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Carbon Footprint of GP Practices Across Humber and North Yorkshire ICS

V1.4

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SEE SUSTAINABILITY

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Health and Care Partnership

Humber and North Yorkshire

Nonclinical carbon footprint analysis

Summary

This project has been designed to make a more robust attempt to calculate the contribution to carbon emissions from GP Practises across the Humber and North Yorkshire (HNY) Integrated Care System (ICS) region. Previous estimates were unreliable and based on the proportion of national share.

The number of patients within the HNY region is identified as 1,761,000 according to data from NHS Digital and there are 229 GP practices.

Emissions

Total Emissions

In total, clinical and non-clinical emissions for HNY are in the order of **128,400 tonnes CO_2e per year**. For a 10,000-patient practice, this is **729 tonnes (729,000kg) CO_2e** per year.

Non-clinical Emissions

In 2020, average CO_2e emissions per patient ranged between 8kg and 27kg with a mean of 15 kg. The total non-clinical carbon footprint for GP practices across HNY was about **26,400 tonnes CO_2e** (range 14,000 - 47,500 tonnes CO_2e).

Within the sample practices, with prescribed medicines and inhalers excluded, the top non-clinical contributors towards the carbon footprint are gas and electricity (17% and 12% respectively), business services (23%), staff and patient travel (23% and 18% respectively) and goods purchased (7%) (Figure 1).

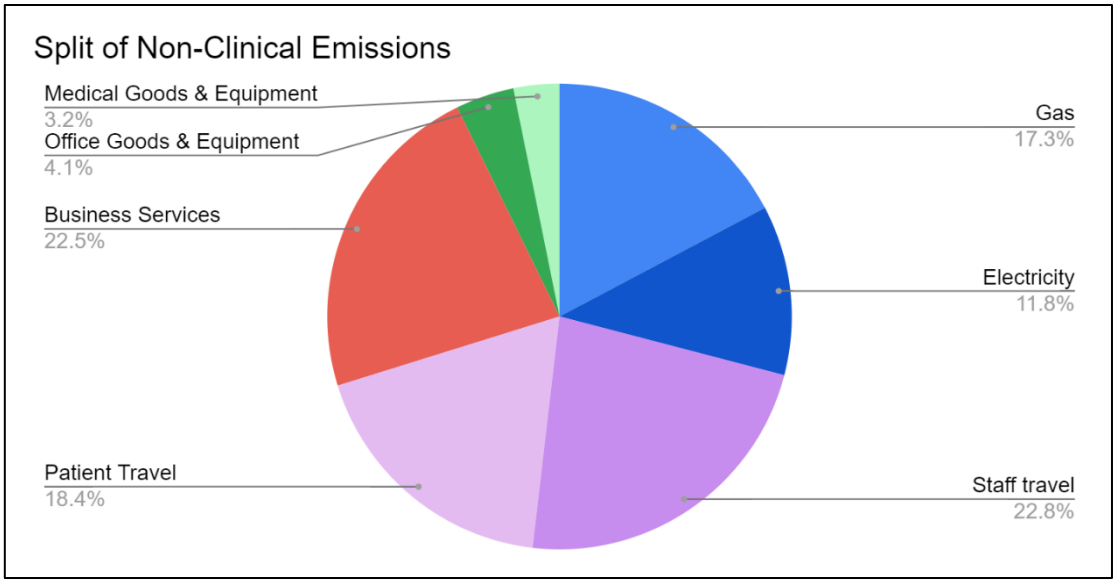

Figure 1. Representation of carbon footprint by area

Further detail of the breakdown of each area is provided in the relevant sections.

Clinical Emissions

Although not the focus of this piece of work, emissions from prescribing (based on expenditure) and inhalers (based on volume) are about 58 kg CO_2e per patient. For HNY, this equates to about **102,000 tonnes CO_2e per year.** Proportions attributable to non-respiratory spend and inhalers is shown in Figure 2.

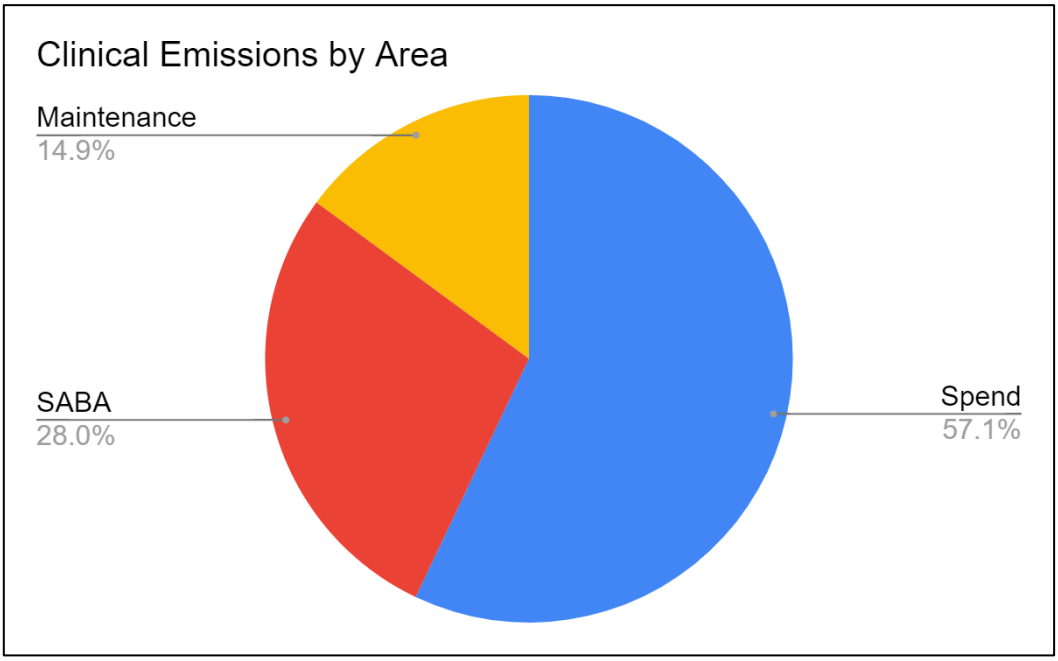

***Figure 2**. Total clinical emissions footprint by area*

The ratio between non-clinical and clinical emissions are about 20:80, as seen in Figure 3.

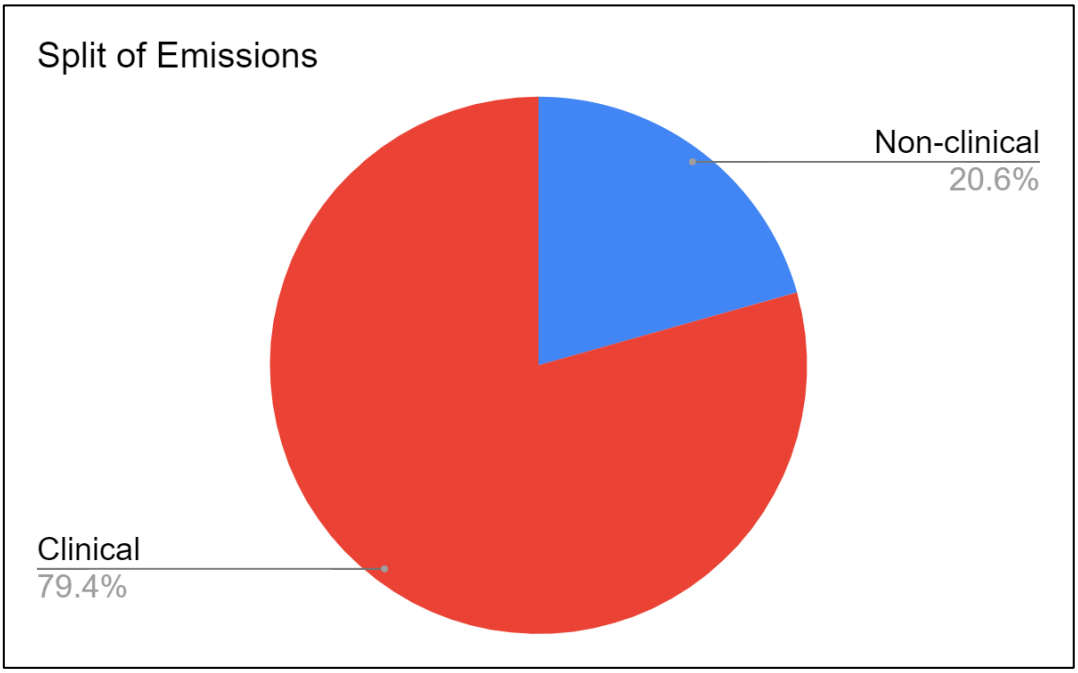

***Figure 3.** Split of clinical and non-clinical emissions*

Contents

Introduction

The number of patients within the HNY region is identified as 1,761,000 according to data from NHS Digital, and there are 229 GP practices.

Data covered a 12-month period between April 2020 to November 2021 which was collected and analysed in winter 2021.

A brief overview of the method used is available at SEEsustainability.co.uk.

Carbon Footprint Analysis Results

Total non-clinical footprint of the sample practices can be expressed either per patient - and range between 8 kg CO_2e and 27 kg CO_2e, or by physical floorspace - and range from 101 kg CO_2e/m^2 to 250 kg CO_2e/m^2 per year. There is no linear relationship between patient list size or floor space and CO2e emissions.

Table 1 shows the breakdown of the non-clinical emissions by area.

Table 1. *Non-clinical emissions by area*

Area	%
Staff travel	22.8
Business Services	22.5
Patient Travel	18.4
Gas	17.3
Electricity	11.8
Office Goods and Equipment	4.1
Medical Goods and Equipment	3.2

Working Towards Net Zero

Some excellent work has already been undertaken, for example:

- Solar panels at multiple practices
- Stickers to advise to turn lights off or automatic light sensors in multiple practices
- Several practices and individual members of Greener Practice
- Installation of showers for cyclists
- Cycle to work scheme being utilised
- Installation of a green team at a practice
- Recent design and planting of a garden/biodiversity area at a practice

To work towards net zero, several areas will need to have plans formulated and targets set. A guide for the practices will be available in Spring 2022 to help the development of a practice decarbonisation plan, looking to tackle the non-clinical contributions to the overall emissions footprint.

Energy

Gas

Overall, across the practices examined, the average was 164 kWh/m^2 compared to a national median gas use for office type businesses of 175 kWh per m^2.[1]

This is **4,567 tonnes (4.6 million kg) CO_2e** for the whole of the HNY area or 26,000 kg CO_2e per 10,000 patients per year.

Electricity

Overall average across the practices examined, the average was 81 kWh/m^2 compared to a nationally median electricity use of 84 kWh/m^2 for office type businesses.[1]

This is **3,120 tonnes (3.12 million kg) CO_2e** for the whole of the HNY area or 17,700 kg CO_2e per 10,000 patients per year.

For total energy, emissions ranged from 143 to 306 kWh/m^2, with a mean value of 245 kWh/m^2. Nationally, the mean figure is 259 kWh/m^2.

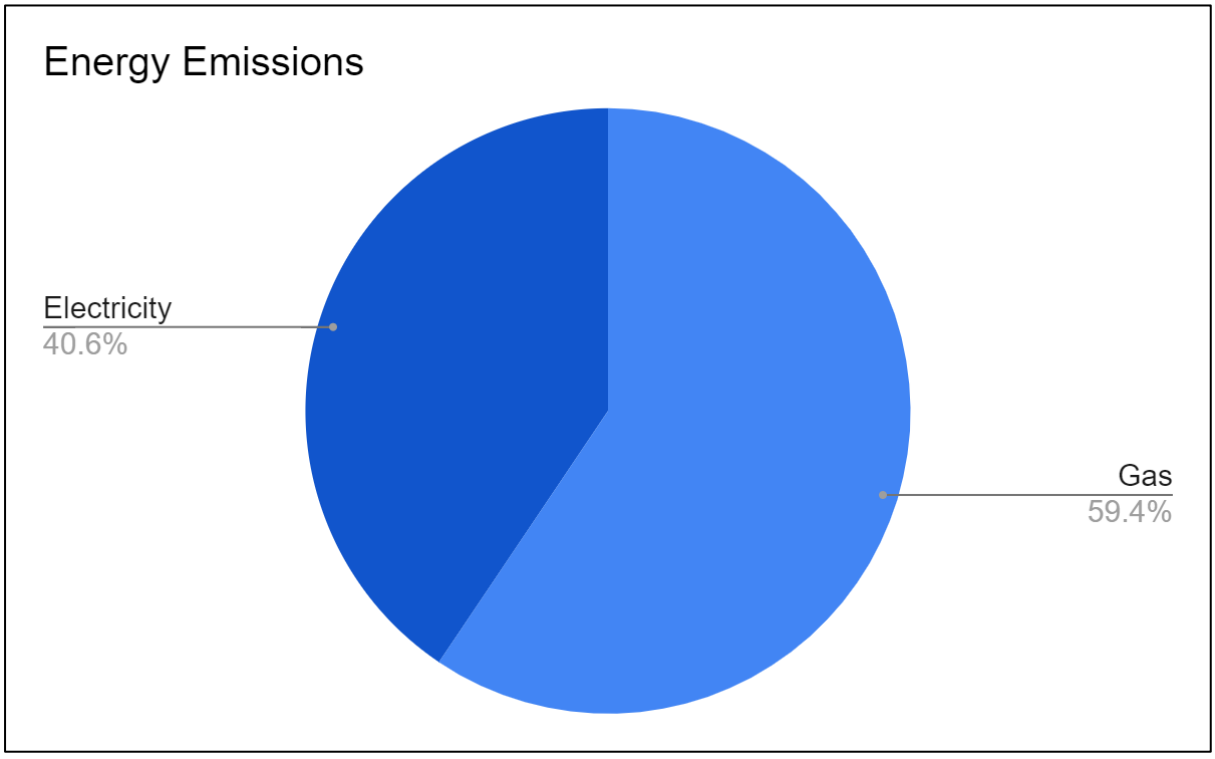

Figure 4. *Proportion of energy emissions due to gas and electricity*

Those with the highest energy use (highest percentage of the total non-clinical footprint) are in shared buildings and have their energy recorded on their EPC. They tend not to have access to their own meters or energy bills. EPCs were used to understand their emissions from energy. However, EPCs contain a reasonable degree of uncertainty surrounding the

1 assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/416369/non_domestic_national_energy_efficiency_data_framework_energy_statistics_2006-12.pdf

emission calculations, and so it is crucial for practices to have access to their energy bills to understand their spending and emissions from this area to set decarbonisation targets.

Gas is used for space and water heating; electricity is mainly for lighting, equipment (computers, pharmacy fridges etc.) and some space or water heating (fan heaters or kettles etc.).

Gas and electricity data was collected using energy bills and Energy Performance Certificates (EPCs) were used if there was limited data collection from energy bills.

Recommendations

- Practices have access to their energy use (total energy, energy per m^2) e.g., through their bills.
- Practices have access to smart meter data providing half hourly energy use.
- Practices have access to expertise to understand and review their energy use.
- Practices have the opportunity to set energy reduction targets for their use
- Practices follow the energy hierarchy as set out in the Decarbonisation Guide and start with 'making every kWh count'.

Observations

There were solar panels at 38% of surgeries visited. This has an impact on total energy use through self-generation and may be an unrepresentative sample overall.

Travel

Cumulative travel is important to understand as this travel by motor vehicle plays a role in carbon emissions and air quality.

A staff travel survey was distributed to each practice which collected information about total distances travelled, number of days worked and type of vehicle by each member of staff.

Patient travel covered the distance travelled from a home postcode to the surgery. Average methods of transport for different distances were obtained from National Travel Survey 2018 results.[2]

Staff Travel

Across the sample practices, staff travelled a mean distance of 4,650 km per member of staff per year (excluding any annual leave). Per 10,000 patients, there were an average of 32 staff across the practices. This equates, across the HNY area as 26.3 million km per year. This is the same as travelling to the moon and back over 68 times a year.

This is **6,000 tonnes (6 million kg) CO_2e** for the whole of the HNY area or 34,300 kg CO_2e per 10,000 patients per year.

In rural practices, the total emissions per member of staff per year for travel is 908 kg CO_2e.[3] In urban practices, the total emissions per member of staff per year for travel is 1108 kg CO_2e.

Patient Travel

Across the sample practices, total patient travel to and from the surgeries per 10,000 patients is 200,000 km. For the HNY area, this is over 35 million km per year. This is the same as travelling to the moon and back over 91 times a year.

This is **4,900 tonnes (4.9 million kg) CO_2e** for the whole of the HNY area or 27,600 kg CO_2e per 10,000 patients per year.

In rural practices, the total emissions per patient per year for travel is 2.7 kg CO_2e. In urban practices, the total emissions per patient per year for travel is 2.3 kg CO_2e.

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/823068/national-travel-survey-2018.pdf

[3] 25% of practices were classified as rural

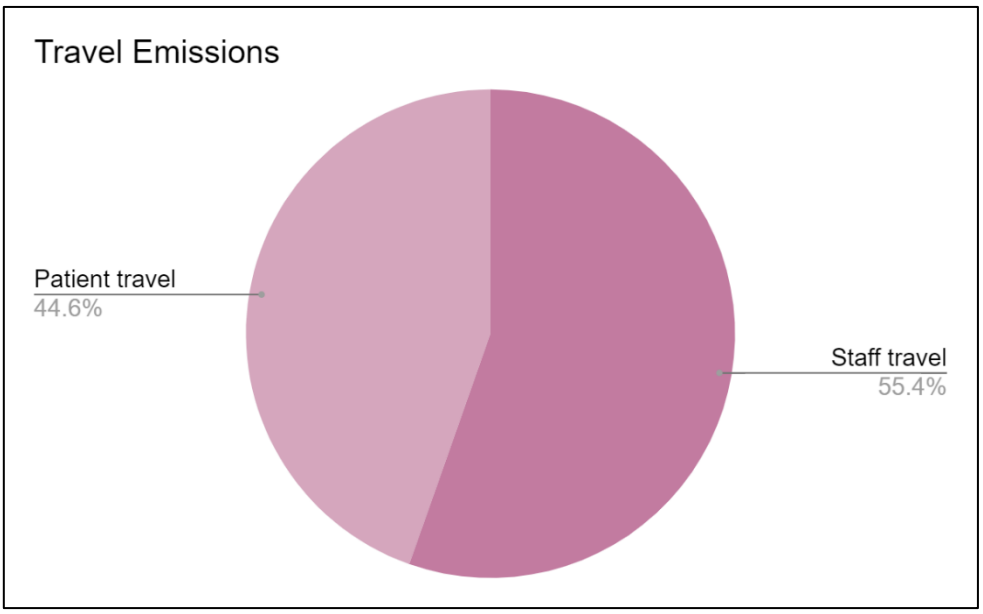

Figure 5. *Proportion of travel emissions due to staff and patient travel*

Observations for Staff Travel

The most popular mode of transport for staff was by petrol/diesel car. On average, across the sample practices, 84% of staff used a petrol/diesel car to get to work during a typical week. This includes staff who used other modes of transport on other days of the week. 77% of staff used a petrol/diesel car every day for their commute.

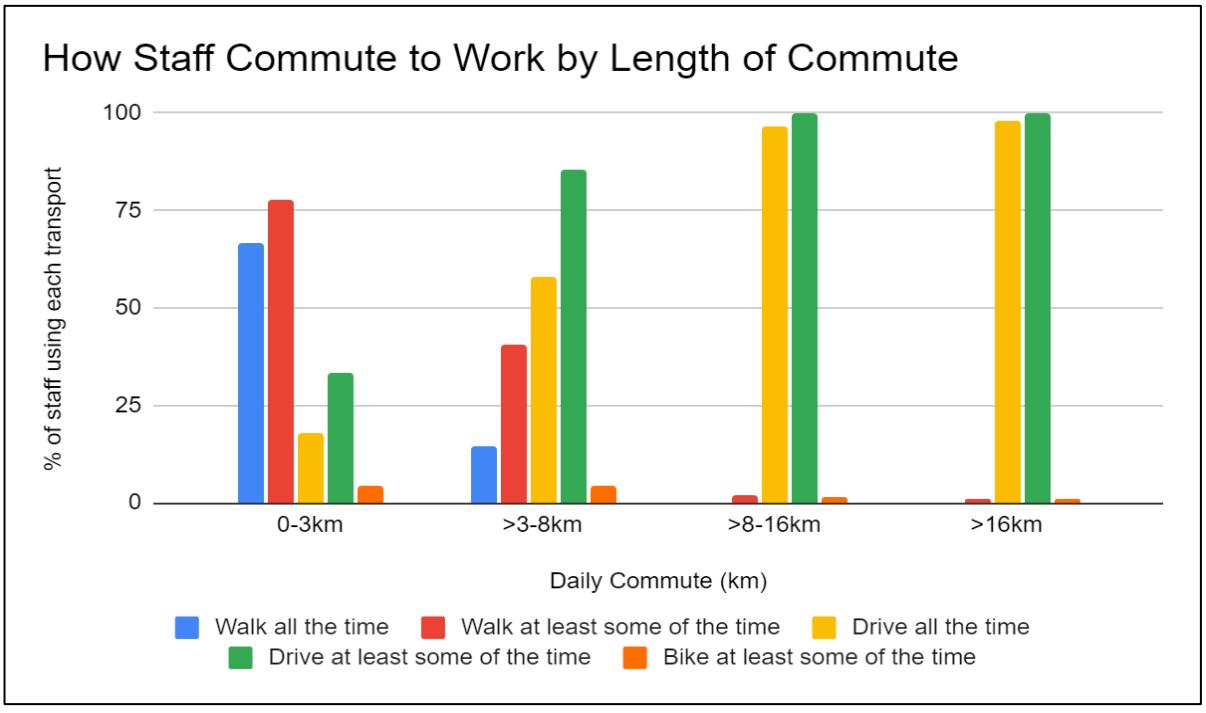

Figure 6. *Staff commute by distance and mode of travel*[4]

[4] Percentages in each commute length category do not add to 100% as staff overlap in different categories.

Overall, average staff travel emissions are lower in rural areas than urban ones. However, this research is based on a small sample size, so may not be representative.

14% of staff live within 1.5 km of work (or 1 mile) or 3 km daily commute.

Walking
Within the rural practices, there is a wide range of staff who only walk to work - ranging from 3% in the lowest walking practice up to 18% in the highest. The overall average for staff walking across all practices is 11% and 18% of staff walk at least some of the time.

In some urban practices, there was a high percentage of staff walkers - from 21 to 28%, well above the region average.

The average percentage of staff who walk at least some of the time is 18%, rising to 36% in one practice.

Cycling
No member of staff who answered the survey only used a bike to get to work. There were a small number (2%) of people who did cycle but would drive on other days of the week as well.

Public transport
No staff used public transport, including the bus, to get to work.

Observations for Patient Travel

Although patients travel a longer distance over the course of a year, they contribute less emissions than the staff travel over the same time period. This is due to the type of transport taken by staff and patients, with staff tending to use more carbonised transport than patients.

Business services

Business services account for around **5,965 tonnes (5.96 million kg) CO_2e** for the whole of the HNY area or 34,000 kg CO_2e per 10,000 patients per year.

Services are required for the successful running of the practice. Some services - such as servicing of equipment is a non-negotiable essential and meet CQC requirements.

Observations

Each service used by the practices has a carbon footprint. It is often not possible to identify an accurate carbon footprint for tier 1 suppliers unless they have carried out a carbon audit of their own and published their findings. However, there are average conversion factors for different professions based on the amount of CO_2e per £ spent. The services with the larger spend are therefore likely to have the larger footprint. For example, total CO_2e for telecommunications is 0.298 kg per £ spent.

Recommendations

In line with the NHS Net Zero report and decarbonising the supply chain, from April 2027 all suppliers with contracts for goods, services, and/or works for any value, will be expected to publish a carbon reduction plan that considers the suppliers' direct and indirect emissions.

- Practices, PCNs and ICSs start to amalgamate list of business suppliers used across primary care.
- At a regional level, suppliers of services are identified and informed of the forthcoming requirements.
- Suppliers are advised they will need to have a carbon assessment performed[5].

[5] https://www.england.nhs.uk/wp-content/uploads/2021/09/item4-delivering-net-zero-nhs-updated.pdf

Purchased Goods

The average total carbon footprint for goods purchased is **1,900 tonnes (1.92 million kg) CO_2e** for the whole of the HNY area or 10,900 kg CO_2e per 10,000 patients per year.

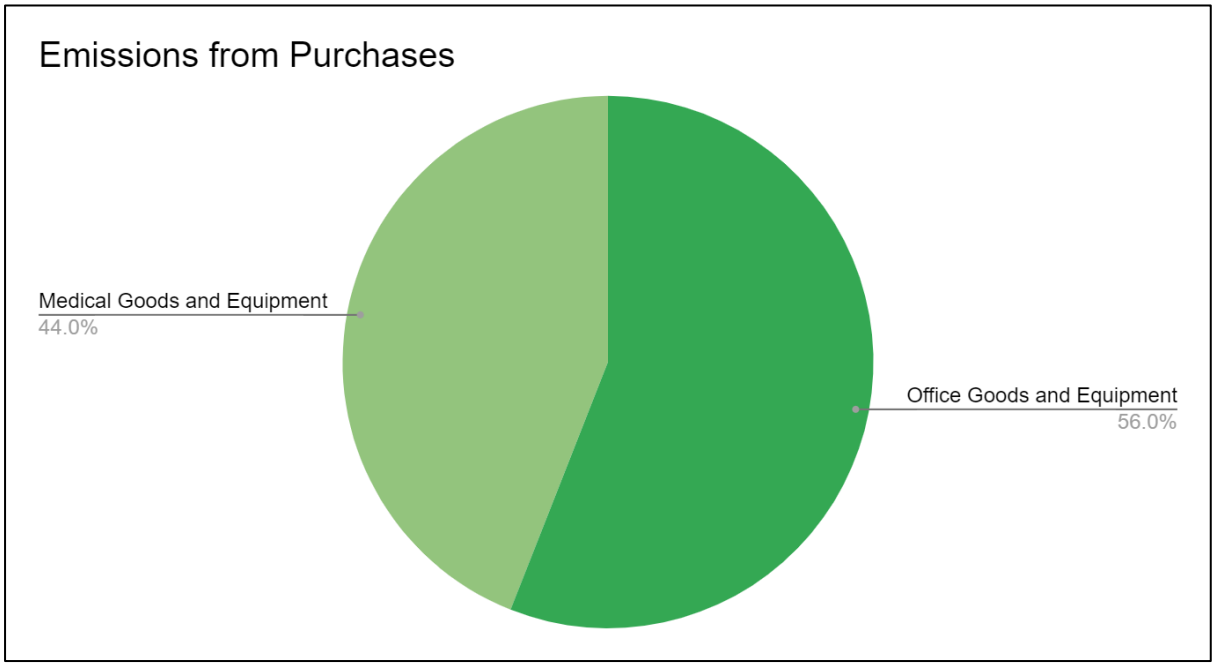

Figure 7. *Proportion of emissions due to procurement of medical or office goods*

Medical Equipment and Consumables

The total carbon footprint is **846 tonnes (846,000 kg) CO_2e** for the whole of the HNY area or about 4,800 kg CO_2e per 10,000 patients per year.

Medical supplies and equipment include items ranging from rubber gloves and couch rolls to PV speculums and spot plasters, from blood pressure machines and pulse oximeters to ECG and spirometry machines. Each can be converted into an amount of greenhouse gas emissions depending on materials and manufacture, resources used and type of material in the product.

Office Equipment and Consumables

The average footprint is **1,076 tonnes (1.08 million kg) CO_2e** for the whole of the HNY area for office goods and equipment or about 6,100 kg CO_2e per 10,000 patients per year.

Office supplies and equipment include items ranging from printer cartridges and paper to paper clips and cleaning cloths.

Recommendations

Recommendations in stock control, stock audits, and talking to suppliers to influence changes within their business.

Clinical Emissions

The footprint for pharmaceuticals is the largest proportion of the total carbon emissions footprint of general practice.

Total Clinical Emissions

The total clinical emissions are **102,000 tonnes CO_2e** for HNY per year or 580 tonnes CO_2e per 10,000 patients.

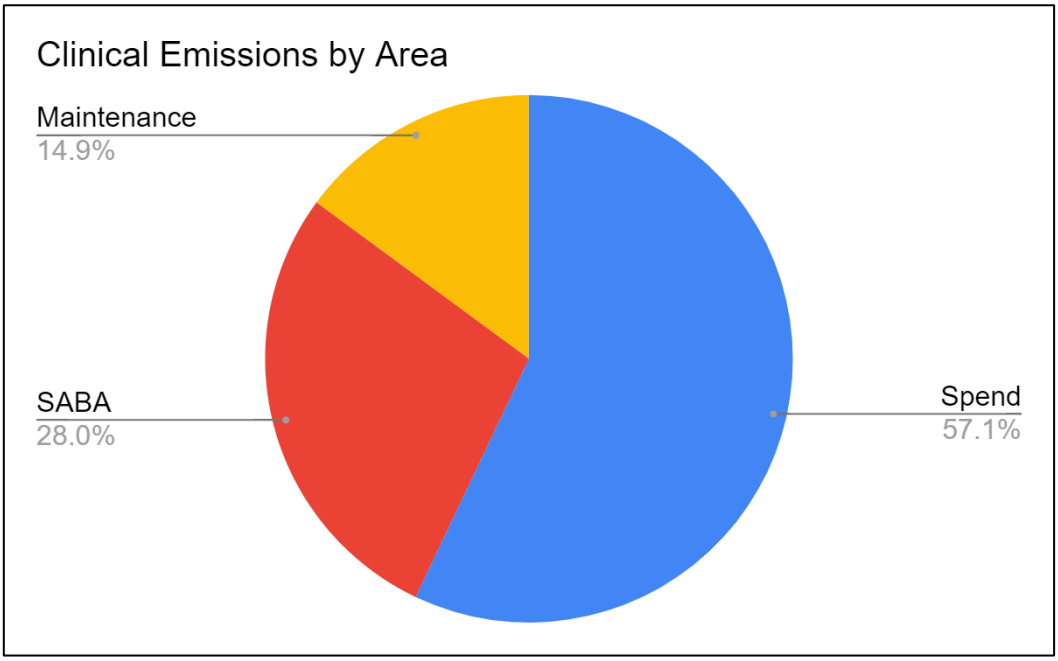

Figure 8. *Proportion of clinical emissions due to inhalers and other pharmaceutical spend*

The clinical emissions are calculated using the following formula:

Total clinical emissions = (total prescribing – respiratory prescribing) + inhaler emissions

Prescribing Emissions

Based on data from NHSBSA and medication bought by the practice (Data Oct 20-Sept 21), average total practice prescribing spend was £2.36 million per 10,000 patients. National data shows respiratory spend is about 10% of the total.[6]

Prescribing spend is £2.36 million per 10,000 patients. Respiratory prescribing is 10% of the prescribing spend (£0.236 million). Therefore, emissions from prescribing spending excluding respiratory prescribing is £2.12 million per 10,000 patients.

Using a conversion factor for CO_2e per £ spent on prescribing, for the whole of HNY, this is **58,200 tonnes (58.2 million kg) CO_2e** per year or **331 tonnes** (**330,500 kg) CO_2e** per 10,000 patients per year.

[6] https://www.nhsbsa.nhs.uk/statistical-collections/prescription-cost-analysis-england/prescription-cost-analysis-england-2019

This is the least accurate figure as pharmaceutical emissions are based on spend data and a single conversion factor. This method has known errors but is the best currently available.

Inhaler Emissions

For the whole of HNY, the total emissions footprint from inhalers is **43,800 tonnes (43.8 million kg) CO_2e** per year or **249 tonnes (249,000 kg) CO_2e** per 10,000 patients per year. Of which **162 tonnes CO_2e** is SABA and **87 tonnes CO_2e** is maintenance inhalers per 10,000 patients per year.

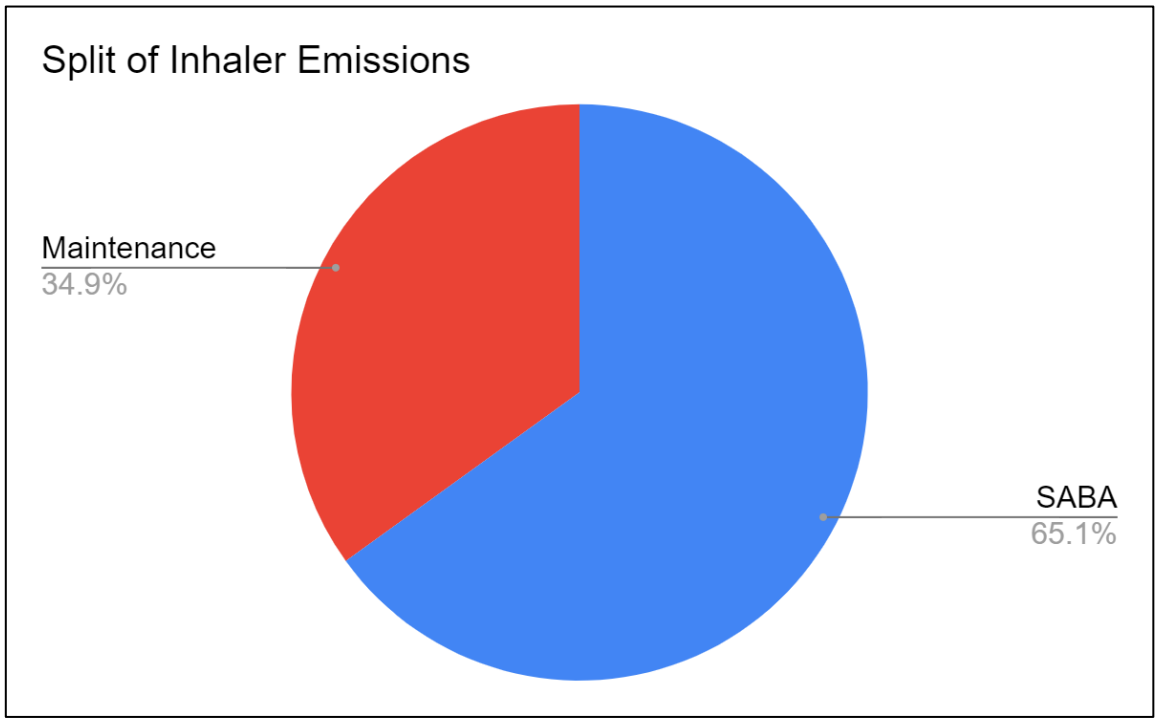

Figure 9. *Emissions from inhalers by proportion of SABA and maintenance inhalers*

As expected, the largest single contributor to the prescribing footprint are inhalers. Total CO_2e produced by inhalers prescribed per year using a combination of data from openprescribing.net and NHSBSA (PACT2).

For most practices, the majority of the emissions are due to SABA prescribing. Although almost all practices had a 65:35 SABA : maintenance ratio, one practice reversed this with a 39:61 ratio.

Maintenance inhalers

Maintenance inhaler emissions are **15,200 tonnes (15,228,000 kg) CO_2e** for the HNY area per year or an average of **87 tonnes (86,500 kg) CO_2e** per 10,000 patients per year.

Across all the sample practices, an average of 35% of the emissions from inhalers were due to maintenance inhalers.

The most popular maintenance inhalers that featured in the top five inhalers prescribed by practices was the Fostair 100micrograms/dose/6micrograms/dose inhaler which was the most prescribed inhaler in six practices. This inhaler emits 19.63 kg CO_2e. Table 2 shows the

inhalers that featured most in the top five maintenance inhalers prescribed by the sample practices.

Table 2. *Top five most prescribed maintenance inhalers across the sample practices*

Inhaler	% frequency inhaler featured in top five prescribed by practices	CO_2e per inhaler
Fostair 100 micrograms/dose /6micrograms/dose inhaler	100	19.63
Clenil Modulite 100 micrograms/dose inhaler	100	20.63
Fostair 200 micrograms/dose /6micrograms/dose inhaler	88	19.63
Generic Trimbow 87 micrograms/dose/5micrograms/dose/ 9micrograms/dose inhaler	50	12.29
Clenil Modulite 200 micrograms/dose inhaler	38	20.36

SABA Inhalers

SABA inhaler emissions are **28,600 tonnes (28,588,000 kg) CO_2e** for the HNY per year or an average of **162 tonnes (162,400) kg CO_2e** per 10,000 patients per year.

The most popular SABA inhaler was the Ventolin Evohaler which also has the highest emission per inhaler at 28.26 kg CO_2e.

Across all the sample practices, 65% of the emissions from inhalers were due to SABA inhalers. This doesn't differentiate between those with COPD and asthma - so for the former, the prescriptions may be appropriate. However, high levels of SABA prescribing (more than 3 inhalers per patient per year), are shown to double the risk of exacerbation and could be a marker of poorer patient outcomes (and poorer clinical care).

Decarbonisation Plan

To reach the ambition of the NHS to achieve net zero, each contributing sector needs an individual plan. The accompanying Decarbonisation Guide for practices gives an insight into an approach to reduce the emissions in a logical, methodical, and achievable manner.

Space and water heating (gas) and electricity can be decarbonised. If both were achieved, the non-clinical carbon footprint of the running of the business would reduce by **29% (46,700 kg CO_2e per 10,000 patients)**. This could be money saving and financially beneficial to practices.

Options include reduced use, eliminating waste, decarbonised heating systems, self-generated electricity or 100% green tariff electricity supplier.

Staff and patient travel contribute **61,900 kg CO_2e per 10,000 patients**, or 41% of the total non-clinical footprint. Providing options to reduce travel, enable active transport, remote working (staff) and consultations (patients), using public or shared transport and decarbonising single use transport would all impact on the overall figure.

Professional services contribute to 22.5% of the total non-clinical footprint, or **34,000 kg CO_2e per 10,000 patients**. Using influence to start conversations with services supplied to the business, reducing their carbon footprint will have gains for the practice carbon footprint.

Purchased goods make up 7% of the total non-clinical footprint, or **10,900 kg CO_2e per 10,000 patients.** Examining the current clinical pathways can demonstrate alternative lower carbon options which maintain excellent clinical care.

Clinical Benefits

The largest single measurable contributor to the footprint of prescribing is inhalers. Much work is already going on to improve the environmental sustainability of respiratory care.

However, the biggest gains could be seen from changing the overall approach to medical practice with more 'realistic' and lifestyle medicine although both more time consuming and in need of the support of a variety of external statutory and non-statutory organisations to enable this to happen. Options include footprint ranging from medication and compliance reviews, encouraging non-drug options for health including social prescribing, practicing realistic medicine[7] and looking at lifestyle medicine[8].

[7] www.nhsinform.scot/care-support-and-rights/nhs-services/using-the-nhs/realistic-medicine

[8] bslm.org.uk/

Appendix 1

Assumptions for Travel

- Staff holidays are not factored in the travel calculations. If there are 6 weeks leave per year, then distance travel can be reduced by about 11% (6/52).
- Staff take the shortest route to and from work.
- Effect of seasonal variations (more likely to walk or cycle in the summer, less likely in the winter/on wet days).
- The practice is open for 252 working days per year.
- Staff travel is based on the staff who completed the travel survey which accounts for the majority of practice staff in each practice.
- Patients travelled the most direct route to and from the surgery and the reason for travel was to attend their appointment.

Assumptions for Business Services and Procurement

- Where there were not enough details on receipts to identify how many items had been purchased, similarly priced items were found on other procurement websites and those details were used to calculate the carbon emissions.

Appendix 2

Details for Medical Equipment

Data collection, where possible, includes product level information. For example, each box of 100 rubber gloves has a footprint of about 4.2kg CO_2e and each IUCD pack has a footprint of about 1.6kg CO_2e.

The European Tissue Symposium calculates that for 10 kg of tissue produced, 13 kg of CO_2e are generated. As each couch roll weighs 1.3kg the amount of CO_2e generated is 1.9 kg CO_2e.