White Paper

Remedy of the Commons

Addressing pharma's carbon footprint

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Introduction

CLIMATE CHANGE STRIKES AT THE HEART OF HEALTHCARE

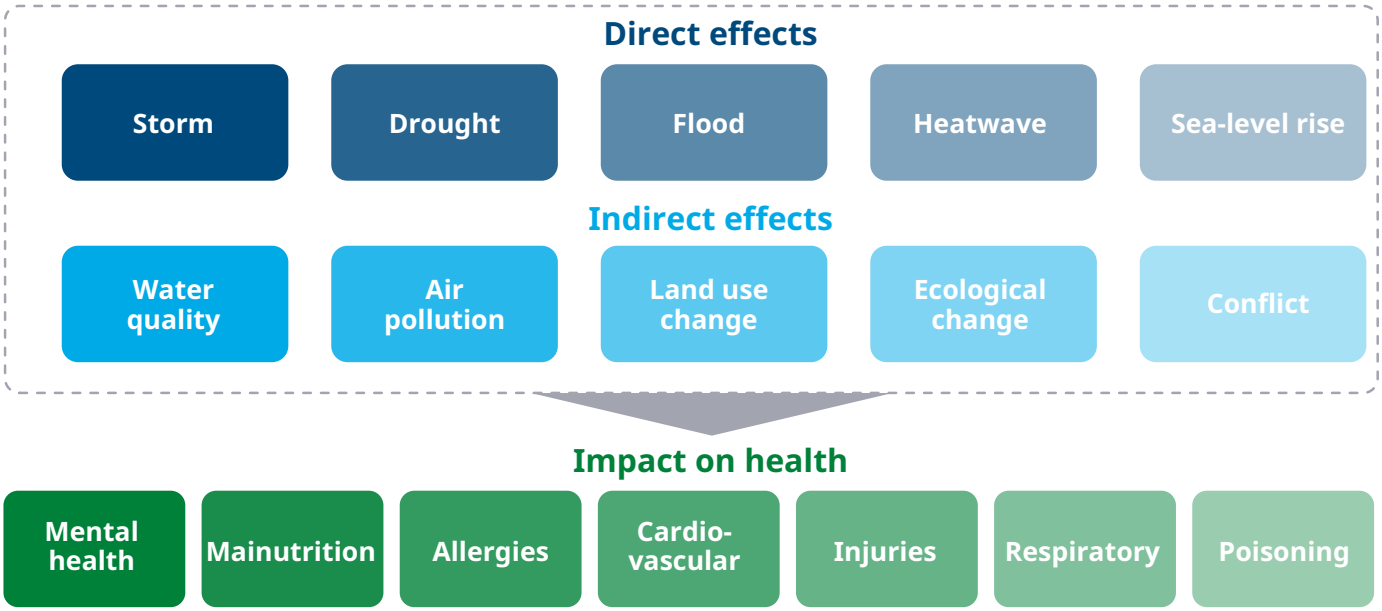
Rapid climate change has a direct impact on human health. These damaging effects arise from multiple causes, such as increased allergens, changes in the ecology of disease vectors and conflicts over resources (see Figure 1).[1] These risks to human health bear down heavily upon healthcare systems and their constituent organisations.

Ultimately, all healthcare stakeholders must act as stewards, forging a sector that benefits the whole population, healthy and sick. Logically, this would include acting to meet environmental goals, so that care no longer exacerbates the health problems that it will increasingly need to address. This can be a challenge when resources are scarce; for example, a report in 2021 suggested less than half (44%) of the public believed that the NHS in England had a responsibility to reduce its carbon footprint, and most had given it a lower priority than competing concerns, such as reducing waiting times or boosting staff morale.[2]

Whilst recognising these immediate challenges, greater public awareness of the bigger picture would encourage support for health systems to reduce their emissions which, collectively, is a large step towards fostering wellness.

Ultimately, all healthcare stakeholders must act as stewards, forging a sector that benefits the whole population, healthy and sick.

Figure 1: Effects of climate change on health and wellbeing



Source: IQVIA EMEA Thought Leadership. Adapted from https://doi.org/10.1016/S0140-6736(15)60854-6.

PRESSURES COME FROM BOTH EXTERNAL AND INTERNAL STAKEHOLDERS

A new wave of activism is sweeping over the private sector. Many prospective employees want to work for socially responsible companies, and when employed they increasingly voice environmental concerns to their leadership.

Externally, shareholder activism has risen sharply, driven in part by the growth of Environment, Social, and Corporate Governance (ESG) funds and a supportive regulatory establishment. A report from the GSI alliance[3] shows that ESG funds have grown from $22tn in 2016 to $35tn in 2020, rising from 28% to 36% of all assets under management in that period, although the methods of defining ESG in this context are increasingly contested.[4] Regulators are also facilitating ESG causes, for example in 2021 the US Securities and Exchange Commission restricted the ability for corporations to exclude shareholder proposals related to ESG[5] and there are plans to increase disclosure requirements in major jurisdictions. Shareholder activism is becoming a real risk to slow-moving companies; in 2021 ExxonMobil lost two board members due to activism by a small hedge fund that convinced larger shareholders the corporation was not doing enough to promote environmental causes.[6,7]

POLICY CONTINUES TO FOCUS ON REDUCING THE IMPACT OF CLIMATE CHANGE

Over the past couple of decades, since the Kyoto protocol in 1997, broader movements towards reducing the effects of climate change have been introduced by nations aimed at all industries. The latest evolution of this movement is the Paris Agreement, ratified in 2015, that specifically aims to keep global warming to well below 2°C and preferably to no more than 1.5°C compared to pre-industrial levels by 2050.[8] The European Union is aiming to go a step further with its European Green deal, introduced in late 2019, where it has committed to become the first climate neutral continent by 2050 and has allocated over €1tn to its objectives. These initiatives aim to provide a cleaner environment, affordable renewable energy, resilient industry, longer lasting products, and a better quality of life.[9]

As policies cascade down to practical application, associations have begun to set guidelines in order to begin acting. For example, the European Federation of Pharmaceutical Industries and Associations (EFPIA) recently released a high-level white paper outlining its members' commitments to climate change and showcasing select case studies from the industry.[10]

Notable in their absence are various international associations representing the innovative, off-patent, consumer health, manufacturing and distribution industries in both Europe and the US that have not communicated a position on the matter. Moreover, there is a lack of consensus across all associations on how to quantify and benchmark their members' carbon footprints.

NHS England was the first to take the ambitious step of committing to net-zero; pledging to do so by 2045.[11] During COP26, an additional 13 national health systems set net-zero dates but there are large countries yet to take this step, including Germany, France, Italy and the US.[12] However, some of these countries have an overarching mandate that will bind them to net zero such as with Germany by 2045 and France by 2050.[13]

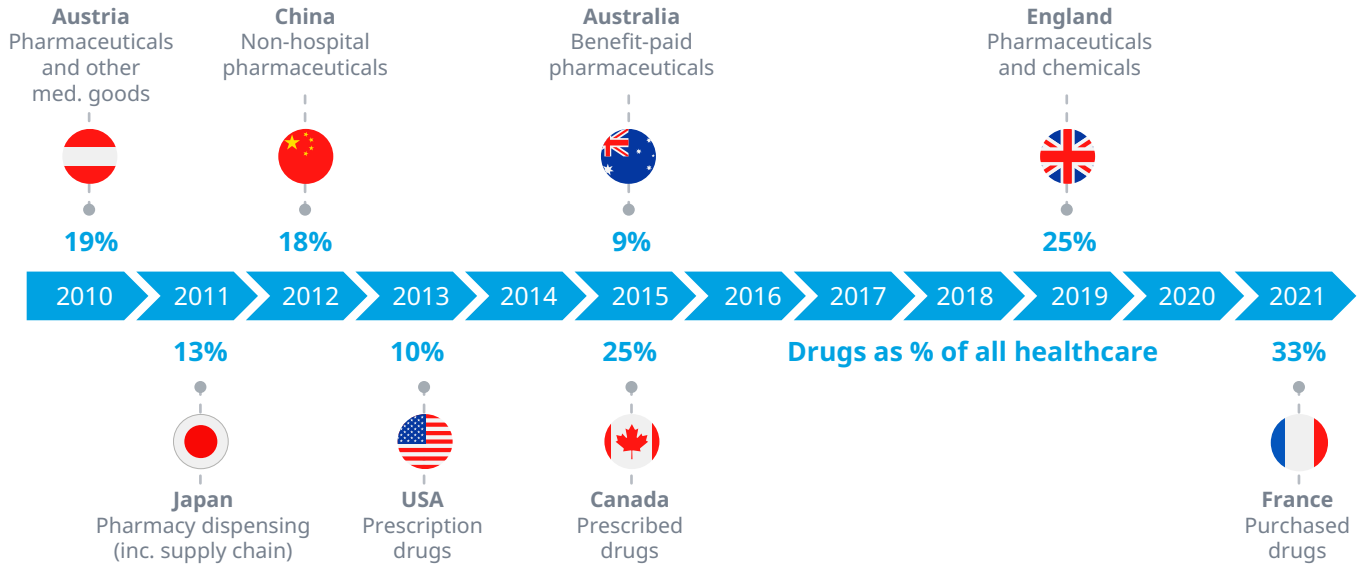
TAKING STOCK OF THE CURRENT SITUATION

The first step to achieving these goals is gathering the body of existing evidence. In the past decade, a small number of healthcare systems have attempted to determine their sources of carbon emissions (see Figure 2).

Recent figures by NHS England and France suggest the contribution from medicines ranges between 25-33% of their total healthcare system greenhouse gas (GHG) emissions respectively; making it one of the largest contributors and likely to be a focus area for action.

The carbon footprint of medicines will only be significantly reduced if the emissions from the majority of medicines volume is quantified and addressed. IQVIA calculates that 500 pharmaceutical manufacturers are responsible for 80% of the volume of all prescription medicines consumed by patients worldwide (e.g. pills, ampoules, pens, containers etc.); it is with these manufacturers where the biggest change is required (see Figure 3).

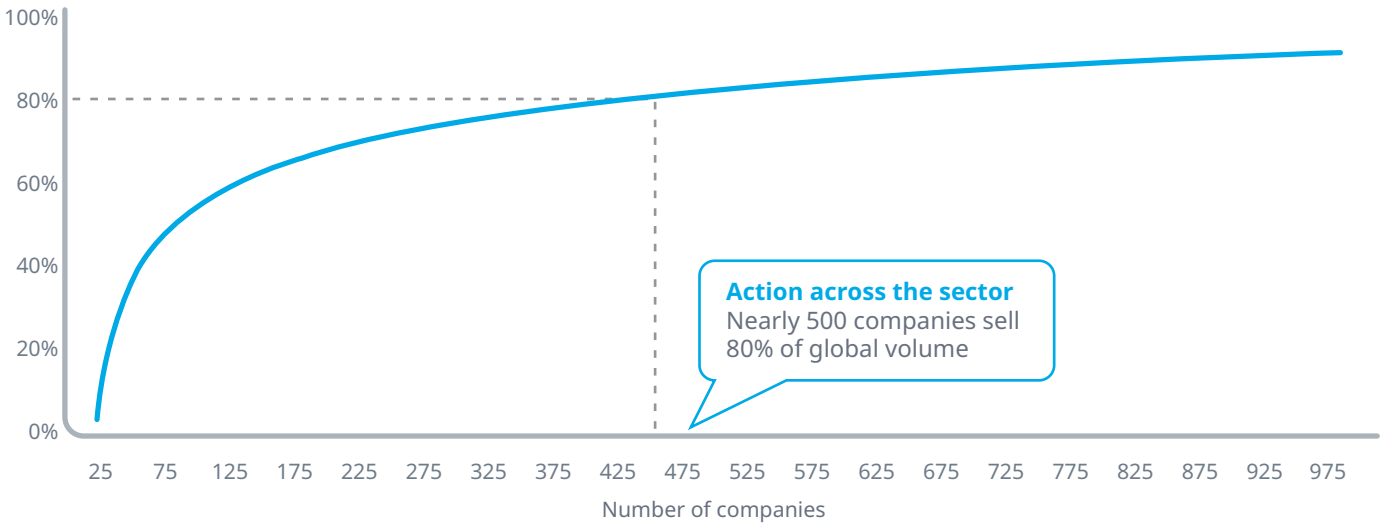
Figure 2: Reported medicines emissions by healthcare systems (% of all healthcare)



Source: IQVIA EMEA Thought Leadership.

Of these 500 companies, 20% are headquartered in the US, 30% in Europe, and 40% in India and China. With Europe and the US leading on policies to control energy use by manufacturers, further enforcement could yield meaningful results. However, for companies headquartered in India and China, where there has historically been lower regulatory oversight, more needs to be done by the industry to promote supply chain transparency and greener manufacturing. Actions such as introducing stricter procurement practices or introducing certifications could help.

Figure 3: Percent of all prescription medicines sold globally (Standard Units, 2021)



Source: IQVIA EMEA Thought Leadership; IQVIA MIDAS MAT Q2 2021; Rx-only.

Quantifying the pharmaceutical industry's carbon footprint

The aim of this report is to bring greater clarity to the carbon footprint from medicines by using three different models to estimate emissions (measured in mega tons of carbon dioxide equivalents; Mt CO_2e) to various levels of granularity.

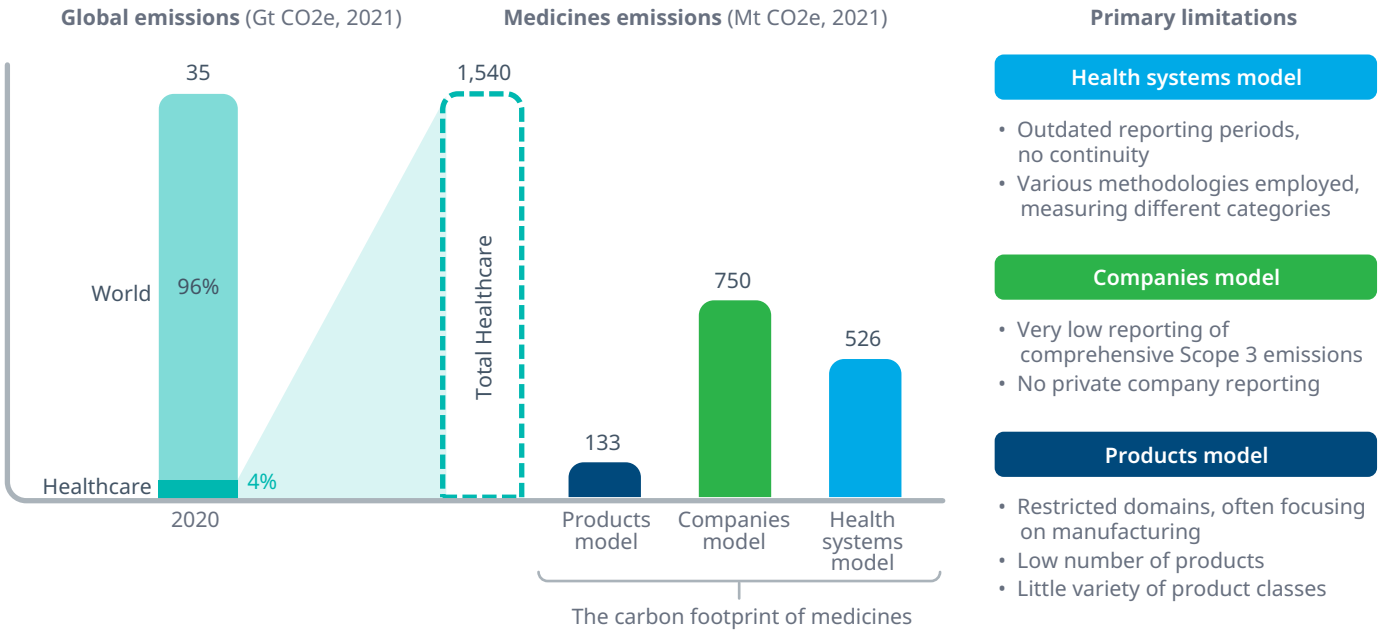
Academic studies estimate the emissions from healthcare at 4.4% of total global rates.[16] Using the Companies model (see the section on methodology for more information), the total carbon footprint of the pharmaceutical industry is estimated at 750 Mt CO_2e and in line with external estimates using similar techniques.[17] This is equivalent to 49% of all healthcare and is IQVIA's highest estimate, preferring to err on the side of caution (see Figure 4).

HEALTH SYSTEMS MODEL: A HOLISTIC VIEW

In 2019, NHS England published the most comprehensive review of a health system's carbon footprint to date. They combined top-down modelling (Multi-Region Input Output; MRIO) with values from individual product lifecycle analyses (LCA) to model their direct and indirect emissions.[18]

The NHS are not the first to estimate their impact on climate change, with many attempts having been made over the last decade. The data from eight major economies from over a decade suggests that the carbon footprint of medicines varies from 13% to 33% in Japan and France respectively. These results are not like-for-like as the methodology, time periods and domain vary significantly but they serve as a ballpark.

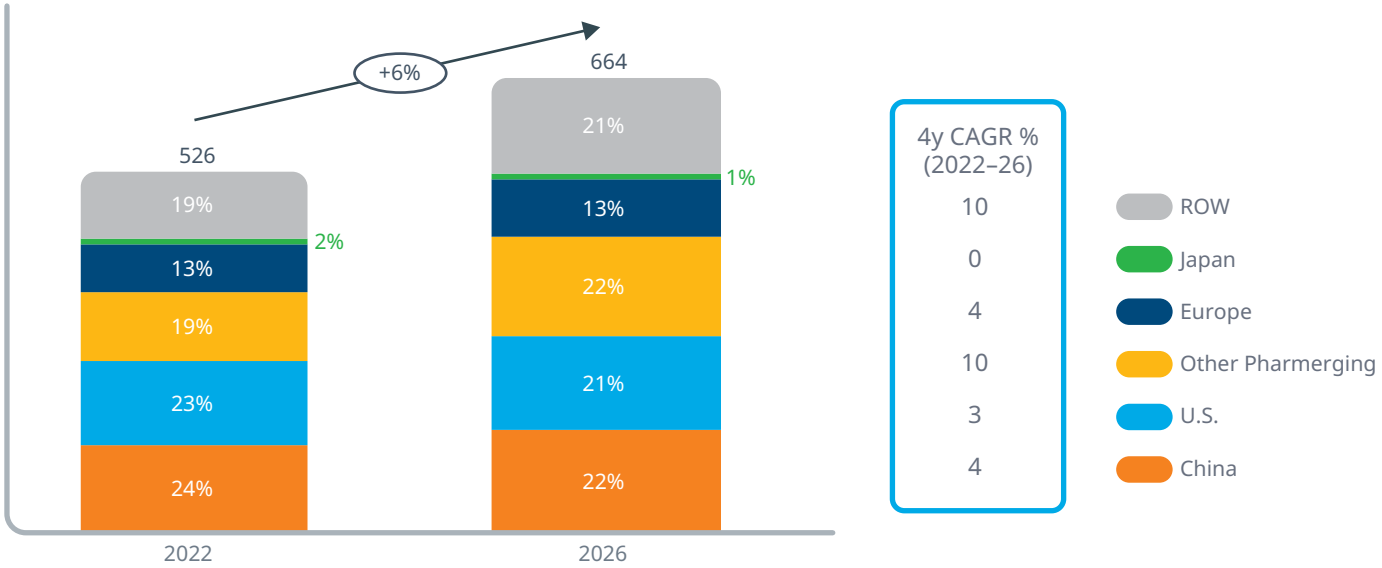
Figure 4: Estimates for the carbon footprint of medicines



Source: IQVIA EMEA Thought Leadership.

Only 8 of the top 100 companies have so far committed to net zero, with targets ranging between 2030 and 2050.

Figure 5: Growth in emissions of the pharmaceutical industry to 2026 (Health Systems model, Mt CO_2e, assuming constant intensity)



Source: IQVIA EMEA Thought Leadership; published Health system reports, IQVIA Market Prognosis Q3 2022.

The Health Systems model shows that the largest contributors to the carbon footprint are from China and the US (see Figure 5). Assuming a constant intensity, we expect that the growth in emissions will increase by 6% CAGR from 2022 to 2026, in part due to the value increase of Pharmerging[19] and ROW countries.

This model emphasises the point that although the US has a greater value share of global pharmaceuticals (42% in 2022), it has a smaller emissions intensity than Pharmerging (22% in 2022). Further work and data are needed to calibrate intensity figures to gain deeper insights using this model.

COMPANIES MODEL: STANDARDISING ESG REPORTING

Large western public companies have led the way on ESG reporting in the past five years and more are now doing so as this shifts from being optional to mandatory. Companies report their emissions in three scopes:

- Scope 1 are directly from activities under the company's control
- Scope 2 are indirectly from purchased energy
- Scope 3 are all other indirect emissions from sources outside a company's control.

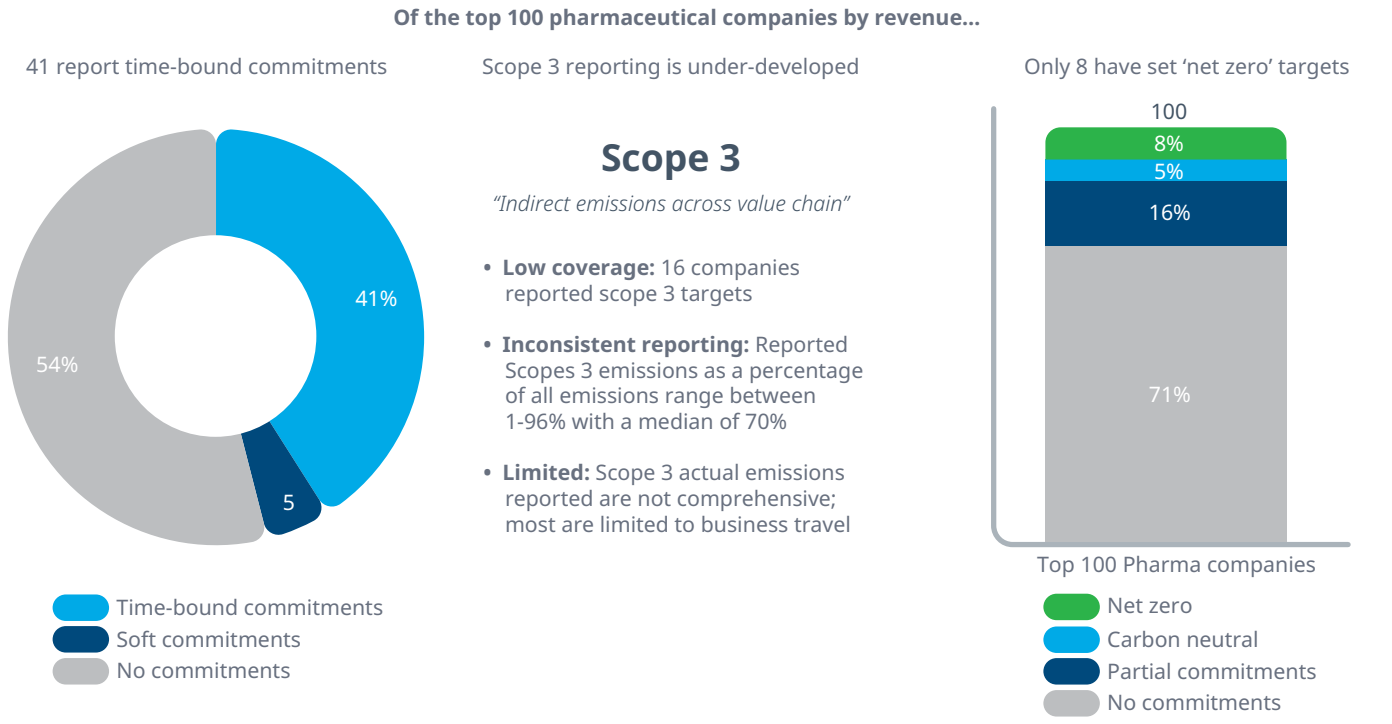
Commitments and progress data were extracted from the top 100 pharmaceutical companies by global prescription medicine sales using IQVIA MIDAS MAT Q1 2022 (see Figure 6). Three key learnings emerged from this exercise:

1. **Less than half of top 100 companies have reported time-bound commitments.** 41 companies reported commitments, although a larger proportion (n=52) began reporting actual emissions.

2. **Scope 3 reporting is under-developed.** Only 16 companies had reported Scope 3 targets but more had begun reporting actual Scope 3 impact (n=31). Further analysis on the latter shows that most of the data is on business travel alone, with a minority of 4 companies attempting a comprehensive Scope 3 estimate.

3. **Only 8 companies had set net zero targets across their value chain.** These goals are generally set to complete between 2040 and 2050. A larger proportion of companies (n= 29) had a partial commitment to carbon neutrality, mostly confined to scopes 1 and 2.

Figure 6: Publicly reported company commitments (Companies model)



Source: IQVIA EMEA Thought Leadership; IQVIA MIDAS MAT Q1 2022; Company reports accessed July 2022.

Carbon Neutrality is an important commitment taken by corporations. This is where they pledge that by a certain future date, they will offset GHG emissions compared to a reference year by purchasing carbon credits or funding carbon reduction projects. This concept is expanded further with net zero where companies do their best to minimise these emissions to below 10%, before offsetting the rest. Only 8 of the top 100 companies have so far committed to net zero, with targets ranging between 2030 and 2050.

PRODUCTS MODEL: GRANULAR INSIGHTS

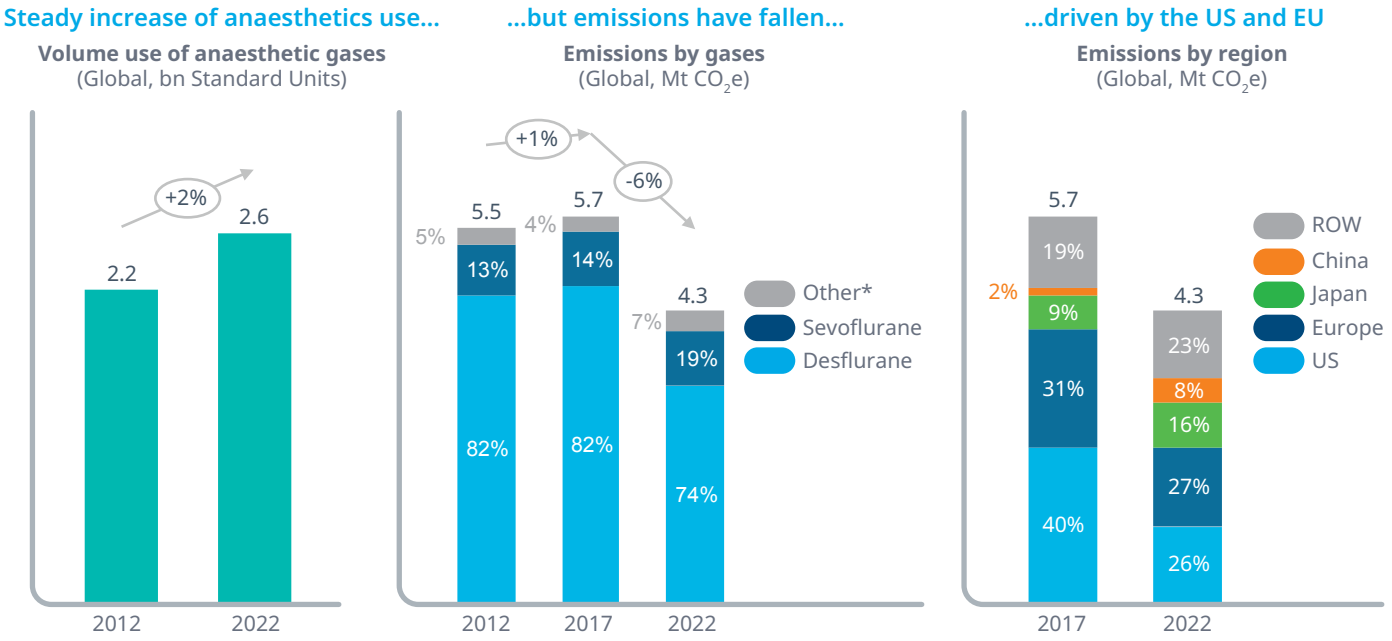
Arguably, the most powerful tool to investigate the industry's carbon footprint is by mapping the emissions from each type of medicine dispensed, for example biologics, small molecule or other class. In future, this could mean that a certification attached to each pack could influence prescribing and dispensing decisions based on how green a product is. Some types of medicine have especially high global warming potentials, which has spurred England's NHS to highlight a strategic focus on tackling anaesthetic gases and inhalers.

The global use of anaesthetics has increased steadily over the past decade, roughly matching population growth. Yet the resulting impact on the environment has decreased, especially in the last five years (see Figure 7), primarily driven by the conscious substitution of desflurane, a common anaesthetic gas, with greener gases such as sevoflurane. Amongst anaesthetic gases, desflurane is one of the most harmful, having 20 times the global warming effect than alternatives in a clinical setting. The reduction in desflurane has been driven primarily by the US and Europe, whereas its use continued to increase in Japan and China.

This global reduction is a positive development and is a clear case study of how the industry can work together to enact meaningful change. On the other hand, inhalers are yet to undergo this inflection point.

As with anaesthetics, the use of inhalers for asthma and other respiratory conditions has also grown at a modest rate and when mapped to emissions data, their combined impact on the environment has increased in lockstep (see Figure 8).

Figure 7: Global use of anaesthetic gases (Products model)

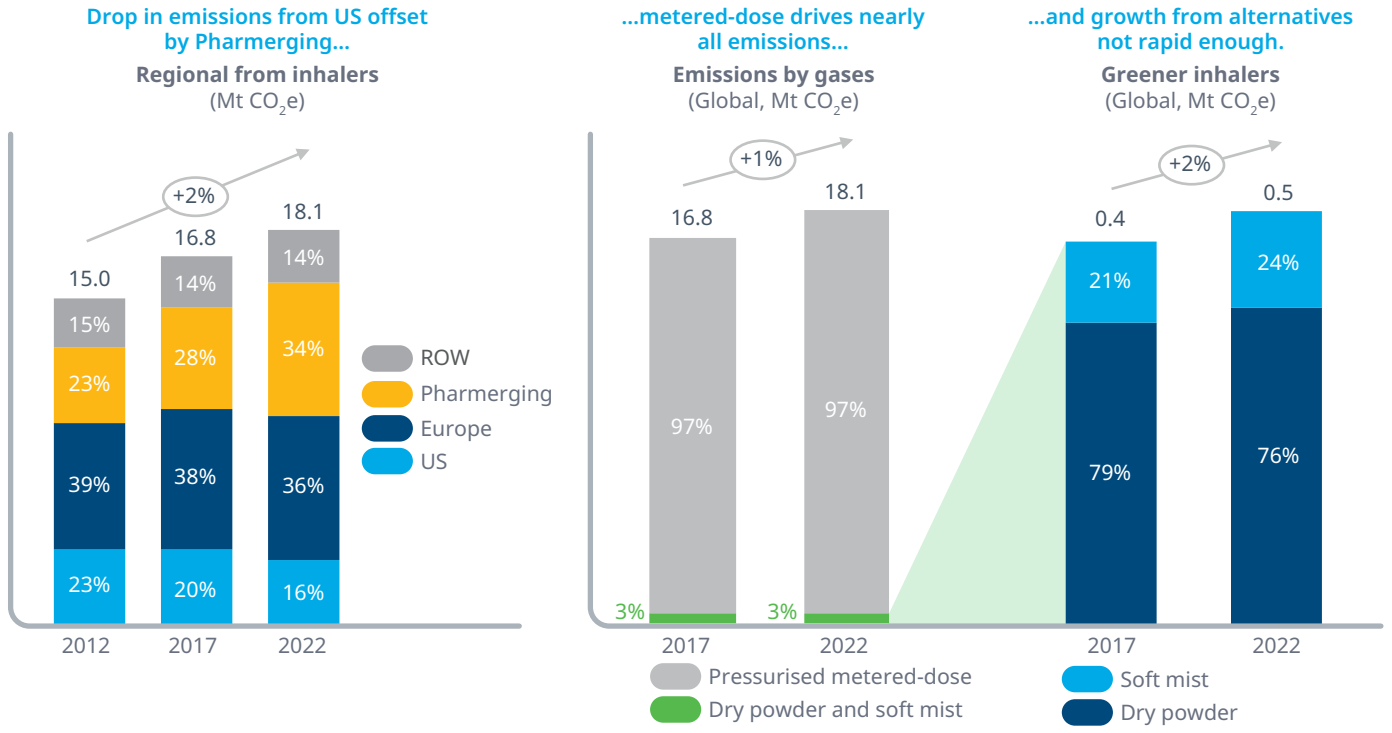


Source: IQVIA EMEA Thought Leadership; IQVIA MIDAS MAT Q1 2022; Rx-only.
Notes: *Other consists of NO_2, enflurane, halothane, isoflurane.

Pressurised metered-dose inhalers, the cheapest and most common type, use propellants (mainly HFC-134a and HFC-227ea) that have a global warming impact thousands of times higher than carbon dioxide.[22]

Propellant-free inhalers have not yet taken over as the dominant technology due to low availability amongst generic inhalers, lack of physician awareness, and institutional inertia.

Figure 8: Global use of inhalers (Products model)



Source: IQVIA EMEA Thought Leadership; IQVIA MIDAS MAT Q1 2022; Rx-only.

Net zero is not zero cost

Decarbonisation must take place across the whole value chain, from development through to manufacturing, distribution and administration (see Figure 9). The path to net zero will take time to establish and step one is getting a clearer understanding of what areas to focus on. Currently, publicly available data does not exist to break down the pharmaceutical industry's emissions by function, and other than the exceptions used in the Products model (see Methodology section), it is also not possible to easily identify individual products where progress can be made rapidly.

A report published for COP27 by the UN's 'high-level expert group' recommended using regulation instead of voluntary arrangements for businesses in all sectors to implement credible net zero pathways and to crack down on 'greenwashing', which is the practice of utilising ineffective policies to boost the perception that action is being taken.[23] This reinforces the importance of generating data, for example through conducting drug LCAs, that will ultimately give credibility to policy by separating genuine from insignificant action.

Health systems must be engaged as the regulators, payers and providers are ultimately beneficiaries of a reduced carbon footprint. This doesn't come for free and creates an inherent dilemma, where priorities to reduce the carbon footprint confronts commitments to reduce the cost of medicines. Net zero has cost implications for health systems that they must be up-front in addressing.

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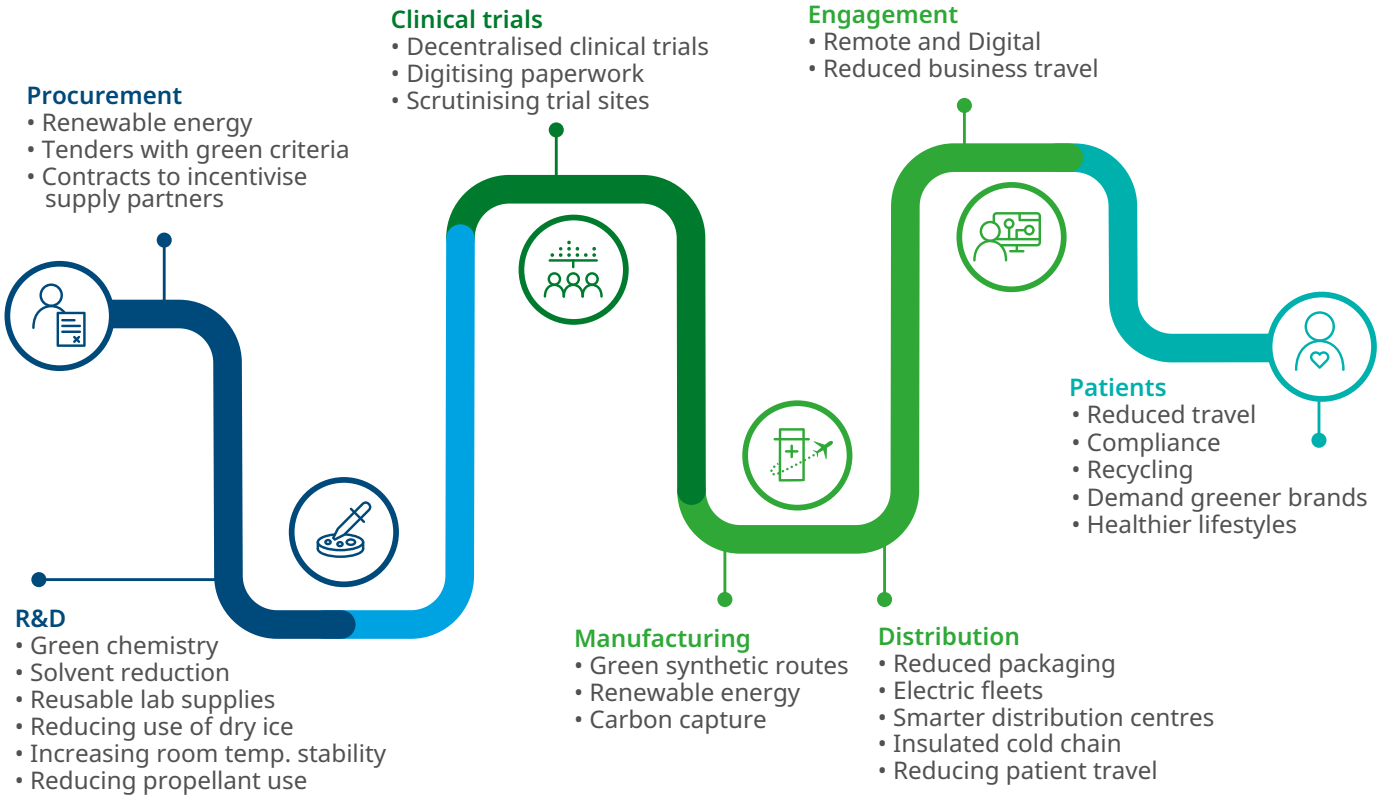
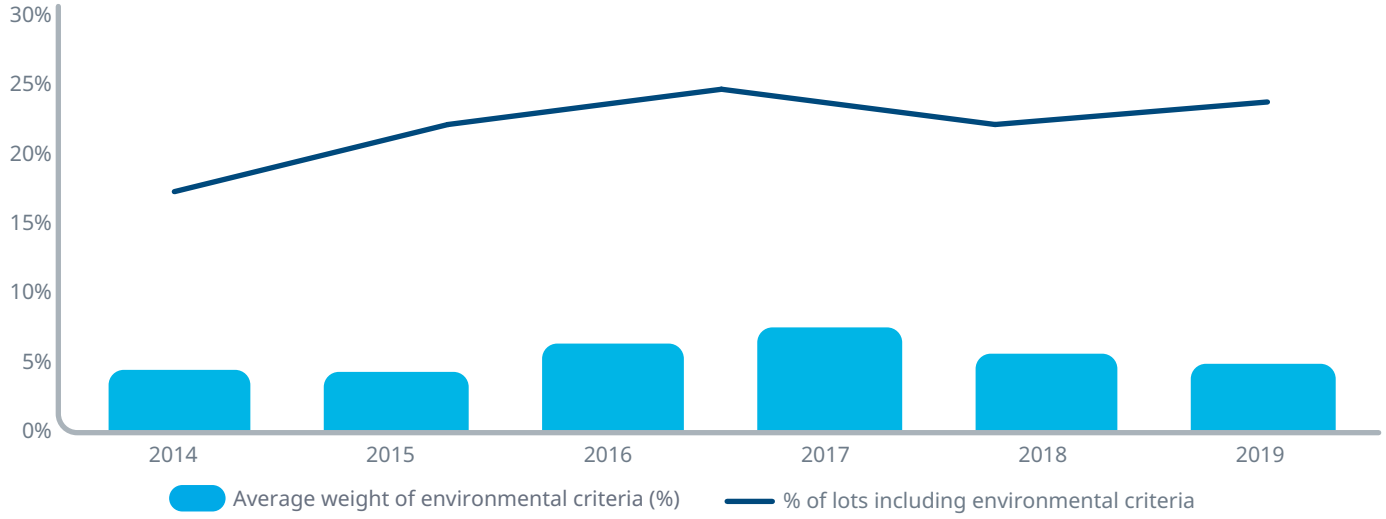
Figure 9: Areas of focus along the value chain



Source: IQVIA EMEA Thought Leadership.

Figure 10: 'Environmental' criteria use in tenders (Denmark, Norway, France, Spain, and the UK)



Source: IQVIA EMEA Thought Leadership; IQVIA THOR.
Note: Environmental criteria excludes other related areas such as sustainability, recycling, social responsibility, packaging, energy use and others.

If companies and health systems are to influence suppliers and customers, which make up the bulk of Scope 3, then they must move away from price-only purchasing and implement criteria that reward the reduction of GHGs. Where tenders are concerned, greater weight should be given to sustainable criteria, which are well understood but poorly implemented. A study of public tenders for prescription medicines between 2014 and 2019, shows a fall in multi-criteria tenders rewarding "environmental" attributes and an average weighting of only 5% (see Figure 10).

To incentivise innovation at an earlier stage in a product's lifecycle, greener clinical development and assessments can be employed. Decentralised clinical trials could reduce patient travel and with careful optimisation vis-à-vis delivering products and services closer to the patient, an emissions minimum could be achieved. A combination of regulatory and transport logistics amendments would need to be enacted to allow for this to happen.

Health technology assessment (HTA) bodies should consider evaluating the benefits that greener medicines bring to society and in in doing so, drive change in companies that are better capitalised to do so. Recently NICE provided a patient decision aid that encourages prescribing greener inhalers where appropriate[24] but HTAs have not yet considered environmental criteria as part of routine assessments.

On a positive note, this is the right time for the pharmaceutical industry to take the initiative and construct a viable path to net zero, where credibly impactful innovation is rewarded. Health systems must be at the forefront in shaping a greener future by aligning all stakeholders in their sphere of influence to enter and deliver on the race to zero.

A carrot and stick approach will spur the greatest change. Regulations demanding greater reporting should be balanced with flexible frameworks that make room for companies to experiment, for example by allowing them to conduct decentralised clinical trials, design greener devices or to treat patients nearer to home. This way, we can ensure that every person as well as every fraction of a degree will matter in the decades to come.

Three ways in which we can shape greener health systems

There are many ways to reduce GHGs and stakeholders are beginning to map out pathways.

The first step is to identify the areas where immediate impact can be made – but there have simply not been enough studies performed to give us the knowledge on which processes and products emit the most GHGs.

We hope that greater clarity can be achieved to make smarter, evidence-based decisions, and recommend three key steps:

1. **Commission lifecycle studies for relevant insights**

   For medicines, generating data across a wider range of product classes can get us closer to pinpointing areas to address at a granular level. The progress made globally with anaesthetic gases highlights how powerful this can be.

2. **Collaborate to share information across sector boundaries**

   Emissions do not happen in isolation, and some initiatives could have counterproductive consequences further down the line; as exemplified by the negative impact of replacing plastic bags with cotton totes.[25] A holistic approach should be prioritised, where public and private institutions can collaborate to share data and agree on reporting frameworks.

3. **Create an environment of accountability across all pharmaceutical players**

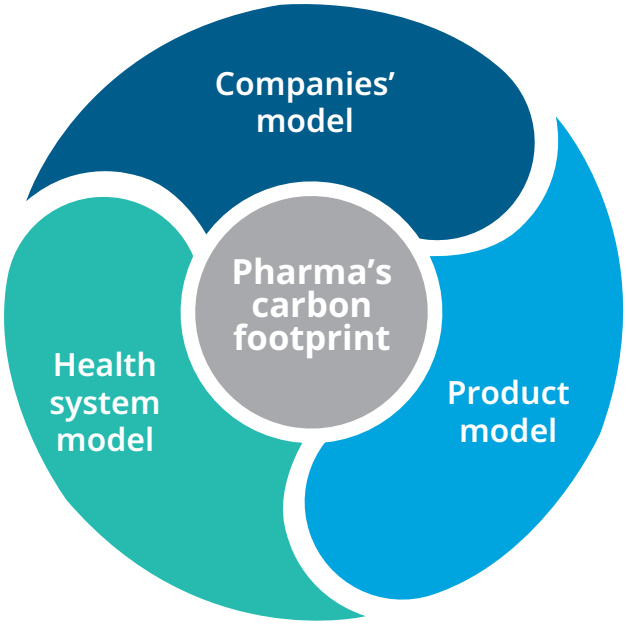
   Real change requires global action across pharmaceutical manufacturing. Shared responsibility must be felt across all levels within organisations. Indirect change should be encouraged by adapting procurement practises to influence purchasing decisions with external and international organisations. Holding everyone to a minimum standard is important and purchasers wield a lot of power here.

These steps will ultimately help us understand and improve the impact of healthcare provision on our environment, giving us the chance to collectively move towards improving population wellness and better outcomes for the healthy and the sick.

Methodology

Three models were constructed to consolidate existing data using differing methodologies and triangulate to an approximation of the pharmaceutical industry's carbon footprint (see Figure 11).

Figure 11. Approach to assessing pharma's carbon footprint



Source: IQVIA EMEA Thought Leadership.

HEALTH SYSTEMS MODEL

- Desk research identified 8 major health systems (see Figure 2) that had reported their carbon footprint
- The estimates for the contribution from medicines was extracted. Definitions varied on these, for example health systems measured non-hospital, pharmacy dispensing, prescription, benefit-paid medicines etc.
- The 8 countries were clustered into geographical regions to apportion intensity figures (carbon dioxide equivalents per dollar) according to the country's geography (US, China, Europe, Japan, Pharmerging, ROW)
- The data set ranged from 2010 to 2021 and so these were normalised to 2022 using revenue growth rates from IQVIA Market Prognosis (assuming constant intensity). This normalised data set was used to estimate intensity figures for each region
- IQVIA Market Prognosis data used estimate the carbon footprint of 220 countries in 2022 and forecasted out to 2026 (assuming constant intensity)

COMPANIES MODEL

- IQVIA MIDAS MAT Q1 2022 was used to generate a list of the top 100 companies by revenue
- For these top 100 companies, emissions were captured from their ESG reports published online. Data captured between April to July 2022
- The companies categorised by the following archetypes according to the majority of their sales (USD) using IQVIA MIDAS attributes:
  - Innovative specialty biologics
  - Innovative specialty small molecules
  - Innovative traditional biologics
  - Innovative traditional small molecules
  - Generics
  - Other
- These categories were used to generate intensity coefficients (carbon dioxide equivalents per dollar) for Scopes 1 and 2 emissions
- The aggregated intensity coefficients were used to calculate Scope 1 and 2 emissions for 16,000 companies in MIDAS
- The ratio of Scope 1 and 2 emissions against comprehensive Scope 3 disclosures were used to estimate the Scope 3 emissions of the 16,000 companies

PRODUCTS MODEL

- Literature search for LCAs relating to individual molecules or products was conducted to build a database where precise values could be mapped to IQVIA MIDAS, or a reasonable average could be constructed
- IQVIA MIDAS used to create the following categories by class of product:
  - oinhalers
  - anaesthetic gases
  - small molecules
  - monoclonal antibodies
  - insulins
  - other biologics
  - other
- Each of these categories mapped to LCA data at the lowest level available
- The total OTC market was assumed to have the same emissions intensity as small molecules and appended to the Rx calculations to arrive at an Rx + OTC figure

About the author

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Aurelio creates topical and forward-looking strategic content relevant to pharma executives and publishes articles, blogs, and white papers on a regular basis. He is involved in numerous projects related to ESG as well as the interface between healthcare and digital technology. He is considered a subject matter expert in these areas and speaks at numerous conferences worldwide, presents at board-level meetings and engages with consulting projects.

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