**Deprescribing within medication reviews in Central Liverpool Primary Care Network.**

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Kitchen, C; Condemine, C; To, K-B; Mohammad, N; Scott, E; van Ginneken, N.

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**Introduction**

Prescriptions form 60% of the NHS primary care’s carbon footprint. We also know that over prescribing, polypharmacy and inappropriate prescribing worsen quality of care. For example prescribing anticholinergics in frailty is associated with increased mortality. Polypharmacy usually leads to several complex side effects, thus impacting on quality of life, and makes people more prone to fall, to be hospitalised and die.[[1]](#footnote-1),[[2]](#footnote-2),[[3]](#footnote-3) Several studies also suggest deprescribing is not harmful and may help longer term outcomes. Particularly in frailty or those > 75 years old, treating for example diabetes or hypertension to usual guideline targets may have more benefits than harm.[[4]](#footnote-4) Deprescribing and relaxing someone’s blood pressure targets may prevent falls from hypotension. Also once frail, these medications’ risk reduction benefits (preventing stroke, heart attacks and kidney disease) once frail are very minimal. Deprescribing is therefore a win-win-win: It is good for the patient – we know it reduces hospital admissions. It is also better for the environment and saves money.

We agreed as the Central Liverpool PCN to use the funding to focus on existing structured polypharmacy medication reviews, but make sure they included a focus on whether items could be deprescribed.

The aim was to reduce unnecessary side effects and interactions for patients, as well as reduce both the cost and the carbon footprint of prescribing.

Objective:

To deprescribe medicines appropriately in patients who are on 10 or more repeat medications, focussing on medicines that were:

* Not being used
* Not felt to be effective/ of no benefit
* Duplicated item
* Potentially harmful: anticholinergics, as well as unnecessary medication/ those that should not be prescribed.
* Causing side effects.

**Methods:**

Three of 14 (13.5WTE) network pharmacists incorporated into their SMR reviews the deprescribing aims as described above from October 2023 to July 2024. We used the STOPP criteria to identify the main drugs worth reducing, calculated the ACB score and applied the deprescribing principles of frailty (understand the patient and their context, adherence, weight loss, side effects, most beneficial drugs, one or two step at a time). We compared their deprescribing rates to 2 other pharmacists over the same time period.

**Results:**

*Patient characteristics*

We reviewed 81 patients (consecutive patients that the pharmacists were seeing in each practice) from 5 practices in Central Liverpool PCN where the 3 network pharmacists work (table 1). Forty eight (59%) patients were female. Their average age was 65 years old (range: 41-93yo).

Table 1: numbers of reviews per practice

|  |  |
| --- | --- |
| **Practice** | **Total** |
| St James Health Centre | 17 |
| Brownlow Group Practice | 28 |
| Kensington Park | 9 |
| Princes Park | 16 |
| Abercromby Health Centre | 11 |
| **TOTAL** | **81** |

Across Central Liverpool PCN which has 120000 patients, 4878 (4%) patients are on 10 medications or more (Table 2).

Table 2: Number of patients on >=10 medicines on repeat prescriptions.

|  |
| --- |
| **18 or over on 10+ repeat meds** |
| **Practice** | **Patient number** |
| **Abercromby** | 390 |
| **Albion** | 344 |
| **Brownlow Central** | 789 |
| **Dingle** | 432 |
| **Elms** | 718 |
| **Kensington** | 287 |
| **Marybone** | 199 |
| **Princes Park** | 521 |
| **St James** | 278 |
| **Vauxhall** | 920 |
| **Total** | 4878 |

During our short study we reviewed 81 of 4878 patients (1.7%) from 5 of the PCN practices.

Patients included were on between 10 and 25 items (average 14.7 items per script, 36% of these were variable repeats) (Figure 1). Across the 81 patients we reviewed 1191 items.

Figure 1: Number of repeat medications per patient (n=81)

The reviews took between 20 and 101 minutes (average 27minutes per review)), which on average was only an extra 7 minutes compared to the 20 minutes an SMR is allocated. In terms of actual contact time with patient, the length was similar to normal (approx. 20 -30 mins depending on the complexity of the review according to pharmacists).

The average anticholinergic score was 3.7 (range 1-11). Successful reductions were in 3/81 patients only (co-careldopa, famotidine, lansoprazole) and were in people with a low baseline anticholinergic score (<2). 20% of patients (16 in total) reported side effects (Figure 2).

Figure 2: Percentage of patients experiencing side effects

The three pharmacists implementing the deprescribing-focussed SMRs stopped a total of 37 items and reduced the doses or frequency of another 32 items (range: 0-4 items per patients) which equates to 69 items reduced or stopped across 81 patients. We retrospectively compared this to 81 reviews done over the same time-period by 2 network pharmacists not taking part in this project. Of their SMR reviews only 16 items were stopped and 9 reduced resulting in about 50% less deprescribing in the deprescribing-focus group (35 items (retrospective control) vs 69 (intervention group) = 49.3% less deprescribing).

Across the deprescribing-focussed SMRs, this resulted in an average of 0.46 items (range: 0-3 items per patient) being stopped per patient and 0.39 items (range: 0-5 items per patient) being reduced. In other terms, this resulted in 3.1 % of patients’ current items being stopped (37/1191reviewed items) and 2.7% of items being reduced (32/1191).

Medicines stopped or reduced included:

* Laxatives 4
* Creams 4
* Medicated shampoos 2
* Vitamins/supplements 9
* PPI/H2 antagonists 4
* LT antibiotics 1
* Pain relief 2
* Eye drops 3
* Cardiac drugs Bumetanide / ramipril 2
* Respiratory drugs: inhalers, carbocysteine 2
* Antidepressants: duloxetine, venla, amitryp, sertraline 4
* Neurological meds: co-careldopa 1
* Alendronic acid 1

Medications started/switched included:

* Analgesics changed: buprenorphine commenced 1
* Antidepressants: sertraline started 1
* Carbocysteine 1
* Metformin increasing 1
* Statin increasing 1

*Carbon footprint*

It was hard to get a carbon rating for all the items we stopped, but we used the MCF classifier (<https://www.yewmaker.com/mcf-classifier>) which categorises medications by categories of carbon footprint[[5]](#footnote-5) (Figure 3). Not all the medications have been included in MCF classifier yet so some have no rating due to unavailability of the data from the pharmaceutical companies at the time of compiling the MCF.

Figure 3: CO2e range of each MCF rating



Only 22/37 (60%) items stopped had a carbon rating. Of the 22 items with ratings, 72% were medium to high carbon footprint (Table 3).

Table 3: MCF ratings of stopped medications (n=37)

|  |  |  |
| --- | --- | --- |
| **MCF rating** | **g C02e per dose** |  |
| Low - Green | 0-10g  | 6 (16%) |
| Medium – Amber  | 10g-100g | 9 (24%) |
| High – red | 100g-1000g | 7 (19%) |
| Very High -  | >/= 1000g | 0 (0%) |
| No rating |  | 15 (40%) |
| **Total** |  | **37 (100%)** |

*Costs and cost savings*

* We received £1000 funding from the Q Network which was the cost of conducting 80 SMRs. The pharmacy team agreed to take on the extra time it took to fill in the audit forms and attend meetings about this project (10 mins per patient and meetings every 2 months).
* The cost savings of 37 stopped- and 32 reduced- medications, was £1,855.83 per annum taking into account the frequency those items were ordered over the preceding 12 months.
* Compared to the average number of items stopped or reduced in the retrospective control group (35), the average cost savings for this group, by extrapolation, would be £941.36 per annum.
* The deprescribing-focussed SMRs have therefore saved £914.47 for these 81 patients. If deprescribing-focussed SMRs were the norm for all 4878 patients on >=10 meds in the Central Liverpool PCN, this would equate to an additional £55,071.42 saved per annum.

**Discussion**

Deprescribing-focussed structured medication reviews on patients on >=10 medications, reduce how many medication items are on peoples’ repeat (average 0.8 items per patient), make for safer prescribing with lower side effects (lower ACB score) and less interactions, thus improving the quality of patients’ care. It also has significant cost savings and carbon reduction.

Limitations were two-fold for this project. Firstly, the pharmacists only focused on one annual review. In the short time-period, we could not plan further follow-up reviews. With deprescribing, reviews would generally be necessary to review changes and make more. Secondly, this project started with the objective to deprescribe in patients who were on 20 medications or more, but because those patients were very complex and often very set in what they take, it became very difficult to make a difference. Having expanded our population to those on 10 or more medications, we were more successful in finding inappropriate medications and gaining patient consent to make these changes.

The cost savings are large. The absolute savings were £1855 from 81 SMRs (from 37 stopped medications stopped and 32 reduced). This equates to: a) £26.9 reduced per medicine stopped/reduced; b) £23 saved per patient per 12 month period or c) £111,762.21 per annum across the CLPCN. Pharmacists doing SMRs as usual (i.e. our retrospective control cohort) are already deprescribing (they are encouraged to by the pharmacy network leads), however this group only achieved half the number of items deprescribed compared to those in this intervention. The relative cost saving of this intervention compared to business as usual SMRs, equates to £55,000, saved across CLPCN (120,000 population (4500 patients on >= 10 meds). This is equivalent to £77,000 (absolute) or £45,833 (relative) saving per 100,000 population). These estimated absolute and relative savings are similar to previous estimated savings (£72,000 per 100,000 population – an absolute reduction estimate).[[6]](#footnote-6)

Pharmacist time increased by (between 0-81mins, average 7 mins), so this intervention is feasible at a small increased cost to time, or may even be possible to do within the remits of the current allocated time. Refocussing the SMR to ensure deprescribing is addressed and prioritised is needed.

We made a small impact on reducing the anticholinergic burden during the study for 3 patients. Anticholinergic side effects can lead to dizziness and confusion which can be a falls risk, also dry mouth, blurred vision, constipation and even memory problems and hallucinations. These side effects are more common in older people but these are often the age group who have multiple medications prescribed for a range of long term conditions. More work is needed to be creative in how to reduce the ACB score, given that patients are reluctant to do so once used to the medication.

This study has demonstrated the multiple positive impacts from having an emphasis of deprescribing within structured medication reviews, for patient, for medication budgets and the environment. This study was too short to measure reduction in side effects however we know from previous studies that deprescribing has an impact on improving patient’s quality of life, and mortality (for certain medications such as anticholinergics). Investing resources in medication review to ensure patients are taking only the medication which is necessary for them with the minimal amount of side effects is a good use of healthcare funding. This refocussing is at no added cost, and results in large cost savings.

1. Specialist pharmacist service <https://www.sps.nhs.uk/articles/understanding-polypharmacy-overprescribing-and-deprescribing/> [↑](#footnote-ref-1)
2. Mair A, Fernandez-Llimos F, Alonso A, *et al.* Polypharmacy management by 2030: a patient safety challenge. 2nd edn. 2017. <https://ec.europa.eu/chafea/health/newsroom/news/documents/polypharmacy-handbook-second-edition_en.pdf> [↑](#footnote-ref-2)
3. Department of Health and Social Care. Good for you, good for us, good for everybody: a plan to reduce overprescribing to make patient care better and safer, support the NHS, and reduce carbon emissions. 2021. <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1019475/good-for-you-good-for-us-good-for-everybody.pdf> [↑](#footnote-ref-3)
4. Strain, W.D., Down, S., Brown, P. *et al.* Diabetes and Frailty: An Expert Consensus Statement on the Management of Older Adults with Type 2 Diabetes. *Diabetes Ther* **12**, 1227–1247 (2021). https://doi.org/10.1007/s13300-021-01035-9 [↑](#footnote-ref-4)
5. Taylor, Haroon and Mahamdallie, Shazia and Sawyer, Matthew and Rahman, Nazneen, A Landscape Analysis of Medicine Carbon Footprints Identifies Antibiotics as a Promising Target for Emission Reduction Interventions. Available at SSRN: [https://ssrn.com/abstract=4633938](https://ssrn.com/abstract%3D4633938) or [http://dx.doi.org/10.2139/ssrn.4633938](https://dx.doi.org/10.2139/ssrn.4633938) [↑](#footnote-ref-5)
6. *https://rightdecisions.scot.nhs.uk/polypharmacy-guidance/help-more-info/appendices/appendix-d-health-economics-analysis-of-polypharmacy-reviews/)* [↑](#footnote-ref-6)