

Patient Care Issues in Climate Change Policy

The Role of Pressurised Medical Aerosols

IPAC

The International Pharmaceutical Aerosol Consortium (IPAC) is an association of pharmaceutical companies which research, develop and manufacture pressurised medical inhalers that are prescribed by doctors to treat patients with asthma, chronic obstructive pulmonary disease, allergic rhinitis and other diseases.

METERED DOSE INHALERS AND MEDICAL AEROSOLS

Metered dose inhalers (MDIs) are pressurised, hand-held devices that use propellants to deliver doses of medication to the patient. These delivery devices are critically important to public health and are used to administer various active ingredients for a range of medical conditions. For the treatment of respiratory conditions alone, an estimated 70 million patients in 100 countries around the world rely on MDIs to control their diseases.

MDIs play a particularly significant role in the treatment of asthma and chronic obstructive pulmonary disease (COPD). Asthma is a disease of the lungs and airways with symptoms of breathlessness, tightness of the chest, wheezing and cough. Factors that may trigger or worsen asthma attacks include air pollutants, dust, smoke, airborne moulds, pollens, exercise, scents, and stress. Asthma can become chronic, severe, and fatal. Asthma patients may be restricted from normal physical activities and subject to sudden, life threatening attacks.

COPD diseases, such as emphysema and chronic bronchitis, produce inflammation, swelling, and mucus in the airway and gradually destroy the surface areas of the lung. COPD is progressive, generally irreversible, and severely restricts a patient's ability to breathe.

At least 300 million people suffer from asthma worldwide, and the prevalence of asthma and asthma mortality is on the rise. Evidence now confirms that asthma prevalence is increasing as urbanisation of developing countries continues. Asthma-related hospital admissions are also increasing, especially among children. However, most asthma deaths and violent attacks are preventable with proper, ongoing treatment.

PRESERVATION OF VITAL THERAPIES

There is international consensus that treatment by inhalation is the preferred form of therapy for asthma and COPD sufferers, because it reduces the risk of significant side effects experienced with other medications.¹ Three types of inhalation delivery systems are available: MDIs, nebulisers, and dry powder inhalers (DPIs). Because these three systems are not equally suitable for all patients, it is essential to maintain each of these therapeutic options if individual patient needs are to be met. While each system

has its particular strengths and weaknesses, nebulisers and DPIs do not provide the same range of benefits as the MDI.

MDIs possess numerous characteristics that, taken together, set them apart from other inhalation delivery systems. These characteristics include the following:

- MDIs assist the patient by providing the energy needed for drug delivery in the form of a propellant;
- doses are metered out independent of the patient's inspiratory effort;
- they are adaptable to a variety of needs, including use by young children and infants;² and
- they are widely available and are used for all of the most commonly prescribed respiratory medications.

MDIs account for 70% of all inhalation therapy in the countries with the largest populations of patients with respiratory disease. The above-mentioned characteristics demonstrate why the MDI is the mainstay of effective therapy worldwide.

Pressurised medical aerosol technology also offers promise as a safe and effective delivery system for existing and emerging medicines, which treat serious illnesses such as cancer, cystic fibrosis, allergy, osteoporosis, and diabetes.

DEVELOPING SAFE ALTERNATIVES TO OZONE-DEPLETING CFC PROPELLANTS

In response to environmental concerns about the impact of CFCs on the Earth's ozone layer, pharmaceutical firms and others evaluated potential non-CFC propellants that could be used safely and effectively in MDIs. In the course of this extensive review, hydrofluorocarbons (HFCs) emerged as the only propellant suitable for pharmaceutical use. No other compound met the stringent criteria for a medical gas to be used for inhalation by patients. A propellant used in a medical inhaler **must**:

- appropriate solvent properties;
 - density; and
 - wide range of
 - of taste and smell);
- be a liquefied gas;
 - have
 - have very low toxicity;
 - have appropriate
 - be chemically stable;
 - be compatible with a
 - medicines.
 - be acceptable to patients (in terms

The HFCs used in asthma inhalers meet these criteria. A recent, peer reviewed study of 15,000 compounds confirmed that there are no other CFC alternatives that appear promising for use as propellants with inhaled medicines. HFCs do not deplete the ozone layer, and they have significantly lower global warming potentials than the CFCs that they replace in pharmaceutical applications.

The process of discovery, development, approval, introduction, and acceptance of any new medical inhaler requires significant attention to product efficacy, safety and quality issues to safeguard public

health. Therefore, it is not uncommon for this process to take more than ten years. An extensive reformulation programme for existing medicines, such as the CFC to HFC transition for MDIs, which involves worldwide commercialisation and patient acceptance, can take up to twenty years. In addition to the substantial costs involved, such an undertaking diverts finite research and development resources away from the discovery and development of much-needed novel medicines for asthma and other serious diseases.

HFCs were identified as a CFC replacement in the 1980's. In the past few years, after extensive safety and toxicity testing, the first HFC asthma inhalers have been introduced in several countries around the world, including in the United States and the European Union. Other HFC-propelled medications are awaiting regulatory approval and will be introduced during the next several years. At a cost of over \$1 billion, the pharmaceutical industry is now bringing a wide range of pressurised MDIs to patients around the world.

FACILITATING THE TRANSITION AWAY FROM CFC INHALERS

The decision to encourage the transition away from CFC-propelled inhalers was taken only a few years ago by the world community involved in implementation of the Montreal Protocol. The progression away from CFC MDIs will involve millions of patients and their health care providers around the world. With the introduction of the first non-CFC MDIs in some countries, this transition period is now just beginning. In the years ahead, patients and their caregivers will come to rely on the HFC-propelled medicines.

IPAC is undertaking educational initiatives with other public health groups to explain the transition to patients and healthcare providers. IPAC hopes that these educational materials help to alleviate any concerns patients may have about this change in their medicines. However, this important and worthwhile transition from CFC inhalers may not occur without guarantees to patients that the new HFC MDIs will remain available. If patients or physicians perceive that the implementation of the Kyoto Protocol could jeopardise the long-term availability of HFC inhalers, they may be reluctant to give up their CFC-propelled devices.

To facilitate the continuation and successful completion of the transition from CFCs, the Parties to the Kyoto Protocol should provide clear and explicit protection for this critical medical use of HFC inhalers.

PATIENT HEALTH AND IMPLEMENTATION OF THE KYOTO PROTOCOL

The Kyoto Protocol attempts to address adverse effects on the global climate resulting from human activity. IPAC shares the Parties' concerns about the potential effects of global warming on, among other things, human health, forests and other natural areas, freshwater supplies, and agriculture. The IPCC is now in the process of assessing the possible direct and indirect effects of climate change on human health. IPAC agrees with the Parties that the Kyoto Protocol should be implemented in such a way as to minimise any negative effects on public health and social welfare, especially in non-Annex I Parties.

IPAC acknowledges the important objectives of the Framework Convention on Climate Change and commends the Parties to the Kyoto Protocol for taking an important first step in achieving those objectives. It is in this context that IPAC seeks to contribute to the international deliberations on sound climate change policy. IPAC supports responsible use and handling practices for HFCs in all aspects of the MDI development and manufacturing processes. IPAC also understands the need for compliance with guidelines regarding good housekeeping practices, sound manufacturing operations, and responsible disposal and/or recycling of manufacturing waste.

The implementation of the Protocol should not jeopardise or impede the use of medical inhalers and aerosols by patients who need access to these medications. Protecting these medical uses is vital for public health and is consistent with the goals of the Kyoto Protocol.

-
- 1 National Heart, Lung, and Blood Institute, National Institutes of Health, "International Consensus Report on Diagnosis and Management of Asthma", US Department of Health and Human Services, Publication No. 92-3091, 29 (June 1992).
 - 2 The World Health Organisation (WHO) has stated: "In terms of ease of administration, availability and effectiveness, metered dose inhalers . . . may be the most appropriate method for administering inhaled medication to young children at home and in outpatient facilities." World Health Organization, "Bronchodilators and Other Medications for the Treatment of Wheeze-Associated Illnesses in Young Children" at 18, WHO/ARI/93.29 (1994).

**AstraZeneca • Boehringer Ingelheim • Chiesi Farmaceutici • Glaxo Wellcome
• Norton Healthcare Ltd. • 3M Pharmaceuticals**