEAP reviewed cost issues (pp. 356-357) and concluded that with a hypothetical switch for one of the widely used medicines (salbutamol) from HFC MDIs to DPI, the "projected recurring annual costs would be on the order of US$ 1.7 billion with an effective mitigation cost of between 150-300 US$ tCO2-equivalent."

4. See also, *The CFC to HFA Transition and Its Impact on Pulmonary Drug Development*, Leach C. (Respiratory Care, Sept. 2005, Vol 50. No. 9) outlining the extensive toxicological testing on HFC-134a and HFC-227ea undertaken by two testing consortia: IPACT-I and IPACT-II. Table 1 of the paper summarizes clinical and other studies. The paper also provides insights on the technical issues encountered in reformulating MDIs to a new propellant (pp. 1204 to 1206).

5. In connection with the phase-out of CFC MDIs under the Montreal Protocol, the European Commission at the time developed a thorough and thoughtful strategy in consultation with a range of stakeholders, including IPAC, clinicians, patients, and regulatory authorities. See: ***Communication from the Commission to the Council and the European Parliament – Strategy for the Phaseout of CFCs in metered dose inhalers (COM 1998) 603 20 November 1998*** (for ease of reference submitted as attachment).

The Commission's CFC MDI Phase Out Strategy noted that "CFCs should only be withdrawn once patients have access to a satisfactory alternative." The Strategy (Chapter 4.16) notes that the following factors must be affirmed ***prior to MDIs being withdrawn from the market***:

1. *a sufficient number of clinically effective, technically and economically feasible alternatives (including DPIs) needs to be available to ensure an uninterrupted supply of medication;*

2. *a sufficient period of post-marketing surveillance of the reformulated products has to be carried out; and*

3. *there needs to be sufficient choice of alternatives available to meet the needs of different patient subgroups.*

The Commission's Strategy undertook a comprehensive review of additional "conditions that also need to be met before it is considered that there are sufficient technical and feasible alternatives," including adequate range of doses and strengths to cover distinct patient subgroups such as the elderly or young children. The Commission sought advice from the competent authorities of the Member States and other experts to determine that all of these conditions have been met. (Chapter 7.23).

The Strategy illustrates the complex, multifaceted undertaking to transition to new propellants and the myriad of considerations. The Strategy notes that the reformulation process involved "more than 70 separate programmes, involving 1400 scientists, and 90 laboratories in 10 countries." (Chapter 5.2).

6. The Parties to the Montreal Protocol convened an expert group to serve as technical resource on MDIs – the Medical and Chemical Technical Options Committee (MCTOC). The MCTOC recently published its Quadrennial Assessment Report and it is an excellent resource on the current use of HFC-134a and HFC-227ea in MDIs, as well as current and prospective alternatives. The MCTOC Report notes:

- "Inhaled therapy remains the mainstay of treatment for established asthma and COPD. Inhalers offer effective symptomatic benefit and control of disease, by delivering drugs directly to the airways, whilst minimising systemic side effects." (p. 235). Oral drugs are only used in limited circumstances given risks of side effects and limited efficacy. (p. 236)

- "Complex considerations are necessary when patients and healthcare professionals make an informed choice about a patient's inhaled therapy, taking into account therapeutic options, patient history, patient preference, ability (e.g., dexterity, inspiratory flow, vision) and adherence, patient-borne costs, as well as environmental implications, with the overall goal of ensuring patient health." (p. 238)

- The process of reformulating CFC MDIs to use HFC-134a and HFC-227ea took decades and was a complex and resource-intensive process. "each new pMDI underwent extensive regulatory assessment of safety, efficacy, and quality, much the same as for the development of any new drug product." (p. 239)

- The MCTOC recommends that countries consider "how to ensure that adequate bulk HFC-134 and HFC-227-ea pMDIs are available in markets to "avoid risks to the continuous supply of pMDIs." (p. 256).

- "mDPI and SMI manufacturing capacity may not be able to pivot rapidly to increase global production to replace the demand for pMDIs. Ramping up DPI and SMI production would take time." (p. 258).

7. In order to assess the risks and socio-economic impact, the burden and impacts of respiratory illnesses should be considered. Asthma is a life-threatening condition affecting patients of all ages, from the very young to the very old. (See, for example, The Global Asthma Report 2022). Similarly, COPD was responsible for 3.3 million deaths in 2019 (see Burden of chronic obstructive pulmonary disease and its attributable risk factors in 204 countries and territories, 1990-2019: results from the Global Burden of Disease Study 2019 | The BMJ). MDIs remain the product of choice for managing those conditions (see for example, 2022 GINA Main Report - Global Initiative for Asthma - GINA (ginasthma.org) and 2023 GOLD Report - Global Initiative for Chronic Obstructive Lung Disease - GOLD (goldcopd.org)).

8. In 2021, IPAC conducted a survey of its members and the data available here illustrates that a significant majority of the MDIs manufactured in Europe are exported around the world. Several MDIs are included on the WHO's Essential Medicine list.

About Organizations

IPAC was formed in 1989 in response to the mandates of the Montreal Protocol and fully supported a timely and effective transition away from chlorofluorocarbons (CFCs) under the Montreal Protocol that balanced patient health and environmental concerns. IPAC's mission is to ensure that environmental policies relevant to inhaled therapies are patient-centric and appropriately balance both patient care and sustainability objectives. IPAC's members: AstraZeneca, Boehringer Ingelheim, Chiesi, GSK, Kindeva, Organon, and Teva. Further information available at www.ipacinhaler.org. *EU Transparency Register No. 602537137644-70.*

IPAC-RS is an international association that seeks to advance the science, and especially the regulatory science, of orally inhaled and nasal drug products (OINDPs) by collecting and analyzing data, and conducting joint research and development projects. Representing the OINDP industry since 2000, IPAC-RS aims to build consensus and contribute to effective regulations and standards by sharing the results of its research through conferences, technical journals, webinars, and discussions with regulatory bodies. IPAC-RS members are listed at www.ipacrs.org/about.

Attachment 1

The comments noted above, in the main section of this document, are in response to information documented within the ECHA Annex XV restriction report and Annex E, particularly with respect to the following items:

1. Table 8 RO1 Medical Devices (Annex E.2.9), pages 98-101 (below)

Use sector (with sub-uses)	Alternatives	Cost impact
Coatings of Metered Dose Inhalers (MDIs)	Sufficiently strong evidence that technically and economically feasible alternatives are not generally available. Conclusion: Low substitution potential at EiF [sufficiently strong evidence]	Regarding coating of metered dose inhalers, the lack of technically feasible alternatives and the high societal value of the medicinal product indicates that a full ban would be associated with high socio-economic costs.
Propellants in Metered Dose Inhalers (MDIs)	Sufficiently strong evidence that technically and economically feasible alternatives are generally available.	Apart from potential transition costs, the costs of substitution are likely to be very small.

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Use sector (with sub-uses)	Alternatives	Cost impact
	Conclusion: High substitution potential at EiF [sufficiently strong evidence]	No additional administrative costs for industry or authorities are expected.

2. Table 9 RO2 Medical Devices (Annex E.2.9) page 129 and 131 (below)

Use sector (with sub-uses)	Proposed derogation or derogation for reconsideration	Duration of derogation period, including substantiation	Cost impact of 5 and 12 year derogation periods
Coatings of Metered Dose Inhalers (MDIs)	Given the sufficiently strong evidence that technically and economically feasible alternatives are not available at EiF, a derogation is **proposed** for: • Coatings of Metered Dose Inhalers (MDIs)	Ban with a transition period of 18 months and a **12-year** derogation, because identification, development and certification of alternatives would take more than five years to complete [sufficiently strong evidence base]. Continued R&D increases the chance that alternatives for the relevant applications will be identified.	Ban with a transition period of 18 months and a 5-year derogation: Same as under RO1. Ban with a transition period of 18 months and a 12-year derogation: If feasible alternatives are identified, developed and approved, the public health concerns (and their related socio-economic costs) due to reduced functionality of the devices would be avoided.
Propellants in Metered Dose Inhalers (MDIs)	Given the sufficiently strong evidence pointing to the existence of technically and economically feasible alternatives at EiF, no derogation is proposed.	Not applicable	Same as under RO1.

3. Section 2.4.3.3 h) (v) where the potential derogations are detailed, Table 13 page 172 (below)

Medical devices (Annex E.2.9.)

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Use sector (with uses)	**Derogations under RO2**	**Cost and other impacts (in comparison to RO1)**	**Environmental impact (in comparison to RO1)**	**Other aspects**	**Overall evaluation**
Includes: • Implantable medical devices (not including meshes, wound treatments products, and tubes and catheters) • Hernia meshes • Wound treatment products • Tubes and catheters • Coatings of Metered Dose Inhalers (MDIs) • Other coating applications • Cleaning and heat transfer: engineered fluids • Sterilization gases	**12-year** derogation after the transition period **proposed** for: • (i) Implantable medical devices (not including meshes, wound treatment products, and tubes and catheters) • (iv) Tubes and catheters • (v) Coatings of Metered Dose Inhalers (MDIs) • (viii) Diagnostic laboratory testing **12-year** derogation after the transition period is marked **for reconsideration** after the Annex XV report consultation for: • (ii) [Hernia meshes] • (iii) [Wound treatment products]	Public health concerns (and their related socio-economic costs) due to reduced functionality of implantable medical devices are avoided when feasible alternatives are identified, developed and approved during the derogation period. Reduced socio-economic costs can be expected related to tubes and catheters, since no derogation would likely result in more invasive procedures and/or procedures that are more painful for the patient. A reduction of high socio-economic costs can be expected resulting from reduced functionality of metered dose inhalers. A reduction of the impacts on the feasibility of diagnostic laboratory testing can be expected, which in turn would have severe implications on public health. Public health concerns related to the functionality of hernia meshes (increased risk of intestinal damage and fistula formation in patients) and their	**No evidence available** about the precise amount of additional emissions from this derogation. **For (i), (ii), (iv), (ix), (xi), (xii):** Under the reference scenario, assuming a full derogation of all polymeric PFAS in this sector, maximum additional emissions would be 16 116 t (30-year period), which is slightly higher than emissions under RO1. Additional emissions arising from the proposed derogation are expected to be be lower than the reference scenario. **For (iii), (v), (vi), (x), (xiii):** Under the reference scenario, assuming a full derogation of all polymeric and PFAA PFAS use in this sector, maximum additional emissions would be 27 647 t (30-year period), which is slightly		Higher and potentially substantial additional emissions in exchange for: • Substantial lower socio-economic costs related to public health effects, in the form of reduced risk of implantable medical device failures and lower frequency of implant replacements. • Substantially lower socio-economic costs related to public health effects, in the form of reduced frequency of invasive procedures and/or reduction in pain suffered by the affected patients. • Substantially lower socio-economic costs related to public health effects, in the form of maintained functionality of metered dose inhalers. • Substantially lower socio-economic costs related to public health effects, in the form of availability of feasible diagnostic laboratory testing. • Potential lower socio-economic costs related to

4. Annex E pages 321-322, page 334, pages 335-336 and pages 343-344 Table E.111. Medical devices - Summary table on assessment of costs and benefits, based on a general transition period of 18 months (below)

Propellants in Metered Dose Inhalers (MDIs)

According to the consultancy report, MDIs currently use HFC-134a or HFC-227ea as propellants. These substances are within the scope of this restriction proposal.

There are mainly two types of alternatives: technical alternatives and non-PFAS propellants.

Technical alternatives include alternative ways of administering the active pharmaceutical ingredient in the human body, such as dry powder inhalers (DPIs) or by pill, liquid or intravenous solution. Each administration method has its own benefits and drawbacks, and in

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some countries, DPIs are more popular than MDIs. These technical alternatives are not suitable for all types of patients. MDIs are particularly beneficial to patients with little breathing power or who lack the coordination to handle a DPI, for instance young children, frail elderly or severely weakened or panicking persons. The Medical and Chemicals Technical Options Committee (MCTOC) of the Montreal Protocol notes the exact proportion of these groups depends on the definition of satisfactory use (UNEP, 2018b). It is probably less than 20 percent, although there is no real-world data.

HFC 152a is a non-PFAS propellant for MDIs with a substantially lower global warming potential (GWP) than HFC-134a and HFC-227ea. HFC-152a would not require any change of usage by the patients that are used to the current HFC MDI inhalers, which implies that HFC-152a can be considered as a "drop-in" alternative. According to the Commissions impact assessment (EC, 2022) for the ongoing review of the F-gas regulation and input in the 2nd stakeholder consultation, HFC-152a will be available on the market starting in 2025 after an extensive period of testing, homologation and necessary approval by the European Medicines Agency that is currently ongoing. A production facility for the substance was opened in 2022[108].

The Commission also notes that research is also currently conducted on the safety of HFC-1234ze for use in MDIs. HFC-1234ze has an even lower GWP[109] than HFC-152a and is expected to be a favoured alternative for the implementation of the F-gas regulation objectives in the long term (post-2030). But since HFC-1234ze falls within the substance scope of this restriction proposal it is not considered as a viable alternative here. It is, however, important to note that in the absence of a regulation of PFAS-propellants in MDIs, HFC-1234ze is expected to be a long-term substitute for both the currently used propellants (HFC-134a and HFC-227ea) and the non-PFAS alternative HFC-152a. This introduces a trade-off between the objectives of the F-gas regulation and the objectives of this proposal for restriction of PFAS.

The Dossier Submitters conclude that the evidence is [sufficiently strong] that technically and economically feasible alternatives are [generally available] for the quantities required for use in [propellants in Metered Dose Inhalers] and that the substitution potential is [high].

E.2.9.4.5. Coatings

Regarding **coating of metered dose inhalers**, several stakeholders in the second stakeholder consultation indicate that alternatives to fluoropolymers are either non-compatible with the medicine, do not resist the corrosive environment or do not have the required non-stick properties that facilitates accurate dosage of the active pharmaceutical ingredients. The lack of technically feasible alternatives and the high societal value of the medicinal product indicates that this RO would be associated with substantial socio-economic costs. The Dossier Submitters conclude that there is [sufficiently strong evidence] that a ban of the use of PFAS in coatings of MDIs is [likely] to have considerable impacts on public health and that it would lead to [high socioeconomic costs]. Furthermore, the Dossier Submitters note that the second stakeholder consultation indicated that the complete process from identification of alternative to approved product takes at least 5-10 years in this sector. This indicates that a relatively long derogation period is required to avoid these costs for coatings of MDIs.

E.2.9.4.10. Propellants in Metered Dose Inhalers (MDIs)

Phasing out the use of PFAS propellants in MDIs can be partly met by increased use of technical alternatives, primarily dry powder inhalers (DPIs). As noted in the assessment of alternatives, the technical alternatives are not suitable for all types of patients. So, part of the phasing out of PFAS propellants – in case of a restriction – will need to be met by increased use of the non-PFAS propellant HFC-152a. In the absence of a policy driver, the market uptake of HFC-152a is expected to be rather slow. In the baseline scenario of the Commissions impact assessment for the review of the F-gas regulation, it is assumed that HFC-152a will be used in 1 % of the new MDIs in 2026, increasing to 50% in 2050 (EC, 2022). If the F-gas Regulation is revised in line with the proposal from the Commission (April 2022) the transition to HFC-152a is expected to happen more quickly. In the "proportionate action scenario" of an external preparatory study for the Commissions impact assessment, the penetration rate of HFC-152a increases sooner than in the baseline scenario and is estimated to reach an average of 47% over the period 2024-2036 (Öko-Institut et al., 2022).

One stakeholder in the 2nd stakeholder consultation claims that ongoing trials indicate that most (by volume), if not all, MDI treatments can be reformulated and approved to use HFC 152a, but the time needed for a complete transition away from the current propellants is unclear.

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The expected year of the adoption of this restriction proposal is 2025. This will be followed by a transition period. The default transition period in this proposal is 18 months. Whether this period will be enough to facilitate a complete transition away from the currently used propellants is unclear. It is also unclear to what extent a transition that is faster than expected in the baseline scenario will lead to additional one-off capital costs or other transitional costs. These issues will need to be clarified in the Annex XV report consultation.

Apart from potential transitional costs, the costs of substituting to HFC-152a are likely to be very small. The price of HFC-152a is equivalent with the price of the currently used propellants in MDIs and the price of the gas is only a very small part of the price of the overall MDI product (less than 1%) which is mostly determined by the medicinal agent (Öko-Institut et al., 2022).

The pharmaceutical sector is a high margin industry. This implies that potential costs of substitution are likely to be internalized by the producers (in the form of lower profit margins) rather than passed on to consumers.

Since the approval process of HFC-152a in MDI applications is already ongoing, the Dossier Submitters assume that a ban on PFAS in these applications will not lead to any additional administrative costs for industry or authorities.

A long-term (post 2030) impact of a ban on PFAS-propellants in MDIs is that the low-GWP propellant HFC-1234ze is not a viable alternative. Unless alternative non-PFAS propellants with similar, or lower, GWP properties (or alternative technologies) are developed, a ban on PFAS propellants will make it more challenging (and probably more costly) to fulfil the objectives of the F-gas regulation. This implies that there is a trade-off between the objectives of the F-gas regulation and the objectives of this proposal for restriction of PFAS.

The Dossier Submitters conclude that the evidence is [sufficiently strong] that a restriction on PFAS as propellants in MDIs is [likely] to have [low socioeconomic costs]. The main uncertainty that needs to be clarified in the Annex XV report consultation is whether the 18-month transition period will be enough to facilitate a complete transition away from the currently used propellants and to what extent the transition will lead to additional one-off capital costs or other transitional costs.

Conclusion	A full ban of PFAS with a transition period of 18 months is proposed for:

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Restriction option	Duration of derogation	Alternatives	Environmental impact	Cost impact	Other aspects

	• propellants in Metered Dose Inhalers,
	• sterilization gases, and
	• packaging of medical devices, excluding:
	  ○ PCTFE-based packaging for medicinal preparations, medical devices and molecular diagnostics,
	  ○ PTFE in ophthalmic solutions packaging, and
	  ○ packaging of terminally sterilised medical devices.
	
	A full ban of PFAS with a time-limited derogation period of 12 years (after the 18 months transition period) is proposed for:
	• implantable medical devices (not including meshes and wound treatment products),
	• tubes and catheters,
	• coatings of Metered Dose Inhalers, and
	• diagnostic laboratory equipment.
	
	A full ban of PFAS with a time-limited derogation period of 12 years (after the 18 month transition period) is under consideration, but further justification is needed, for:
	• hernia meshes,
	• wound treatment products,
	• coatings applications for medical devices (other than coating of Metered Dose Inhalers),
	• engineered fluids for medical devices,
	• membranes used for venting of medical devices,
	• rigid gas permeable contact lenses and ophthalmic lenses, and
	• the following packaging of medical of devices:
	  ○ PCTFE-based packaging for medicinal preparations, medical devices and molecular diagnostics,
	  ○ PTFE in ophthalmic solutions packaging, and
	  ○ packaging of terminally sterilised medical devices.
	
	In light of the weak evidence that technically and economically feasible alternatives are not available for these applications is not proposed at this point but marked for reconsideration. A derogation might be proposed at a later stage if additional information on the (lack of) availability of feasible alternatives is provided.				