

Medicines adherence and waste

This bulletin focuses on medicines adherence and waste. It provides guidance, advice and examples of good practice for Integrated Care Boards (ICBs) and Health Boards (HBs) to develop local initiatives and campaigns. This bulletin is part of the [PrescQIPP adherence and waste webkit](#), which includes tools such as a project planning document, webinars, prevent medicines waste campaigns, and public and professional materials, for example, posters, leaflets, animations and media messages.

Please note: In the absence of specific guidance for the devolved nations, the recommendations in this bulletin are considered to represent best practice.

Recommendations

- ICBs/HBs should review the good practice examples and supporting resources available within the [PrescQIPP adherence and waste webkit](#) and implement and evaluate the impact of medicines waste campaigns for the public and healthcare professionals.
- ICBs/HBs should consider undertaking a social media marketing and communication strategy for medicines waste campaigns.
- ICBs/HBs should engage with other stakeholders to maximise the impact of medicines waste campaigns, such as community pharmacies, GP practices, secondary care, care homes, local community services, patient participation groups, third sector organisations (not-for-profit organisations and charities) and local councils.
- GP practices and community pharmacies should consider using the repeat prescription ordering campaign materials available as part of the [PrescQIPP adherence and waste webkit](#).
- GP practices should consider using the care homes checklist and GP receptionist checklist under 'resources for professionals' as part of the [PrescQIPP adherence and waste webkit](#).
- Prescribers should consider using electronic prescribing to support the reduction of medicines waste.
- GP practices should undertake appropriate medicines optimisation audits in addition to regular medication reviews for patients to optimise treatment, improve adherence and reduce medicines waste.
- Community pharmacists should undertake appropriate medication reviews in accordance with their service specifications, to assist with improving adherence and reducing medicines waste.
- Both clinical and non-clinical staff should be made aware that they have an individual responsibility for managing waste sustainably (e.g. recycling suitable packaging instead of disposing of it as clinical waste) to reduce costs to the NHS and lessen the environmental impact.
- GP practices and community pharmacies should source environmentally friendly and reusable alternatives to single-use plastics, such as medicine spoons, medicines cups, oral syringes and plastic compliance aids, where possible, and ensure the appropriate management and recycling of medicines packaging and pharmaceutical waste.

Background

It has been estimated that between 30% and 50% of medicines prescribed for long-term conditions are not taken as intended.¹

Involving people in decisions about their medicines means that medicines are more likely to be taken and used properly.² Medicines waste may occur as a result of non-adherence/non-compliance, where the economic costs are not limited to wasted medicines but also include the knock-on costs arising from increased demands for healthcare if health deteriorates.²

Medicine waste can be split up into five categories:³

- **Non-compliance** – patient does not take medicines as prescribed. For example, taking at irregular intervals or in incorrect doses.
- **Intentional non-adherence** – patient stops taking medication due to adverse side effects or personal beliefs.
- **Unintentional non-adherence** – patient stops taking medicine, or fails to take at correct intervals due to forgetfulness.
- **Non-preventable waste** – patient dies and unused medicines are wasted, or a change in treatment means current dispensed medicines are no longer required.
- **Preventable waste** – patient stock piles medicines “just in case”. All items from repeat prescription are dispensed even if patient no longer takes the medicine. Refer also to the [PrescQIPP bulletin 325. Empowering patients to manage their repeat prescriptions.](#)

What is the scale of medicines waste?

The wastage of medicines has a huge burden on NHS financial resources.

It has been estimated that medicines costing £250 to £300 million are not used and therefore wasted in primary and community care in England on the NHS each year.^{3,4}

On the Isle of Man, an additional £300,000 a year has been estimated to be attributed to wasted medicines.⁵

In Scotland, it has been estimated that 1 in 10 medicines go to waste.⁶

In Wales, inefficiencies in the ordering, prescribing and supply of medicines have been estimated to cost the NHS over £13 million per year.⁷

In Northern Ireland, it has been estimated that wasted medicines are valued at £18 million annually, which is further compounded by the £650,000 cost to safely dispose of these unused medicines.⁸

Furthermore, it has been highlighted that:^{3,4}

- An estimated £90 million worth of unused medicines are retained in people’s homes at any one time.
- £110 million worth of medicines are returned to pharmacies for disposal, over the course of a year.
- £50 million worth of NHS supplied medicines to care homes are disposed of unused.

Although not all waste is avoidable, it has been estimated that 30 to 50% of the volume of wasted medicines could be avoided.⁴

What is the environmental impact of medicines waste

Medicines account for 25% of carbon emissions in the NHS in England.⁹ [The Department for Environment, Food and Rural Affairs](#) estimate that for every £1 cost avoidance there is a potential carbon avoidance of 0.581kgCO₂e for basic pharmaceutical products and pharmaceutical preparations. Carbon avoidance data for organisations can be seen in the [PrescQIPP scorecards.](#)

An [NHS England report](#) has highlighted that every year, NHS providers produce approximately 156,000 tonnes of clinical waste that is either sent to high temperature incineration or for alternative treatment, which is equivalent to over 400 loaded jumbo jets of waste. This has a significant environmental impact and is associated with high running costs and carbon emissions.¹⁰

In addition to reducing the total quantity of waste needing to be managed, it is important to improve compliance in the segregation of waste types. All members of the NHS workforce, both clinical and non-clinical, have individual responsibility for managing waste sustainably as good clinical waste management reduces the cost and lessens the environmental impact. For example, not all waste created as a result of delivering clinical services is 'clinical' waste. Certain packaging, for example, would be recyclable waste¹⁰ and should be separated at the point of disposal and disposed of correctly.

Few environmental impact studies have compared liquid and tablet medicines, although the available evidence suggests that pills have a lesser carbon footprint than equivalent liquid medications. This is thought to be due to the following factors:¹¹

- Tablets and capsules typically come in smaller, lighter packets than liquids, take up less space in distribution lorries, and create less packaging waste. Liquids also require dosing syringes or spoons, contributing to increased plastic waste.
- Pills have a longer shelf life and can be stored out of the fridge, compared to some liquids, so have lower energy requirements during their use, and are less likely to be discarded as a result of inadequate storage conditions.
- Pill packets can be divided up to dispense a specific number of doses, whereas liquid formulations must be dispensed in whole bottles, meaning excess doses from short-term prescriptions (such as antibiotics) are often wasted.
- For long-term prescriptions, pills can be dispensed in larger quantities than liquids, reducing the number of patient journeys to and from the pharmacy.

Pill-swallowing tips and resources can be found in this [2024 BMJ article](#) to aid healthcare professionals in pill training with children or adults to help minimise the unnecessary use of liquid formulations, where this is appropriate.

What are the general causes of medicines waste?

The causes of medicines waste vary from inefficient prescribing and stock piling to patient recovery and non-adherence. Medicines waste can occur at any stage from the point of prescribing to the taking/not taking of medicines by the patient, and can occur through failures in existing processes or patient behaviours.³

The causes of waste include the following:³

- Repeat/habitual dispensing - Medicines on repeat prescriptions are dispensed without checking if they are required.
- Stock piling/over-ordering - Patients habitually order every line on a repeat prescription, regardless of need due to fear over loss of drug on their repeat prescription list through non-use.
- Patient recovery/change of medication - Instances where a patient recovers, or has a change in condition that necessitates a change in medication. Remaining older medication is wasted.
- Patient death - Drugs may be changed or dispensed on precautionary basis during the final stages of palliative care and there may also be previously unused medicines.
- Prescription duration - Many prescriptions are dispensed for longer periods than are required (e.g. the patient recovers or changes their medication two weeks into a three month prescription).
- Unnecessary disposal - e.g. a care home that routinely disposes of all medications at end of the month regardless of shelf life.

- Patient non-adherence - Patients intentionally, or unintentionally fail to adhere to instructions. This may be due to forgetfulness, (unintentional) or change in beliefs/side-effects (intentional).

The prescriber, dispenser and patient all play a part in waste creation. One of the major concerns is that patients may not be experiencing the intended benefits and outcomes from their prescribed treatment. This can be due to either the patient not taking treatment as directed or their treatments not being reviewed regularly enough to ensure their prescription meets their evolving treatment needs.³

National guidance

The NICE guideline (NG5) '[Medicines Optimisation: the safe and effective use of medicines to enable the best possible outcomes](#)' (2015), identifies key areas for improvement and developing a patient-centred approach to taking medication in England and Wales.¹

The Royal Pharmaceutical Society (RPS) produced a guide entitled '[Medicines Optimisation: Helping patients make the most of medicines](#)' (2013) to support the medicines optimisation agenda, including guiding principles for medicines optimisation, aiming to lead to improved patient outcomes.¹²

The ultimate goal of both of these key documents is to give best practice advice for healthcare professionals. By implementing these guidelines, those patients receiving sub-optimal benefit from their prescribed medicines will hopefully have improved adherence, and this, in turn, should reduce medicines waste.

NHS England produced a report called '[Pharmaceutical waste reduction in the NHS](#)' in 2015. The report highlights best practice in relation to reducing waste from local initiatives. It provides examples aiming to encourage others to introduce similar initiatives to improve outcomes where appropriate.³

The RPS document '[Keeping patients safe when they transfer between care providers - getting the medicines right](#)' (2012) recommends improving the quality of hospital discharge communications when medications are stopped, started or changed,¹³ as this will help to reduce waste/avoid repeat ordering of stopped medicines.

The RPS have also published [sustainability policies](#) on tackling medicines waste, including calls for the following:¹⁴

- Only prescribing antibiotics when clinically appropriate and supporting patients to self-care when they have symptoms of common self-limiting conditions.
- National public awareness campaigns on antimicrobial resistance, prudent use of medicines and appropriate medicines disposal, and pharmacy support to use antibiotics appropriately.
- Medicines waste campaigns for the public and healthcare professionals should be implemented and evaluated.
- Improved management and recycling of medicines packaging and pharmaceutical waste.
- Environmentally friendly alternatives for single-use plastics, such as medicine spoons, medicines cups, oral syringes and plastic compliance aids, including sourcing reusable alternatives.
- Educate the public about not stockpiling medicines, only ordering the repeat medicines they need and the appropriate disposal of medicines.

The Royal College of General Practitioners and the RPS jointly published a [Repeat Prescribing Toolkit](#) in October 2024, which includes information on reducing avoidable waste.¹⁵

No specific national guidance was identified in relation to Scotland, Northern Ireland and the Isle of Man. Consequently, in the absence of local guidance, the above documents represent best practice.

Electronic prescribing

Electronic prescribing is currently available in primary care in England and Wales.^{16,17} Digital prescribing and dispensing is planned for Scotland with implementation through mid-2024 to mid-2026¹⁸ and

Northern Ireland are aiming to launch a system for electronic transmission of prescriptions during 2030-31.¹⁹ Electronic prescribing supports the reduction of medicines waste in the following ways:^{16,17}

- A standardised drug dictionary is used to complete electronic prescriptions, improving prescription accuracy and reducing the risk of patients receiving the wrong medication.
- The risk of duplicate prescriptions is reduced as electronic prescriptions cannot be lost.
- Prescriptions can be cancelled at any time until they have been dispensed.
- Replacement prescriptions can be sent electronically.

Medicines waste and adherence project suggestions

Campaigns that address some of the issues that contribute to medicines waste and highlight best practice can be used with the aim of improving adherence and waste reduction. Issues to focus on could include the following:

- Reviewing repeat prescribing management at GP practices or pharmacies. The following PrescQIPP resources can support implementation: [292. Repeat prescriptions](#), [325. Empowering patients to manage their repeat prescriptions](#) or the [PrescQIPP Practice medicine co-ordinators' e-learning course](#) (aimed at non-clinical staff in GP practices that manage the repeat prescribing process).
- Improving the management of repeat prescriptions by patients, e.g. by encouraging them to download the NHS App in [England and the Isle of Man](#) and [Wales](#), and using this to order repeat prescriptions.
- Encouraging patients struggling with medicines adherence to use different interventions and tools to help remind them. Smart phone medication reminder apps might be helpful for individual patients, but the quality and integrity of information in apps vary and may in some cases have misleading information. The NHS Specialist Pharmacy Service have summarised different ways to [support adherence](#) including information on smart phone medication reminder apps.
- Utilising a social media marketing and communication strategy for medicines waste campaigns. Standalone posters and leaflets will not change behaviours. Refer to the [PrescQIPP adherence and waste press releases and social media messages](#) examples.
- Ensuring that the NHS England [Clinical Waste Strategy](#) is implemented and recyclable waste (e.g. cardboard packaging, and other packaging such as blister packs and metered-dose inhalers depending on local arrangements) is disposed of correctly, instead of being sent for incineration as clinical waste, which is associated with an increased cost and environmental impact.
- Increasing the awareness of patients, GPs and practice staff regarding pharmacy services that help to check adherence and reduce waste, e.g. the New Medicine Service (England), the Discharge Medicines Service (England), the [Community Pharmacy Discharge Medicines Service](#) (Northern Ireland), the [Discharge Medicines Review](#) (Wales) and the [New Medicines Intervention Support Tool](#) (Scotland).
- Ensuring regular medication reviews are carried out to support taking prescribed medicines appropriately, discuss medicines-taking behaviours, review inappropriate polypharmacy and engage in shared decision-making. The following PrescQIPP resources can support implementation: [259. Care Homes/domiciliary care-Pharmacy Technician medication review and process reviews](#), [319. Good prescribing](#), [331. Medication review in patients with multi-morbidity](#), [268. IMPACT](#) and the [Using IMPACT for a medication review](#) webinar recording.
- Identifying stockpiling or non-adherence through asking to see a patient's medicines at the point of review. In addition to addressing medicines waste, this could help to identify those at an increased risk from adverse events from erratically taking medication, poor optimisation of long-term conditions, and a missed diagnosis (e.g. dementia). This was done during home visits in South

Somerset by asking '[show me your meds, please](#)', highlighted by the British Geriatric Society, with good results but could also be extended to asking patients to bring in all their medicines to their review.

- Preventing the ordering of medicines on prescription that are no longer required, emphasising that patients should only order what they need and tell their prescriber if there are medicines they are no longer taking. View the [Dorset ICB PrescQIPP highly commended project 'Only Order What You Need'](#) campaign project as an example of how a systemwide patient empowerment campaign can reduce unnecessary primary care prescribing.
- Making sure people know to return any medicines that are out of date or no longer required to their local pharmacy for safe disposal, highlighting that medicines that are returned cannot legally be reused and must be incinerated, along with the negative environmental impacts associated with the inappropriate disposal of medicines. Use the [PrescQIPP public facing waste campaign materials](#) to support your local campaign.
- Making sure prescriptions are only issued at the request of the patient/patient's carer. Prescription requests should not be accepted from any appliance contractors as this can lead to considerable wastage if inappropriate quantities are requested or prescriptions are requested when they are not needed.
- Reviewing the duration of prescribing to prevent wastage if medication has changed or stopped, the patient's health condition has changed, new medications are started or the patient has died.
- Reviewing overmedication and any inappropriate prescribing, for example, of antibiotics, psychotropic medication for behavioural symptoms, opioids, etc. through audits and medication reviews. Use the [Stopping over-medication of psychotropic drugs](#) resources to support your local projects.
- Supporting patients to self-care when they have symptoms of common self-limiting conditions and maximising non-pharmacological treatment options. Use the [PrescQIPP self care webkit](#) to support implementation of your local project.
- Improving medicines reconciliation at the interface between NHS care providers. Use the implementation resources available in [278. Transfer of care around medicines](#) to support your local medicines reconciliation project.
- Utilising environmentally friendly alternatives for single-use plastics such as medicine spoons, medicines cups, oral syringes and plastic compliance aids, including local recycling schemes, sourcing reusable alternatives and avoiding oversupply of these items. Refer to [340. Sustainability in medicines optimisation](#) for examples of reducing medicines waste and the medicine carbon footprint.
- Improving medicines management procedures at residential or care homes. Refer to [291. Prescribing, ordering and receiving medicines in care homes](#), [293 Medicines administration in care homes](#) and the [PrescQIPP e-learning courses on managing medicines in care homes \(1 to 3\)](#)
- Providing advice and information to prevent patients feeling frightened or worried about asking for help regarding taking their prescribed medicines. Use implementation resources such as a patient leaflet, text/email messages, a patient invitation letter or stopping your medicine guide available with [331. Medication reviews in patients with multi-morbidity](#).
- Proactively auditing the content, volume and cost of medicines waste (e.g. when this is returned to pharmacies) to assess any local patterns in terms of the types of medicines being wasted or high-cost areas to target and assess the outcome of targeted interventions.

Further PrescQIPP resources that are relevant to this bulletin are hyperlinked below.

[Adherence and waste webkit](#)

This webkit brings together all the PrescQIPP medicines adherence and waste resources as well as showcasing good practice examples of projects focusing on reducing medicines waste. Each set of resources contains tools that can be adapted for local use before implementation. Resources include webinars, patient facing campaigns, resources for professionals, and shared good practice examples of both medicines waste and repeat prescription management. These provide a good starting point for organisations who wish to undertake a project to reduce medicines waste and improve adherence. They can be built upon and support the evidence base needed in a business case to secure longer term funding for implementation of this work.

[Patient centred approaches to medicines adherence webinar](#)

This includes issues around adherence, practical and perceptual approaches and developments, the need to optimise consultations to address behaviour change and empowering patients around making the most of their medicines.

[Bulletin 255. Prevent Medicine Waste Campaigns - inhalers, insulin, ONS \(sip feeds\) and general campaign](#)

Four separate waste campaigns for inhalers, insulin, ONS (sip feeds) and a general waste campaign. The general campaign can support potential over ordering with messages such as, “Don’t tick it if you don’t need it” and “Everyone has a part to play in reducing medicine shortages”. Resources available include patient information sheets on how to manage insulin, inhaler or ONS supplies, receptionist guides on insulin and inhaler ordering quantities, and a guide on insulin quantities for prescribers.

The [PrescQIPP Scorecards](#) can be used to select and review progress on medicine optimisation projects. Under the ‘Priorities Report’ tab organisations and practices in England, Wales, Northern Ireland and the Isle of Man can view the estimated 12 months carbon avoidance as a result of implementing one of the medicine optimisation projects listed.

Summary

- The causes of medicines waste are multifaceted. Consequently, medicines waste and adherence projects and initiatives need to be multi-layered and long term in their approach. Standalone posters and leaflets campaigns will not change behaviours. An extensive social marketing and communication strategy is essential and partnership working across many organisations and stakeholders is encouraged.
- Both clinical and non-clinical staff should be aware that they have an individual responsibility for managing waste sustainably to reduce costs to the NHS and lessen the environmental impact.
- Implementing the NICE guidance on medicines optimisation¹ and using shared good practice and case studies to build up a business case to support investing in medicines adherence projects can be used to reduce medicines waste.

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Additional PrescQIPP resources

Including
implementations
resources and data

<https://www.prescqipp.info/our-resources/bulletins/bulletin-366-medicines-adherence-and-waste/>

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