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SUSQI PROJECT REPORT

Project Title:

Turning Blue Inhalers Green - High Quality Low Carbon Asthma Care

Start/End date of Project:

April 2022 - Ongoing

Team Members:

Jackie Reynolds Pharmacist Prescriber at Oakfield St Surgery and Medicines Management Primary Care Respiratory Lead Pharmacist Aneurin Bevan University Health Board

And Practice staff at Oakfield St Surgery

Date of Report:

07/07/2022

(Data updated in February 2023)

Background:

In March 2021, the [NHS Wales Decarbonisation Strategic Delivery Plan \(gov.wales\)](https://www.gov.wales/government/policies/healthcare/healthcare-decarbonisation-strategic-delivery-plan) was published outlining recommendations and initiatives for the public sector in Wales to be net zero by 2030. Three of these recommendations are specific to inhalers:

- Take a patient centric approach to optimise inhaler use focusing on a reduction in the over-reliance of reliever inhalers.
- Where suitable transition high global warming potential (GWP) inhalers (MDI devices) to lower carbon alternatives with the aim of shifting 80% of inhalers to low GWP BY 2025.
- Encourage responsible disposal of inhalers.

Over the last few years, much of the work around 'greener' inhaler prescribing has been focused on switching maintenance (preventer) inhalers from high GWP metered dose inhalers (MDIs) to low GWP dry powder inhalers (DPIs). While this is still relevant, not least because many patients have poor inhaler technique with MDIs, I believe focusing on reducing over prescribing of 'blue' reliever inhalers (short-acting beta₂ agonists /SABA inhalers) will deliver greater carbon savings and importantly improve patient outcomes.

This is because:

1. SABA prescribing rates in the UK are high
 - SABA accounts for 70% of all inhalers prescribed and is responsible for 67% of the total Greenhouse gas (GHG) emissions from all inhalers
https://thorax.bmj.com/content/76/Suppl_1/A19.1



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- Up to 94% of SABA is prescribed as a MDI i.e., the device with the highest carbon-footprint <https://doi:10.1136/thoraxjnl-2019-213740>
2. In Asthma, SABA over-reliance is associated with poor control, worse outcomes, and a high carbon burden
- The 2014 National Review of Asthma Deaths (NRAD) report highlighted excessive SABA prescribing and under-prescribing of preventer medication as an avoidable cause of some deaths <https://www.rcplondon.ac.uk/projects/outputs/why-asthma-still-kills>
 - In the UK SABINA study 38% of Asthma patients were classified as having high SABA inhaler use (≥ 3 inhalers/year) which was associated with approximately twice the number of asthma attacks and an increased risk of exacerbations and healthcare utilisation compared with low users (prescribed 0-2 inhalers/year) and regardless of asthma severity. <https://doi.org/10.1007/s12325-020-01444-5>
 - GHG emissions associated with uncontrolled asthma are on average three times higher than the GHG emissions associated with controlled asthma with SABA use contributing to the majority of the GHG emissions. https://erj.ersjournals.com/content/58/suppl_65/OA76
 - In the UK, 83% of SABA inhalers in Asthma are being prescribed to patients who are potentially over-using (defined as 3 or more SABA cannisters per year). https://thorax.bmj.com/content/76/Suppl_1/A19.1

To support implementation of the NHS Wales inhaler decarbonisation strategy I had already co-developed a clinician resource guide (Appendix 1), with the aim of encouraging a more holistic approach to green inhaler prescribing and raising awareness the decarbonisation of inhalers is more than just switching from MDI to DPI devices. The recommendation to reduce SABA over-reliance was an area I had already started to address in my role as a prescribing Pharmacist, but I wanted to explore how the whole practice could take a more targeted and environmental approach for the benefit of both patients and the planet.

Similar quality improvement projects have been done elsewhere e.g. The Sentinel Project <https://sentinelplus.info/> but these have generally been resourced. The intention of this project was to determine if practicing good asthma care, something we should already be doing in primary care, could serve as a 'proof-of-concept' project to demonstrate what can be achieved during routine clinical practice with existing staff resource to benefit patients and the planet.

Specific Aims:

In my surgery, during the 4 months of the project, I aimed to.

- Raise awareness of sustainable respiratory care, in particular SABA over-reliance, through delivering education sessions to staff members
- Increase engagement of the practice team through PDSA cycles
- Through SUSQI, reduce the number of asthma patients having three or more SABA inhalers per year by improving diagnosis, optimising medication in line with NHS Wales Asthma Guidelines and reducing over-ordering by removing SABA from repeat
- Reduce the total carbon footprint of inhalers through medicines optimisation and preferentially prescribing inhalers with a lower global warming potential



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Methods:

The SUSQI framework was used to identify and deliver change.

Engagement and whole team approach

Key practice clinical (GP partners, salaried GPs, nurses) and non-clinical staff (Prescribing Clerks, reception staff) were engaged to process map (Appendix 2) the journey of a SABA prescription from request to issue to establish opportunities for patient identification and intervention. This was displayed in a staff area for two weeks and staff encouraged to add additional comments (these have been added in red). The local Community Pharmacies were also identified as a key stakeholder but due to work pressures were unable to be involved.

A PowerPoint presentation was delivered to practice staff to raise awareness of sustainable respiratory care and provide context and background to the project. To encourage engagement, relevance to the new QAIF green inhaler project and the inhaler decarbonisation National Prescribing Indicator were also discussed. Following this meeting the GPs asked for the NHS Wales Asthma and COPD guideline posters to be available in all clinical rooms.

A driver diagram was then produced based on sustainability principles to identify areas for action (Appendix 3).

Sustainability Principles

Ideas for change were then chosen and aligned to the four sustainability principles:

Prevention – To prevent asthma attacks and reduce healthcare utilisation, improve diagnosis (particularly for those on SABA alone) and improve medicines optimisation to address SABA over-reliance.

Patient Self-care – Empower patients to improve self-management through education and encouraging uptake of the NHS Wales Asthma apps via text messages, leaflets attached to prescriptions and posters in the waiting room.

Lean Pathways – The whole team to process map a SABA prescription from request to issue to establish opportunities for patient identification to address SABA over-reliance and identify over-ordering.

Low carbon alternatives – Assess inhaler technique to avoid routinely prescribing MDI devices. Use NHS Wales Asthma Guidelines to guide choice and preferentially choose lower carbon alternatives. When prescribing SABA MDI choose brands with a lower volume of propellant to minimise the carbon footprint.

Utilisation of PDSA cycles

During the project, a mixture of tools including multiple PDSA cycles were used to trial interventions.

Example PDSA Cycle

An ad-hoc process for a Practice Pharmacist telephone review for asthma patients ordering 3 or more SABA in the last 12m was already in place prior to the project starting but this was only



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opportunistic and outcome data was not being collected. Following completion of the process map, as most of the requests were initially handled by the prescribing clerks, it became clear they could be involved in routinely identifying patients for the Pharmacist to review. It was decided to test this process using a PDSA cycle.

PLAN: Prescribing clerks actively flagged asthma patients requesting SABA but who already had at least 3 in the previous year to Practice Pharmacist.

DO: Practice Pharmacist telephoned the patient (5-10 minutes) to establish if SABA was needed or being over-ordered.

- If on repeat and not needed, SABA was removed from repeat, environmental issues discussed, and the patient signposted to the NHS Wales app if not already using.
- If SABA needed, signs of poor asthma control discussed, environmental issues discussed, signposted to the asthma app and offered a face-to-face or telephone appointment for review. A SABA prescription was issued but where appropriate changed to a lower carbon alternative e.g., Ventolin Evohaler switched to Salamol MDI (lower carbon footprint due to less propellant) or SABA MDI changed to DPI device if the patient had maintenance therapy in a DPI device.

STUDY:

- It was not possible to contact all patients.
- Some patients with an already limited number of SABA on repeat and a recent asthma review with 'rarely needs SABA' documented were still over-ordering. Explanations from those that could be contacted were 'I ticked it by mistake', 'the Pharmacy orders my repeats', 'a family member ordered my medication this month and just ticked everything'.
- Some patients with SABA on acute were still over-ordering.

ACT:

- Pharmacist telephone slots for SABA >3 added to daily workload.
- A prescription was still printed for patients who were unable to be contacted but the right-hand side of the prescription was annotated with a request to book an appointment for a review.
- A further PDSA started for all members of staff conducting asthma reviews to remove SABA from repeat where appropriate.

A further PDSA cycle is planned to explore the reasons for over-ordering, this will require engagement with the local Community Pharmacies.

Measurement:

Patient outcomes:

Quantitative data on the number of asthma patients using three or more SABA inhalers within 12 months was obtained from a free commercial Asthma Care Dashboard provided by Astra Zeneca. The dashboard was imported in July 2021 but due to ongoing implications of the pandemic affecting



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staff workload it was never fully utilised until the start of this project. Monthly data extracts were undertaken from April 2022 except for June 2022 due to workload pressures.

Quantitative data on changes in Asthma Control Test (ACT) scores was collected manually for a small number of patients at a post intervention follow-up asthma review.

Environmental sustainability:

The Server for Prescribing Information Reporting and Analysis (SPIRA), Inhaler Decarbonisation Dashboard was used to monitor the total inhaler and salbutamol carbon impact trend including monthly, quarterly, and annual changes. Prescribing data from the Comparative Analysis System for Prescribing Audit (CASPA) was used to gain information on the reduction in SABA items. For an example of how the decarbonisation dashboard looks please see Appendix 4.

Quantitative data on the number of patients over-ordering was collected manually for a 2-week period during the Pharmacist Telephone review PDSA cycle.

Economic sustainability:

Prescribing data from CASPA was used to gain information on the financial savings relating to a reduction in SABA items

Social sustainability:

Qualitative data was collected from voluntary patient feedback.

Results:

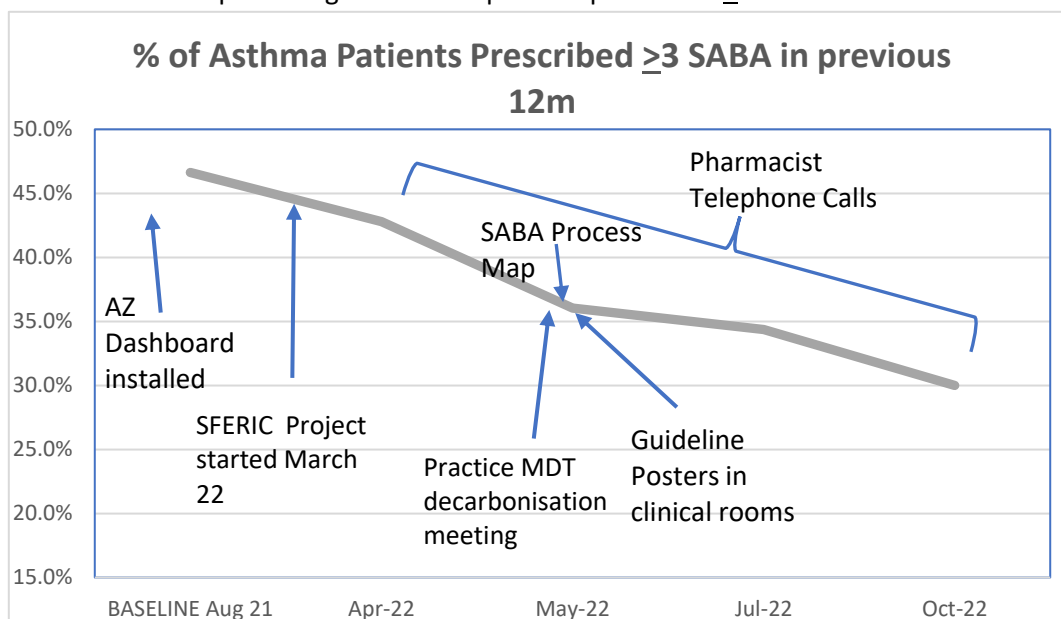
Patient outcomes:

Data from AZ Asthma Dashboard

The number of patients having 3 or more SABA inhalers is decreasing, with the percentage prescribed reducing from 43% to 30% from April 2022 to October 2022. In accordance with the SABINA study this reduction (shown in Fig 1 below) is a marker of positive clinical outcomes, with patients on 3 or more SABA inhalers in the last 12 months being associated with worse asthma outcomes than those on less than 3. This decrease was seen in patients prescribed SABA alone and in patients prescribed preventer therapy with an inhaled corticosteroid with and without additional preventer therapy. A consideration in this study is some of this SABA reduction may be due to reduced over-ordering, and therefore would not impact symptom management.



Figure 1. Trend in the percentage of asthma patients prescribed ≥ 3 SABA



CASPA Prescribing Data

During the 6 months of the project, comparing Q2 and Q3 2022 data with the same period in 2021 156 fewer SABA items were prescribed in Oakfield Surgery (Table 1). Similar reductions were not seen at a National, Health Board or local Cluster level. As previously mentioned, this reduction in items can be used as a surrogate marker of improved clinical outcomes with the caveat that some of the reduction will be due to a reduction in waste from over-ordering.

Table 1. Six-month SABA prescribing comparison (CASPA data)

| Entity | SABA costs Q2/Q3 2022 | % Variation from Q2/Q3 2021 | Cost Difference | SABA Items Q2/Q3 2022 | % Variation from Q2/Q3 2021 | Items Difference |
|------------------|-----------------------|-----------------------------|-----------------|-----------------------|-----------------------------|------------------|
| National GP | £1,882,004 | 3.44% | £62,549 | 851,429 | 2.53% | 21,007 |
| Aneurin Bevan GP | £338,060 | 5.67% | £18,133 | 155,813 | 4.51% | 6,722 |
| Caerphilly North | £34,774 | 1.40% | £481 | 16,565 | 1.80% | 293 |
| Oakfield Surgery | £7,145 | -8.32% | -£649 | 2,941 | -5.04% | -156 |

The SABA prescribing trend graph (Figure 2) shows the practice as a previous higher-than-average prescriber, with the trend following a similar trajectory to National, Health Board and Cluster prescribing trends until March 21 when the trends diverge. This coincides with the start of the early SABA over-reliance work. The trends diverge again March 22 which coincides with the start of the SFERIC project.

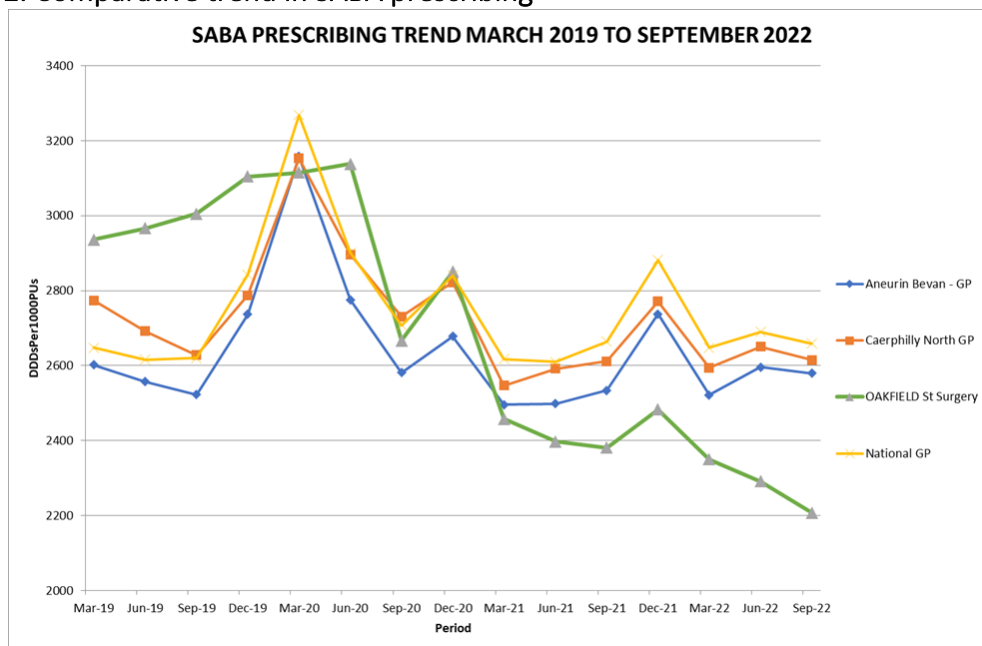


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Figure 2. Comparative trend in SABA prescribing



Manually collected post intervention data

Two patients showed a clinically significant 10-point increase in ACT score, following a change in therapy from preventer with separate SABA to maintenance and reliever therapy (MART) in a single inhaler device.

Environmental sustainability:

Carbon savings obtained from the NHS Wales decarbonisation dashboard ([SPIRA - Decarbonisation Dashboard](#), accessible to NHS Wales network users only) demonstrate a 28% or 18,823 kgCO₂e reduction in the carbon footprint of SABA inhalers when comparing 6 month data from Q2/Q3 (April to September) 2022 with the Q2/Q3 2021. This includes reduction due to reduced SABA items, reductions relating to any SABA MDI switched to DPI and reductions due to SABA MDI being switched to lower GWP SABA MDI e.g. Ventolin to Salamol. Projected across a year, this is a saving of 37,646 kgCO₂e, equivalent to driving 108,427 miles in an average car.

Waste

25% of patients audited during a PDSA cycle were found to be over-ordering SABA. Although the number of patients audited was small (n=16) there are significant implications for environmental and economic savings if this proportion is representative of and scaled to all the asthma patients in the practice.

Interestingly one of the patients had severe asthma and prescribed maximum inhaled therapy including a biologic and had two SABA inhalers on repeat every month. My initial thought was to exclude this patient from the telephone review service as he was under active secondary care follow-up but on contacting him, he didn't use the SABA that often and wondered why he got two inhalers on his repeat every month and was happy for the items to be removed and requested as



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acute when needed. One of the considerations for developing a lean pathway for SABA requests was to exclude patients under active secondary follow-up. This has strengthened the need for all patients having three or more SABA a year to at least have an initial review as they can be flagged as excluded if there is a genuine need to prescribe more than this.

Economic sustainability:

Comparing Q2/Q3 2022 to the same period in the previous year, the practice has reduced SABA prescribing by 156 items (5%), equating to a prescribing budget saving of £649 (source Caspa data). Projected across a year, this is a potential saving of £1, 298.

While there are still reductions to be made, these SABA related cost savings would not be expected to grow year on year because as SABA over-reliance is addressed the number of asthma patients on inappropriate SABA should reduce.

Compared to asthma maintenance inhalers (i.e., containing inhaled corticosteroids), SABA reliever inhalers are relatively low cost so it needs to be acknowledged that overall upfront respiratory prescribing costs may increase. This is because patients previously on no or sub-optimal asthma maintenance treatment will be prescribed appropriate medication. During Q2/Q3 2022 the practice prescribing spend for inhaled corticosteroids alone and in combination with a long-acting beta2 agonist reduced by 3.85% giving a saving of £3,731 (source Caspa data). This compares to an increase of 0.03% in Welsh average prescribing cost and 0.43% increase in Health Board prescribing costs for the same inhaler group over the same period. This may suggest, in addition to SABA cost reductions, other cost saving medicines optimisation initiatives are being implemented but due to time constraints this has not been evaluated for this project.

There is also an expectation that any potential future increase in respiratory prescribing costs would be offset by healthcare avoidance including reduced hospital admissions, fewer days off work etc. if asthma control is improved as evidenced in the SABINA study. Costing these expected outcomes is beyond the scope of this project.

This project was completed utilizing existing resources. Staff undertaking the clinical reviews were already trained so there was no need to fund additional training. The raising awareness sessions were also provided in-house without additional funding. Funding may be required if this work is replicated elsewhere if there is a need to upskill existing staff or a requirement for external raising awareness sessions.

Social sustainability:

Feedback from patients having the initial telephone call was positive with most commenting they were unaware of the environmental issues and did not know about returning used / unwanted or expired inhalers to pharmacy for safe disposal. Most were also happy to change to lower carbon alternatives following the discussion.

Following an asthma review and having treatment optimised to MART therapy one patient commented,

“I didn’t realise how bad my asthma was, since starting my new inhaler, I’m no longer waking up at night coughing.”



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Two patients identified had no respiratory diagnosis, one was initially given SABA for suspected asthma but due to the pandemic never came back for further investigation and just kept ordering Ventolin. Asthma has now been diagnosed and appropriate treatment started. The other patient only had two SABA in the previous 12 months but had been flagged for pharmacist action as it was an acute request with the prescribing clerk unable to issue. On reviewing her record, she had been given SABA for persistent dry cough, and a chest x-ray and spirometry booked but this was March 2020 so was not completed as the COVID Pandemic started. On speaking to the patient, she was highly symptomatic, waking most nights with cough but had been using SABA less than twice a week as she had been told to use it sparingly! A clinical history and subsequent serial peak flow readings confirmed a diagnosis of asthma with complete resolution of symptoms on MART therapy with ACT score improving from 15 to 25.

With more time qualitative surveys could be used to expand this data further. Qualitative surveys could also be used to evaluate the impact of the respiratory sustainability awareness training on staff.

Discussion:

The interventions in this project are not new, they form the routine basics of good asthma care and can easily be applied in day-to-day practice without the need for extra staff resource or investment. However, for clinicians not familiar with the basic principles of asthma care there will be a training need requiring investment in both time and money. Although the telephone calls and some of the asthma reviews were carried out by a prescribing Pharmacist with a specialist respiratory interest, with appropriate guidance, this work could still be replicated by any Practice Pharmacist or even other clinical / non-clinical staff with the review aspect referred to an appropriately trained clinician.

This project demonstrates that sustainable respiratory care is about holistically providing good asthma care and is a good example of value-based rather than cost-based prescribing. It was encouraging to see that doing what is best for the patient can be good for the planet and have financial savings too.

Barriers: Due to primary care workload pressures, it was often difficult to get protected time to perform the necessary quality improvement measures to enable evaluation of the project. This became easier when the GP contract QAIF green inhaler project was announced as this then justified the time spent and provided a financial incentive as this work could become part of the QAIF project.

Another barrier was stakeholder engagement in developing the process map. Planned meetings were postponed due to the pandemic affecting staff resource. This was overcome by talking to quality improvement staff in the Health Board who suggested I start with my version of the map and display in a staff area, encouraging staff to write on the map with their suggestions.

It would also have been beneficial to gather data on interventions and outcomes from all the patients reviewed but as this was collected manually it was too time-consuming.



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Conclusions:

Working on this project has been really rewarding, particularly the patients whose quality of life has been improved by getting an accurate diagnosis and starting appropriate treatment or from their medication being optimised. It has also generated further ideas for quality improvement e.g., prescribing clerks to issue SABA on acute request for up to 3 issues before flagging to Pharmacist for review, add recalls for suspected asthma patients to ensure they are not lost to follow-up, take SABA off repeat for all asthma patients, these will be explored at the next practice meeting to discuss project results.

One of the key elements contributing to the success of the project was raising staff and clinician awareness of sustainable respiratory care. This gave staff an understanding of the issues and the rationale for making the interventions. Another element was having a key motivated individual to drive change and keep staff informed of progress to keep the momentum going when it would have been easier to issue the prescription and not address SABA over-reliance or over ordering.

Key to lasting change is engaging the whole practice team in the principles of sustainable respiratory prescribing. The preliminary outcomes of this project have already been shared with other practices in the locality at a Health Board GP/nurse CPD event and nationally at the AWTTTC Decarbonisation Best Practice Day and the Primary Care Pharmacist Association Welsh conference. There are plans to share with the Respiratory Health Implementation Group, Respiratory Alliance Wales, and Greener Practice Wales to highlight education, implementing the Welsh Asthma Guidelines and good asthma care is beneficial to patients, Health Boards, and the planet. As of 2023 we are in discussions with ABUHB Primary Care Respiratory Specialist Nursing and Medicines Management Teams to consider how this project can be adopted as part of their workload this year. The next step is to scope how this can be scaled up and implemented across the whole Health Board and to engage with Community Pharmacy Wales to see if a similar approach could be adopted in Community Pharmacy. More recently I have become a member of Welsh Government's Decarbonisation of Inhalers Task and Finish Group so there is an opportunity to explore how this project can also influence the goals and measures being planned for Wales.

THANK YOU TO ALL PARTNERS:

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Appendix 1: REDUCING THE ENVIRONMENTAL IMPACT OF INHALERS

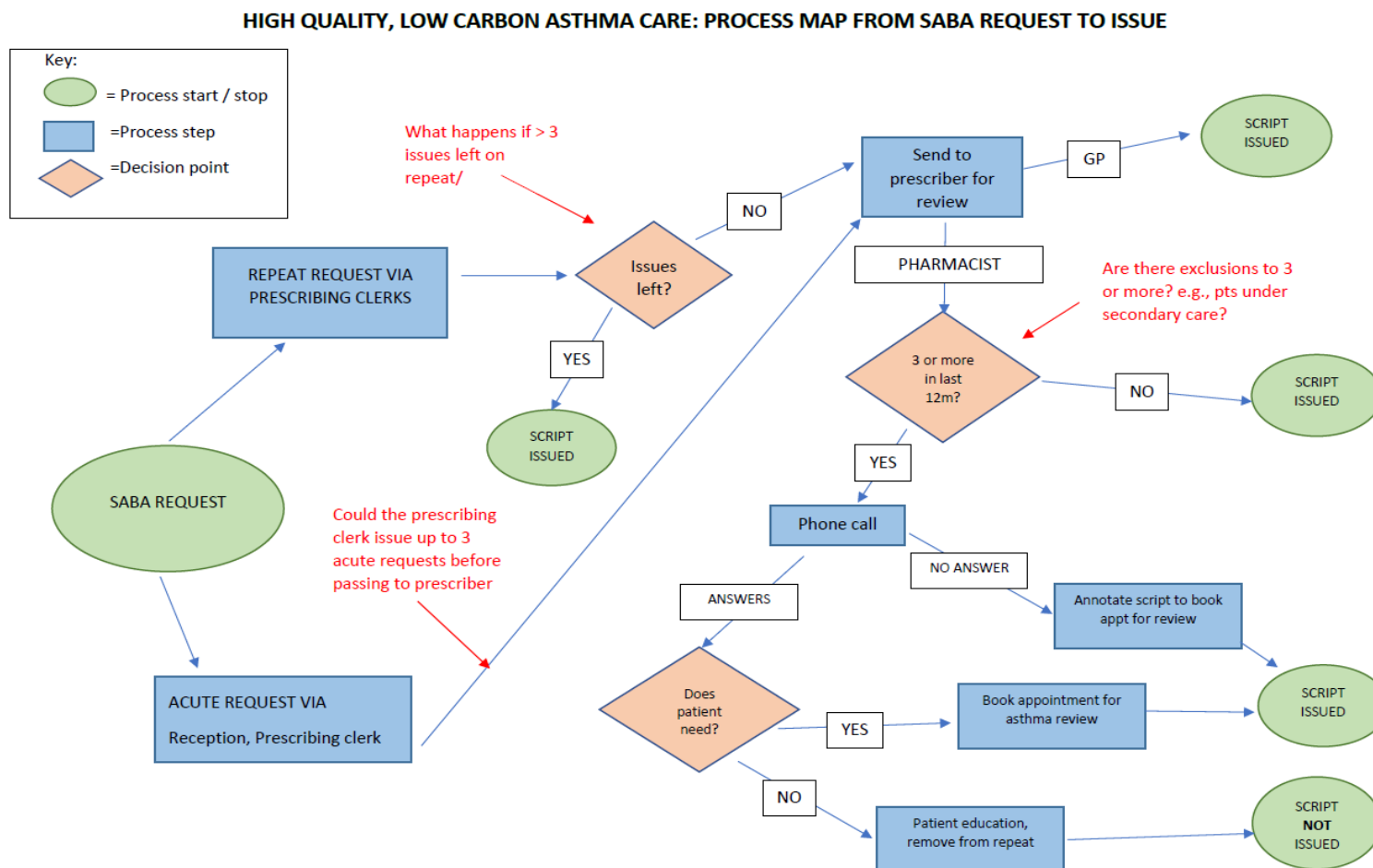


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APPENDIX 2: Process Map



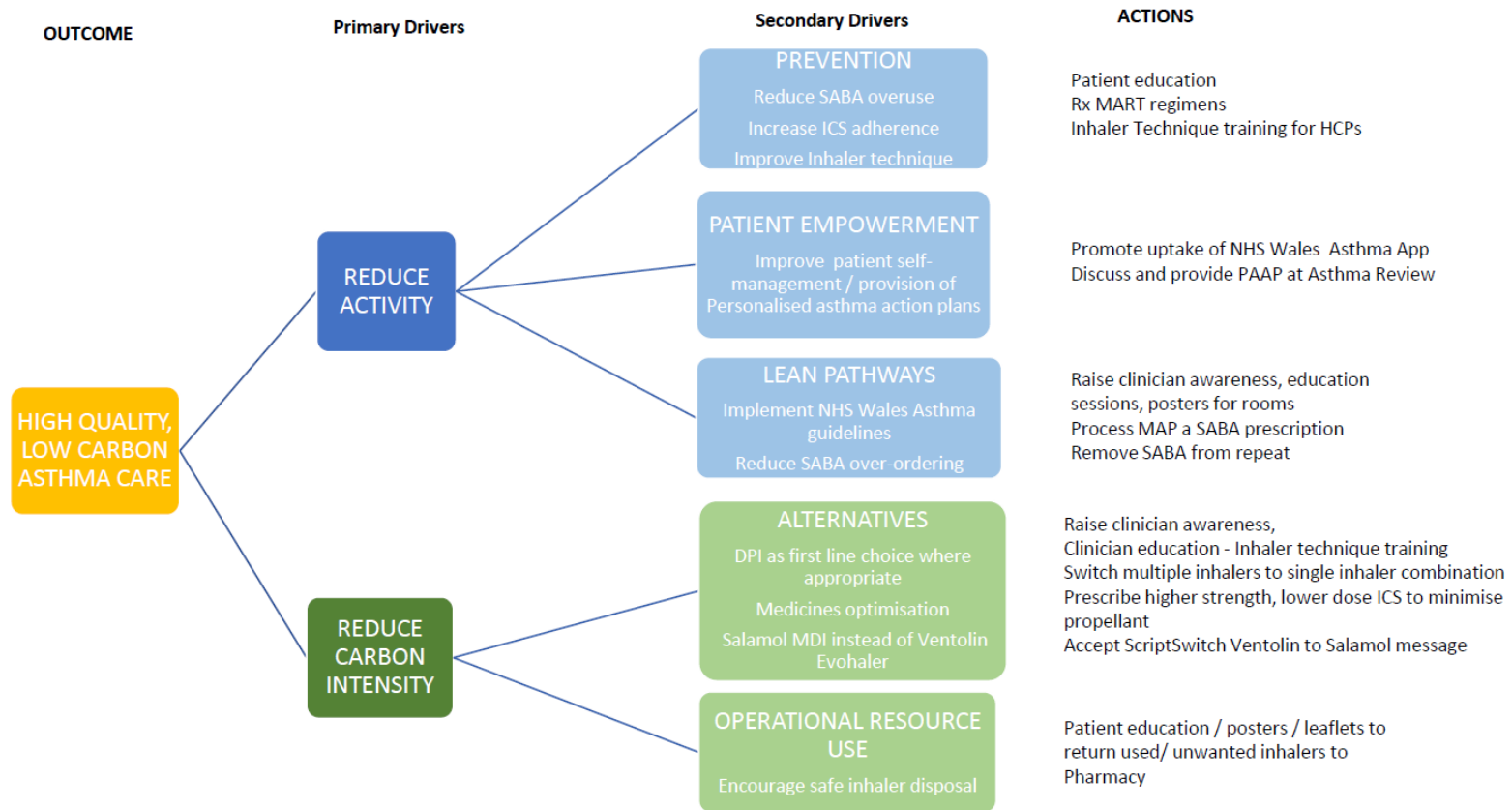
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APPENDIX 3: Driver Diagram

DRIVER DIAGRAM: High quality, low carbon asthma care



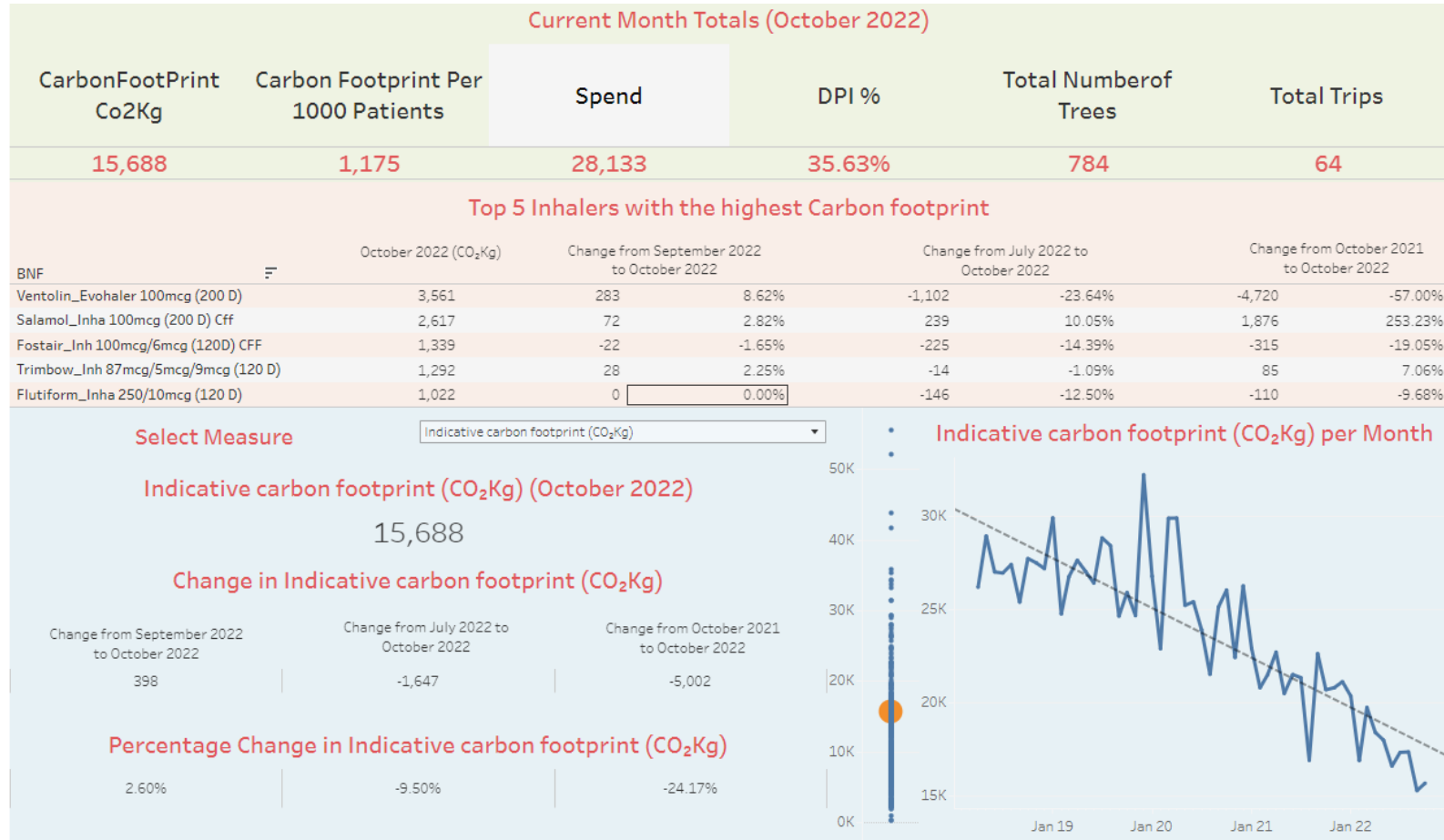
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APPENDIX 4: NHS Wales decarbonisation dashboard; Practice indicative inhaler carbon footprint

This graphic depicts the total carbon footprint difference from all inhalers (not just SABA). October 2022 is compared to October 2021 (this is not a cumulative comparison).



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