Department of Health & 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

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We would like to express gratitude to all of the participants in the National Overprescribing Review for providing their time, personal experience and expertise to inform the creation of recommendations to reduce overprescribing nationally. Participants came from a diverse background and recommendations were created by consensus. Therefore, these may not represent the individual views of all those who participated.

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Contents

Glossary

Appropriate polypharmacy – prescribing for an individual for complex conditions or for multiple conditions in circumstances where medicines use has been optimised and where the medicines are prescribed according to best evidence.

Adverse Drug Reaction (ADR) – an unwanted or harmful reaction experienced following the administration of a drug or combination of drugs under normal conditions of use and is suspected to be related to the drug

Cultural competency – the ability to participate ethically and effectively in personal and professional intercultural settings. It requires being aware of one's own cultural values and world view and their implications for making respectful, reflective and reasoned choices, including the capacity to imagine and collaborate across cultural boundaries

Clinical indication – the condition, symptom or reason that a medicine is being prescribed to manage or treat for this patient.

Dependence Forming Medicines (DFM) – are, primarily, opioids, z drugs, benzodiazepines, Gabapentin and Pregabalin. Dependence in this case is defined as the need to continue taking a medicine to maintain a state of normality and avoid symptoms of withdrawal.

Deprescribing – a collaborative process, with the patient and/or their carer, to ensure the safe and effective withdrawal of medicines that are no longer appropriate, beneficial or wanted, guided by a person-centred approach and shared decision-making.

Inappropriate or problematic polypharmacy – the prescribing of multiple medications inappropriately or where the intended benefits of the medications prescribed are not realised.

Medicines reconciliation – the process of identifying anomalies in what the prescribing records says a patient should be taking, compared to the medicines the patient is in fact receiving and taking.

Medicines optimisation – a person-centred approach to safe and effective medicines use, to ensure people obtain the best possible outcomes from their medicines.

Overprescribing – the use of a medicine where there is a better non-medicine alternative, or the use is inappropriate for that patients' circumstances and wishes.

Personalised care – care based on 'what matters' to people and their individual strengths and needs. A change to the one-size -fits-all health and care system. The Comprehensive Model of Personalised Care has six evidence-based components: sharing decision-making, personalised care and support planning; enabling choice; social prescribing; supported self-management; and personal health budgets.

Polypharmacy – the concurrent use of multiple medicines for one person. There is currently no consensus on a definition for polypharmacy. The World Health Organisation defines polypharmacy as four or more medicines, academia tends to use five or more, NHS Scotland uses 10 whilst practice data tends to be based on the NHS Business Services Authority polypharmacy definitions that start at eight unique medicines. In this report we have calculated the prevalence of polypharmacy at both 5+ and 8+.

Primary Care Network (PCN) – a group of general practices joined as a network, typically covering 30,000-50,000 patients. The networks will provide the structure and funding for services to be developed locally, in response to the needs of the patients they serve.

Rethinking Medicine – a collaborative initiative that focuses on quality of life and well-being rather than pathology, clinical states or markers of disease.

Shared Decision Making (SDM) – a collaborative process between a clinician and a patient, where the clinician supports the patient to reach a decision about their treatment that is right for them. It brings together the clinician's expertise of treatment options, evidence, risks and benefits and the patients' circumstances, goals values and beliefs.

Social prescribing – a way for local agencies to refer people to a link worker. Link workers give people time, focusing on 'what matters to me' and taking a holistic approach to people's health and wellbeing. They connect people to community groups and statutory services for practical and emotional support.

Structured Medication Review (SMR) – a comprehensive and clinical review of a patient's medicines and detailed aspects of their health. Delivered by facilitating shared decision-making conversations with patients aimed at ensuring that their medication is working well for them.

Transfer of care – when a person moves between care settings or care is handed over from one medical professional to another.

Unique medicines – one or more medicines prescribed as the same chemical substance whether it be different formulations (presentations) or different strengths.

Foreword

For the NHS, as for the communities it serves, COVID-19 continues to be a hugely challenging experience. Yet among the tragedy and heartbreak of this year there has been a real spirit of togetherness and millions of people have stepped up to support those who are in need.

This report seeks to build on that spirit. It recognises that generally the NHS has a strong track record of evidence based prescribing and rational use of medicines. The achievements of the NHS in partnership with others to address the problem of overprescribing so far, in terms of optimising the use of medicines, developing better systems and listening to the needs and preferences of patients. And it points to where we need to go in future.

COVID-19 has made the case for change even stronger. As we look to learn from what has happened, and do things differently, we need to build in improvements so we reduce overprescribing once and for all. In January 2019 the NHS Long Term Plan set out the key themes for the NHS: preventing illness, tackling health inequalities, improving care quality, providing digitally-enabled care and backing our workforce – all of which are picked up in our recommendations. The Long Term Plan is also putting new resources into the NHS and it is vital that we get the most from these investments.

Overprescribing is a complex issue, involving systems and culture as well as individuals, and tackling it needs a system-wide response, with clinicians and patients both receiving more support to ensure the NHS is getting prescribing right. During the review, we heard from hundreds of patients, clinicians and experts who helped us to identify a range of ways in which we can improve prescribing systems and culture and these form our proposed strategy for reducing overprescribing. We also have to recognise how much more we need to know: our recommendations on research are fundamental to our ability to continue to reduce overprescribing.

If we invest in tackling overprescribing as this report recommends, then we estimate the NHS will be able to reduce the volume of items dispensed in primary care in England. With well over a billion items dispensed each year, there is a huge prize to be gained in improving the health of millions of people – comparable to a new 'blockbuster' medicine – if we can only get this right.

Medicines do people a lot of good and this report is absolutely not about taking treatment or services away from people where they are effective. But medicines can also cause harm and can be wasted. Building on important initiatives now underway, including the rapid expansion of clinical pharmacists alongside GPs, and the scaling up of social prescribing. This report shows how the NHS can make the most of a once in a generation opportunity to reset prescribing in a new, patient-centred way.

Dr Keith Ridge CBE
Chief Pharmaceutical Officer for England

Executive summary

This review was set up to develop recommendations to reduce overprescribing, which is where people are given medicines they don't need or want, or which may do them harm. (*See 'This review' section.*)

The review has found that overprescribing is a serious problem in health systems internationally that has grown dramatically over the last 25 years. (*See 'The causes of overprescribing' section.*) It has two main causes:

- **systemic:** key factors are single-condition clinical guidelines, a lack of alternatives to prescribing a medicine, a need for on-going review and deprescribing to be built into the process of prescribing, inability to access comprehensive patient records, the lack of digital interoperability, and pressure of time

- **cultural:** a healthcare culture that favours medicines over alternatives and in which some patients struggle to be heard

As well as the physical and mental impact on patients, overprescribing can lead to more hospital visits and preventable admissions, even premature deaths. There is also the cost in wasted medicines. Overprescribing may disproportionately affect Black, Asian and Minority Ethnic communities and those who are more vulnerable, such as the elderly and those with disabilities. (*See 'The consequences of overprescribing' section.*)

Recent initiatives by the NHS have helped stem the growth rate of overprescribing but it remains at unacceptable levels. Evidence is limited, but the review estimates that it is possible that at least 10% of the total number of prescription items in primary care need not have been issued.

We know what will reduce overprescribing: shared decision-making with patients; better guidance and support for clinicians; more alternatives to medicines, such as physical and social activities and talking therapies; and more Structured Medication Reviews (SMR) for those with long-term health conditions. (*See 'Responses to overprescribing' section.*)

The NHS Long Term Plan is addressing many of the system problems already, such as improving digital systems, interoperability and patient records, funding more pharmacists in primary care networks (PCNs) to perform Structured Medication Reviews and introducing personalised care for patients. Initiatives such as Rethinking Medicine have set out the cultural change in medicine that needs to be developed and spread. But to achieve a substantial reduction in overprescribing, we need a comprehensive and proactive strategy to co-ordinate this work and drive the recommendations of this review. (*See 'Our strategy' section.*)

The review therefore proposes:

- systemic changes to improve patient records, transfers of care and clinical guidance to support more patient-centred care (*see 'The system' section)*

- culture change to reduce the reliance on medicines and support shared decision-making (s*ee 'Culture' section*)

- a new National Clinical Director for Prescribing to lead a cross-system implementation programme including research and training (*see 'Implementation' section*)

The coming year will be critical for the work on overprescribing, with the need to make the best use of NHS resources to continue to respond to the impact of COVID-19 as well as to deliver important routine healthcare services. This report shows how the development of a long-term strategy on overprescribing will help to deliver on these challenges by bringing about a fundamental improvement in prescribing systems and culture to support the aims of the NHS Long Term Plan. The review proposes to reconvene within a year of publication to assess progress.

1. This review

In December 2018 the Secretary of State for Health and Social Care, Matt Hancock, commissioned a review to be led by Dr Keith Ridge CBE, the Chief Pharmaceutical Officer for England, to evaluate the extent of overprescribing in the NHS and recommend what might be done to reduce this problem, particularly in primary care.

The Review was guided by a Short Life Working Group (SLWG) which brought together senior stakeholders from across the healthcare system, together with patient and third sector representation. A review team from both NHS England and NHS Improvement and the Department of Health and Social Care provided support, including analysis of primary care data, along with research commissioned from The Policy Research Unit in Economic Methods of Evaluation in Health and Social Care Interventions (EEPRU)[1]. A summary of the Review's approach and working methods is at Annex A.

1.1 Patient and professional engagement

The Review drew on the expertise of ninety healthcare professionals and patient representatives. The Review also ran or commissioned:

- a symposium with around 150 delegates from the medicine, nursing and pharmacy professions, from academia and from patient groups and charities

- a co-design workshop with patients, in partnership with HealthWatch[2], the campaign group Me and My Medicines[3], and the Yorkshire and Humber Academic Health Science Network[4]

- six engagement events with clinicians

- 16 focus groups and 20 in-depth interviews with patients and the public from an independent research agency

More on professional and patient engagement can be found in Annex A.

1.2 Equality and health inequalities

Promoting equality and addressing health inequalities are at the heart of NHS England's and NHS Improvement's values. Throughout this Review we have:

- given due regard to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations

between people who share a relevant protected characteristic (as cited under the Equality Act 2010) and those who do not share it

- given regard to the need to reduce inequalities between patients in access to, and outcomes from healthcare services and to ensure services are provided in an integrated way where this might reduce health inequalities

We have carried out an Equality and Health Inequalities Impact Assessment (Annex B) which records our analysis and conclusions. Overprescribing directly affects some protected characteristic groups, notably older people, who our evidence shows are much more likely to be prescribed multiple and long-term medication and so are more likely to experience overprescribing. Other groups are also at heightened risk, including those from Black, Asian and Minority Ethnic communities, those living in areas of high deprivation and those with a learning disability, and our recommendations directly address these risks.

2.   The causes of overprescribing

2.1 In this section:

- What do we mean by overprescribing?

- The causes of overprescribing

- The prescribing system

- The culture of prescribing

2.2 What do we mean by overprescribing?

Put simply, overprescribing is where people are given medicines they don't need or want, or where harm outweighs benefits. It occurs in every healthcare system in the world. It occurs in several ways:

- the patient is prescribed a medicine, when there would have been a **better alternative**. An example of this would be a patient being given a medicine to reduce their blood pressure when changes to diet and lifestyle would be more appropriate for them

- the patient is prescribed a medicine which in itself is generally appropriate for that condition, but which is **not appropriate for the individual patient**. For example, a patient may have a second condition, such as kidney disease, that means the medicine taken for the first one could affect them adversely

- the patient is prescribed a medicine, their condition changes and the medicine is **no longer appropriate**, but the prescription is not reviewed. For example, anti-diabetic medicines prescribed to a patient in their 60s might not still be appropriate in their 90s

- the patient no longer needs or benefits from the medicine, but **continues to be prescribed it**. An example of this would be someone prescribed strong painkillers for the short term who is not offered alternative support to assist with pain management

When a clinician issues a prescription, it is usually because they genuinely believe that it is something the patient needs. Overprescribing is rarely the result of a faulty diagnosis. As we shall see, the extent of overprescribing is a result of weaknesses in the healthcare system and culture, not the skills or dedication of individual healthcare professionals.

It is not easy to know the true extent of overprescribing, but the review has looked at the available evidence and **our best estimate is at least 10% of the current volume of medicines may be overprescribed (though this will be less than 10% by value)**. There are over 1.1 billion prescription items dispensed each year in primary care and the community in England,[5] which indicates the scale of the problem. (This estimate is discussed further in 'Our strategy' section.)

2.3 The causes of overprescribing

Most of us are familiar with the prescribing process. We see a healthcare professional and describe our symptoms. They diagnose and prescribe a medicine which we collect from the pharmacy. Depending on the condition, it may clear up straight away. In some cases, particularly as we get older, we may need to keep taking the medicine, and for convenience we will receive a repeat prescription for a set period without needing to see a healthcare professional each time.

But what can seem so simple can be very complex, as those with multiple or long-term conditions know all too well. People don't always see the same clinician. As well as GPs, there are consultants and specialists in hospitals, and some nurses, clinical pharmacists, allied health professionals, health visitors and dentists also prescribe medicines. This has improved patient care but created new challenges such as managing prescribing records across multiple systems, ensuring reviews are holistic and managing clinical interactions well.

> "The GPs are fine – it's the co-ordination between all the different
> consultants and across the county boundary."

Prescribing itself is far from straightforward. Choosing the right treatment depends on knowing the patient's previous medical history and current conditions and treatments; and also their wider lives – anything from stress at work to damp or mould in their home. Clinicians need to understand the person, not just the condition. This understanding depends on building up trust, so that patients can overcome anxiety, open up about their needs, fears and cultural or other preferences, and ask questions about their condition or treatment.

> "It would help a lot if they had a better understanding of culture and
> upbringing – this is a general society issue, not just about the NHS."

Despite this complexity, most of the time, this process works. Every day, people get the medicines they need, and their health and wellbeing is improved as a result. Essentially, this is because clinicians are able to diagnose quickly what is wrong, and agree the best

course of treatment with the patient – though many clinicians, like patients, would like to have more time for this than the standard appointment allows.

For this review, we spoke to over a hundred individual patients and most were full of praise for clinicians and for the NHS. However, many could tell of experiences that fell short of the ideal:

- feeling they were not listened to, so the prescription didn't really address their issues or their preferences

- taking medicines without really understanding why, or knowing what the risks or side effects might be

- not receiving the support or answers they need when they have issues with or questions about their medicines

- being prescribed medicines such as antidepressants, where an alternative such as a talking therapy would have been more appropriate

- being prescribed medication by different clinicians, with no co-ordination or joining up of treatments or patient records

- taking medicines that no longer seem to work, or which are causing troubling side-effects, but not being confident to talk to the doctor about it

The clinicians we heard from were similarly frustrated with the current system:

- they often didn't feel they'd got to the root of the patient's problem, and so the treatment they offered was dealing more with symptoms than causes

- they would have liked to refer a patient for a non-medical treatment, but this was not available or the waiting time was too long

- they couldn't be sure how the treatment they were prescribing would fit with care being provided by other healthcare professionals

- other clinicians had prescribed medicines, but they didn't know why because the reason wasn't recorded on the patient's records

Today's clinician can deploy a vast number of treatments that doctors would not have dreamed of at the inception of the NHS in 1948. But it is in part because they can be, or are perceived to be, so effective, that the tendency is to prescribe more drugs to more patients. In 1996, the number of prescription items dispensed in primary care and the

community in England was 10 per head[6]. By 2016, it had doubled to 20,[7] as shown in Figure 1.

Average Number of Prescription Items per Head of Population
(Sources: NHS Digital Prescribing in the Community (1994-2017); ePACT2 (2018-2019); ONS Mid-year population estimates)
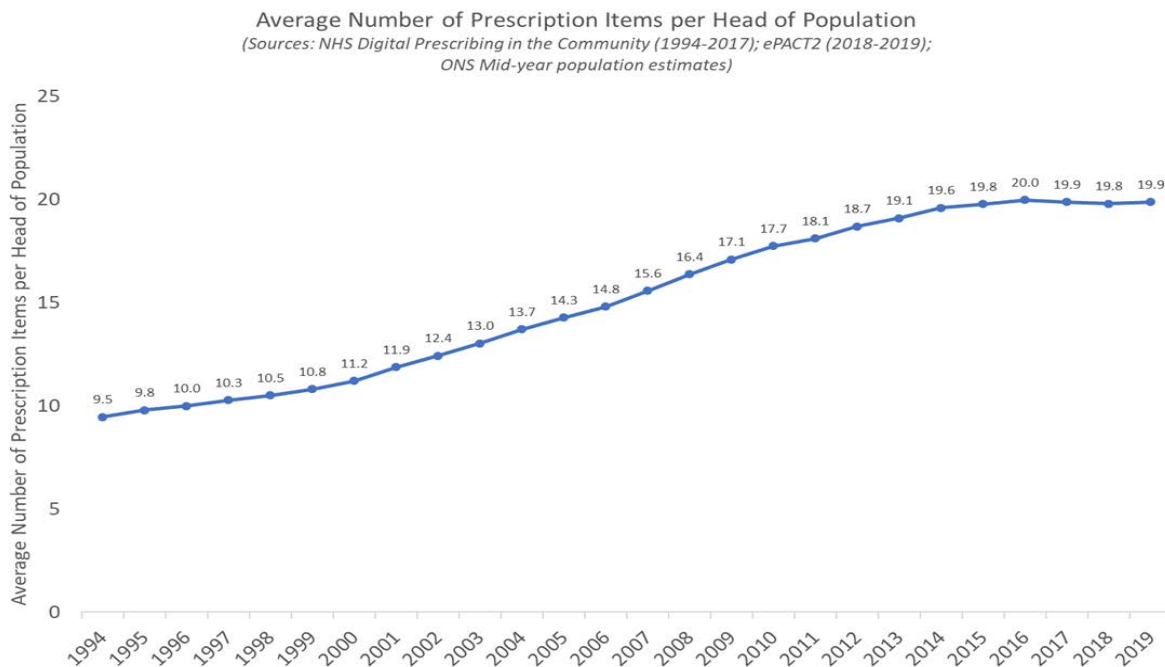
Figure 1: The Average Number of Prescription Items per Head of Population by year 1994-2019.

There are more people taking the same medicine for months or years to treat a long-term condition. Repeat prescriptions make up around three-quarters of all prescription items. They can be left without review for long periods, increasing the risk of overprescribing.

There are also more people taking multiple medications. Currently, around 15% of people in England are taking five or more medicines a day, with 7% on eight or more (see Annex E). In some cases, people are taking one medicine to deal with the side effects of another. Side effects are a major cause of overprescribing, because what may be the right treatment for someone with a single condition, may need to be adjusted or stopped for someone who has multiple conditions. One medicine may interact negatively with another. There is also the cumulative burden on the patient's metabolism – and on their quality or life – of taking so many different medicines each day.

2.4 The prescribing system

The Review has identified a series of factors in the healthcare system that contribute to overprescribing. All these tend towards more prescribing, and longer periods of prescribing, often at higher doses. These include:

Patient care records. Where these are not comprehensive or are not available to the clinician providing care to the patient or the patient themselves. Although Electronic Health Records are becoming more common and effective, there are issues with exchange of information between primary and secondary care, or with giving full access to all those providing care. As well as GP prescriptions, many people receive medicines from other providers including hospitals, not all of which have electronic systems for recording prescribing. If the computer systems in each sector are not linked, prescribers may be unaware of other medicines prescribed. Also, patients may purchase medicines over the counter, which can sometimes affect how prescribed medicines work. In most instances, patients are unable to add information of this kind, or on side effects they have experienced, to their records.

"I don't think GP surgeries and pharmacists talk enough between each other. They should be more joined up."

Hospital discharge letters. These are an essential link between different providers of care – typically a hospital consultant and a GP – but sometimes those who need the information, such as those providing a care package for a patient being discharged from hospital – do not receive the letter in time, or at all. This can lead to errors, including inadvertent reintroduction of discontinued medicines. Similar problems arise with other letters communicating clinical decisions or information, such as clinic letters between specialists and primary care. There are also limited mandatory fields on discharge letters for medicines so full information may not be supplied.[8]

Clinical indications. One clinician may be reluctant to withdraw medication which has been prescribed by another, particularly if the latter is a specialist or they do not know why it was prescribed. Discharge letters, clinic letters and the electronic health record should record the 'clinical indication' or rationale for prescribing the medicine, but this does not always happen.[9]

Transfer of care. When a patient's care transfers between services there is an increased risk of medication errors. In 2015 a NICE report suggested between 30% and 70% of patients may have experienced an error or unintentional changes to their treatment when care was transferred.[10]

Treatment guidelines. Evidence and guidance on rational alternatives to medicines is also much less extensive and rarely integrated properly into treatment or prescribing guidelines. Guidance on prescribing does not routinely explain when and how to stop a medication or regularly review its long-term benefit.

Clinical evidence. There is a marked imbalance between the evidence that supports the prescribing of medicines and the evidence for reducing or stopping a medication. For example, clinical trials typically involve people between the ages of 18 and 64, which means that the effects of the medicine on older patients is less well understood.

Alternatives. Medicines can also 'crowd out' alternatives such as clinicians giving advice on diet or exercise or access to physiotherapy or counselling. These may be less accessible or affordable, particularly in contrast to medicines that can be provided quickly or easily in primary care and which are free for the patient in around 90% of cases.

"If I exercised, I know it would have benefits, but I'm just not motivated to do so."

Repeat prescriptions. When managed correctly, repeat prescribing reduces the need for appointments and ensures continuity of medicines. However, because repeat prescriptions can be issued for months, even years, it is important they are subject to effective review. There is no standard approach to processing repeat prescriptions within GP practices. Further, GP practices can receive over 200 requests for repeat items a day, and GPs can spend up to two hours a day dealing with repeat prescriptions[11], and there is a risk of this becoming a tick-box exercise. Also, many patients find the system complex, inflexible and unreliable and it can lead to stockpiling medicines or ordering everything on their prescription when they only need a few items. These may end up being thrown away, or given to others or misused.

"They give you more than you need. I can take up to three tablets with one of my medications, but I don't always need to, so I end up with extra boxes all of the time."

Single reviews. Medication needs to be reviewed to make sure it is still effective and safe, but quality incentives in general practice often focus only on a single condition, where what patients want and need is a holistic review of their care.

"If medication is not reviewed, you could be on the wrong thing for the rest of your life."

2.5 The culture of prescribing

Today's prescribing culture includes a strong sense of ethics, a commitment to knowledge and evidence and a dedication to patient care. However, in some cases there is still a paternalistic tendency to believe that 'doctor knows best' and to treat the illness not the person, and a belief in the primacy of medicines to treat people's ills. Pressure for change is coming from within the healthcare professions, as well as from patient groups, as shown by the number of clinician-led initiatives such as Rethinking Medicine.[12]

> "You give the GP the facts and say what is wrong with you and your role is to take them as instructed."

The 'biomedical model'[13] of healthcare encourages prescribing following single-disease guidelines, often without consideration of alternatives to medicines and without sharing decision-making with the patient, and with a resistance to stopping or altering medication initiated by another clinician. Many patients do not feel that they experience a compassionate, coordinated service that pays enough attention to their individual needs, assets, values, preferences and priorities.[14]

> "I felt I was pressured by the doctor to take amphetamines [for ADHD] and they didn't explain enough about the side-effects."

The biomedical model can influence patients too. Some say they have experienced anxiety – even a feeling of abandonment – when there was no suitable medication available for them. And we have seen with antibiotics (notwithstanding recent improvements in prescribing these important medicines), when patients expect, or press for, medication, clinicians may be influenced to prescribe when it is unlikely to be helpful or appropriate.

> "Some doctors are not strong enough to say 'I am not prescribing that'."

But this is not how the healthcare professions or patients want it to be. Just as with poor IT or the lack of alternative treatments, clinicians are working within a culture that lets them and their patients down, but which is hard to change.

The Review has identified a series of factors in prescribing culture that contribute to overprescribing and which will need to be addressed if we want patients and clinicians to be equal partners. These include:

> **Equality**. Patients report that the unspoken signals given by busy clinicians during appointments – such as not looking up from their keyboard – discourage them from asking the questions that might reassure them or help them to manage their own health better. Similarly, discharge letters symbolise an old-fashioned way of

thinking about the equal relationship of the clinician and the patient, because they are not addressed to the patient, but to another clinician, in effect discussing the patient and their treatment 'over the patient's head'. Further, the letters are often written using medical abbreviations and jargon, making them very difficult for most patients to understand and act on.

"I just do what the doctor tells me."

"You take it for granted that the GP knows what he's doing."

Information. Many patients we spoke to were cautious about using the internet to research their conditions and wanted more trusted and accessible information. Though some were positive about leaflets produced for patients about specific conditions, they were particularly critical of patient information leaflets contained within boxes of medication, saying they were too detailed, too alarming and designed to 'cover the backs' of the manufacturers.

"The NHS website is pretty good. You can trust that."

"The leaflets are scary. The side effects are worse than the problem."

Knowledge. There is a widespread assumption that medicines are more effective than other strategies to manage health and wellbeing (such as keeping active, eating a healthy diet, connecting with community activities or physiotherapy). Both the general public and healthcare professionals over-estimate the benefits and underestimate the harms of medical interventions.[15],[16]

"Sometimes I have no clue what they're talking about. I just take whatever medications they give me."

Confidence. We heard from patients who did not feel they were on the right medicines, but who did not know what to do or were reluctant to bother their clinician or ask further questions. Patients need to be reassured that they should contact their clinician if their condition changes or their medication no longer feels right.

Challenge. Tackling overprescribing depends on continuing to develop a culture of openness to challenge within healthcare. Many patients report not fully understanding their discussions with clinicians, particularly when they are anxious or upset or where language or cultural barriers exist. Many also feel reluctant to question the decisions of clinicians and so will accept or continue with a prescription, even when they do not think it is helping – or may simply stop taking the medicine but will not let the clinician know. Clinicians too can be reluctant to

challenge their colleagues, or seniors, or specialists, and some clinicians do react negatively if a pharmacist or another clinician queries a prescription. We need a clinical culture that is accepting of questioning and, if necessary, of challenge, where it is not seen as a criticism of the prescriber but a means of facilitating discussion and ensuring patient safety.

"I ask, but I've felt so put down that I just don't ask any more."

"Sometimes you've got to be prepared to fight your own corner."

There are numerous examples of significant advances in the treatment of disease that are due to the efforts of the pharmaceutical industry. However, some activities of the pharmaceutical industry can influence both the prescribing habits of clinicians, and the demand for medicines from patients. In the USA, direct advertising of prescription medicines to patients is thought to have a major impact on demand for medicines, and the role of the pharmaceutical industry in overprescribing of pain-relieving medications, such as opiates, has been criticised and led to extensive litigation. In the UK, direct advertising of prescription medicines to the public is not permitted. It should stay that way. The UK pharmaceutical industry has engaged in initiatives to optimise medicine use, including reducing problematic polypharmacy, but concerns remain about pharmaceutical sponsorship of professional education or patient representative groups, and how sometimes clinicians undertaking research sponsored by the pharmaceutical industry are also involved in the development of clinical guidelines.

3. The consequences of overprescribing

3.1 In this section:

- The patient experience

- Patient harm

- Problematic polypharmacy

- Healthcare resources

3.2 The patient experience

Medicines are a matter of life or death for many people, and bring huge benefits to many millions more. But the more medicines someone takes, the more likely they are to experience side effects and interactions between their medicines. If they are taking a medicine for which there is a better non-medicine alternative, this may impact on their health and quality of life. There can also be a burden simply in taking and managing their medicines, particularly for those on multiple medication, leading to medicines not being taken as intended. Some people simply find it all too much and stop taking their medicine altogether.

These burdens weigh particularly heavily on older people, who are more likely to be taking multiple medications. And as people get older, so the body's reaction to medicines changes, which means the dose might need to be changed or the medicine stopped altogether. But sometimes that does not happen, and patients can suffer adverse effects such as falls due to low blood pressure or low blood sugar. This can have very real and negative impacts on older people's day-to-day functions and activities.

> "I take eleven medications now after having a heart attack twelve years ago. Some of the tablets deal with the side effects of other ones."

3.3 Patient harm

An adverse drug reaction (ADR) is an unwanted or harmful effect of a medicine: what patients tend to call side effects. ADRs are not uncommon and, not surprisingly, the chances of experiencing an ADR go up, the more medicines you take. ADRs are thought to occur in 10-20% of hospital in-patient admissions.[17] A person taking ten or more medications is 300% more likely to be admitted to hospital because of an ADR[18].

> "I was given tablets for blood pressure and they affected my anxiety
> levels."

As an example, some classes of medicines, such as those to reduce blood pressure, can increase the risk of falls amongst the frail and elderly, often leading to broken bones. This will often mean a long hospital stay and extended recovery, and may result in the patient experiencing on-going pain, and a loss of mobility, confidence and independence. [19]

Around 6.5% of hospital admissions are caused by adverse effects of medicines. This rises to up to 20% in the over 65 age group[17]. Two thirds of medicines-related hospital admissions are considered preventable.[20]

Some prescribed medicines create a risk of dependency or can be difficult to stop taking. This can lead to overprescribing, as identified in the Public Health England (PHE) Prescribed Medicines Review Report[21].

> "For addictive drugs, you should be called in for a review. You might not
> need them, or you might be able to get a lower dose."

3.4 Problematic polypharmacy

Problematic polypharmacy is one of the main consequences of overprescribing. People who are taking multiple medicines are more likely to be older, have worse health conditions, be taking medicines for longer, face more difficult decisions about treatment and find the cumulative burden of their medication harder to bear than the average. For this cohort, it is also harder for clinicians to spot problematic or unnecessary prescriptions, as the cumulative effect can be difficult to evaluate without more specialist training.

> "In some cases, they just respond to what you tell them and give you
> medication for it. I don't think they take account of the other conditions that
> you have."

Polypharmacy – the medical term for taking multiple medicines – is not of itself a bad thing. For instance, by following the National Institute for Health and Care Excellence (NICE) guidance on post-myocardial infarction,[22] a patient will be prescribed five medicines, which is within one definition of polypharmacy.

However, studies of inappropriate or problematic polypharmacy[23] reveal some of the causes and consequences of overprescribing. In 2009, the Care Home Use of Medicines Study (CHUMS)[24] report highlighted deficiencies in the prescribing, handling and administration of medicines. A report in 2011 by Age UK and the Health Foundation[25] reinforced the findings from CHUMS on reporting excess and inappropriate prescribing,

lack of a structured medication review, and a lack of resident involvement in decisions about medicines.

Distribution of number of unique medicines by age
(Rate per 1,000 population)
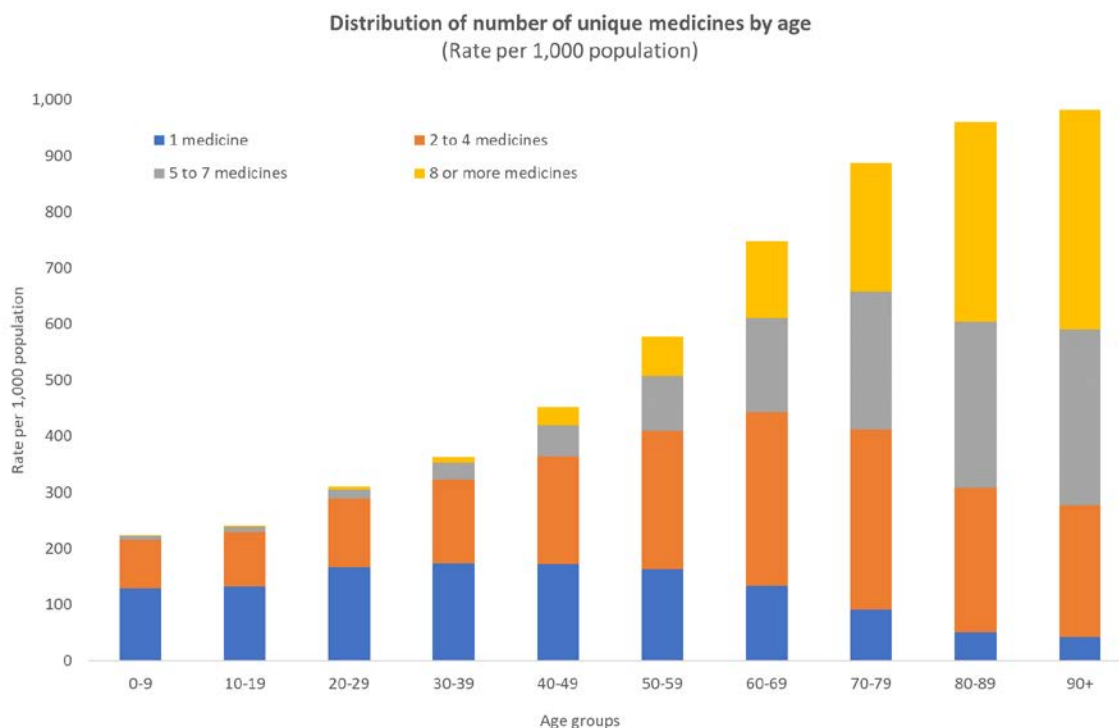
Figure 2: Distribution of number of unique medicines by age (rate per 1,000 population).

Polypharmacy data also points to potential links between overprescribing and health inequalities. Polypharmacy increases with relative deprivation (as shown in Figure 3) and the rate of those on two or more medicines is 2.8 times greater in the most deprived areas compared to the least deprived. Even allowing for age and sex, those living in the most deprived areas are much more likely to be taking eight or more medicines. We cannot say what proportion of this polypharmacy is problematic, but the data is concerning: for example, almost two in three people who are taking eight or more medicines are on at least one drug that may cause dependency (see Annex E).
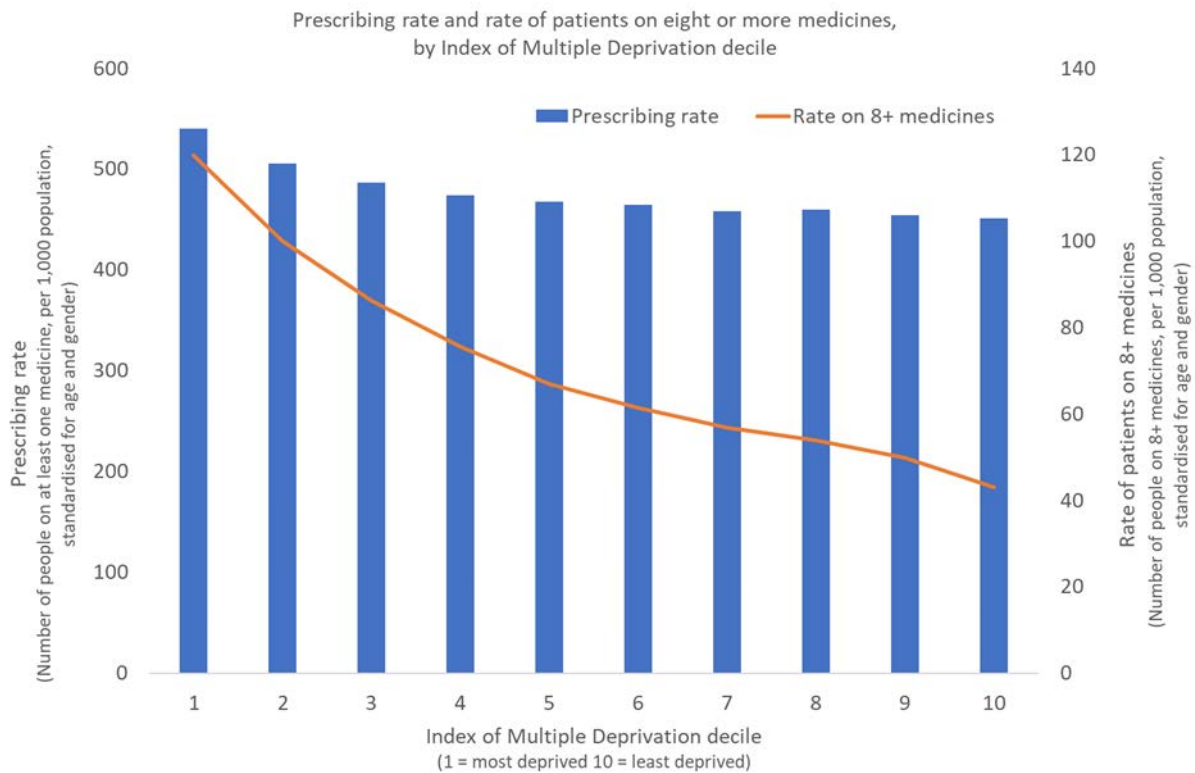
Figure 3: Prescribing rate and rate of patients on eight or more medicines by IMD decile, standardised by age and gender.

Similarly, from a sample in June 2019[1], we can see that a higher proportion than average of those who identify as Asian/Asian British are on eight or more medicines (as shown in Figure 4). Again, we cannot say from this data what proportion of polypharmacy amongst Black, Asian and Minority Ethnic populations is problematic, only that the data suggests there might be differences worth investigating.

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[1] The sample is broadly representative of ethnicity in the population at large but we don't know the extent of any sampling bias that might mean, for example, that the Asian people in the sample need more medicines than Asian people in the country as a whole. Further information is available in the Technical Information Annex.

Age-standardised proportion of patients on eight or more medicines, by ethnicity
(Source: Clinical Practice Research Database (CPRD). Sample size = 1.1m)

Confidence intervals are based on the the method for Directly Standardised Rates as described in Public Health England technical guidance
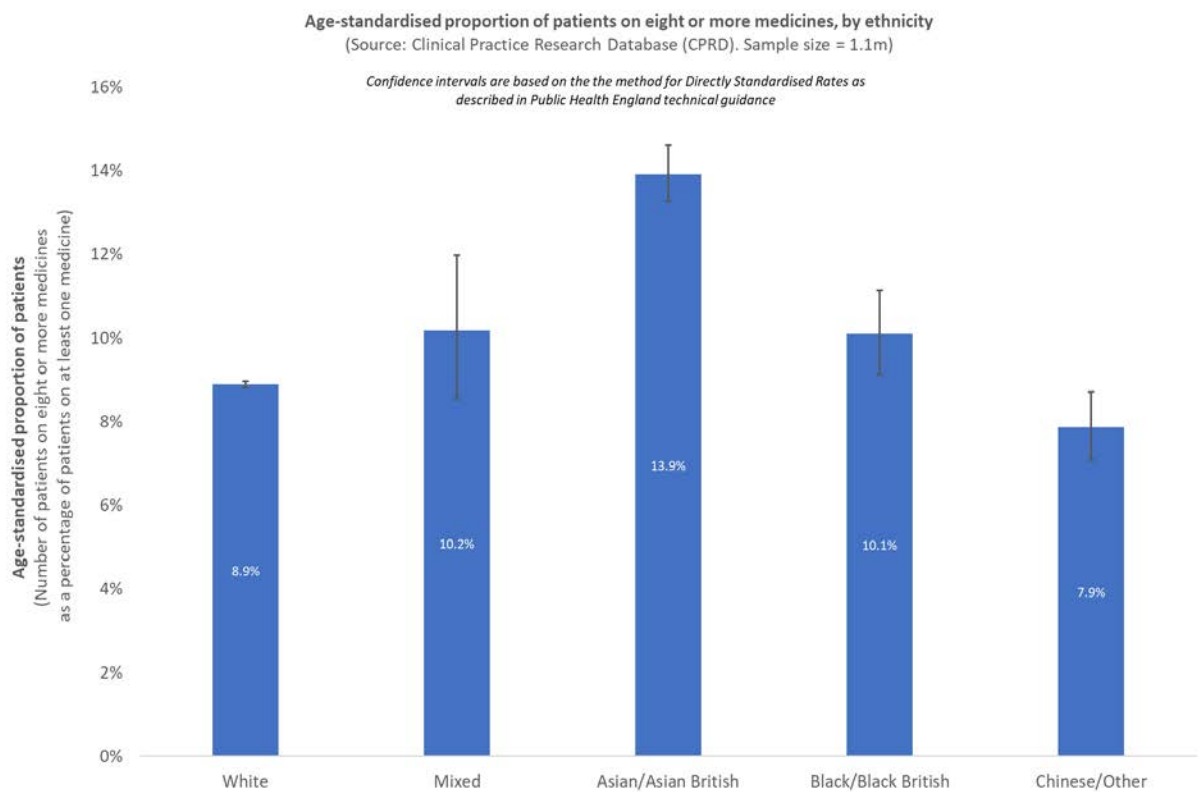
Figure 4: Age-standardised proportion of patients on eight or more medicines, by ethnicity.

3.5 Healthcare resources

As well as the directly negative effects for individual patients, overprescribing is also a waste, in that the National Health Service is buying medicines and giving them to people who don't need or want them. The Medicines Value Programme has demonstrated how spending can be reduced without affecting the quality of care provided to patients, for example by identifying where medicines should not be routinely prescribed or where patients can obtain items 'over the counter' from pharmacies. With overprescribing, given that the NHS primary care medicines budget is around £9.2 billion a year,[26] the potential savings and reductions in waste are very significant. Tackling overprescribing will also bring savings in preventing avoidable hospital admissions and the use of other services.

Our estimates of overprescribing imply that millions of packets of medicine are wasted each year, which consumes energy, plastics and other resources from manufacturing via distribution and storage to disposal, in the UK and internationally. For example, the production and use of some medicines can generate significant greenhouse gas emissions and so contribute to climate change. Reducing overprescribing will help the NHS fulfil its commitment to become carbon net zero.[27]

4. Responses to overprescribing

4.1 In this section:

- Medicines optimisation

- Patient-level medicines optimisation

- Structured medication reviews

- Medicines reconciliation

- Deprescribing

- Variation and data analytics

4.2 Medicines optimisation

Overprescribing is not a new problem and a lot of great work has been done to address the issue, on which this review aims to build. (Examples of case studies are in Annex C, and key papers are in Annex D.) Healthcare professionals and NHS managers have been developing strategies for many years, and together with scientists, policymakers and patient representative groups have contributed to building up our understanding not only of the problem, and its consequences, but also of ways to tackle it.

The key to stopping overprescribing is **medicines optimisation**: ensuring that patients are prescribed the right medicines, at the right time, in the right doses.[28] In some cases, medicines optimisation may lead to a patient being offered additional medication, or having their dose increased, but it also provides a framework for reducing and stopping overprescribing.

Medicines optimisation is based on four principles:

- aim to understand the patient's experience

- evidence-based choice of medicine

- ensure medicine use is as safe as possible

- make medicines optimisation part of routine practice

Alongside these four principles, there is the overall aim of better patient outcomes, and the foundation that medicines optimisation must be centred on the needs and preferences of the patient and depends on effective measurement and monitoring. Supported by the NICE Quality Standard for Medicines Optimisation,[29] this can be best captured in the diagram in Figure 5.
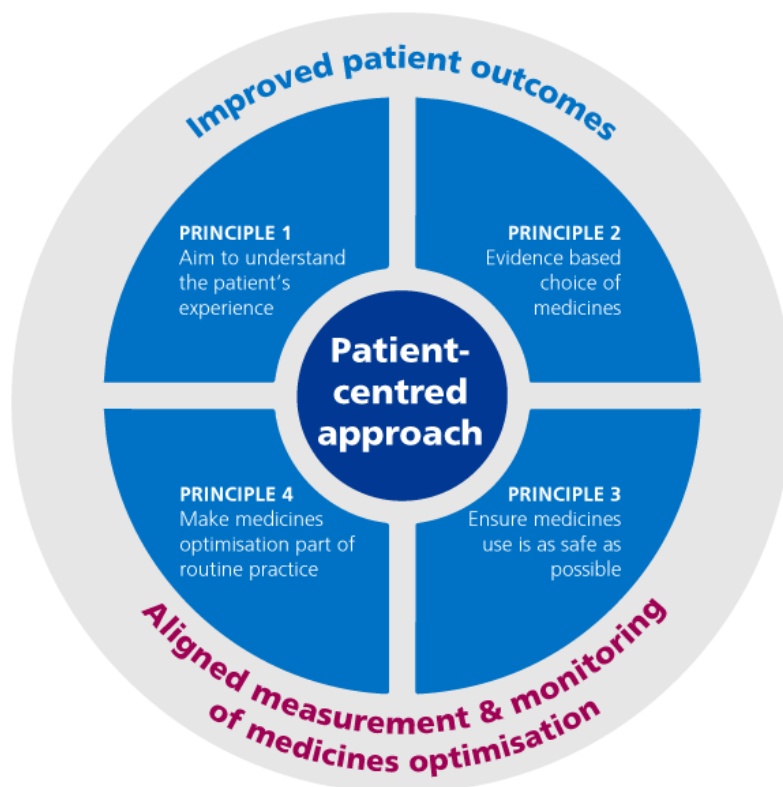
Figure 5: The key principles of medicines optimisation.[30]

From the 1990s, there have been several initiatives to help promote medicines optimisation and reduce overprescribing across the primary care system. To mention a few from within the NHS:

- **pharmaceutical advisors** in Clinical Commissioning Groups (CCGs) have worked with prescribers to help ensure that patients benefited from therapeutic advances, but in a manner that is safe and cost-effective;

- **medicines optimisation teams** in CCGs have worked with GP practices to improve the safety, efficacy and value of the prescribing within the practice;

- **Regional Medicines Optimisation Committees**[31] or RMOCs have been established to bring together decision-makers, healthcare professionals and patients, as well as **Area Prescribing Committees** in primary care, to reduce unwarranted variation and improve outcomes and value from medicines use;

- **the Medicines Value Programme**[32] includes producing guidance for CCGs on optimising the use of medicines;

- the **Academic Health Science Network Medicines Optimisation Programme**[33] which has worked to improve transfers of care around medicines, problematic polypharmacy, medicines errors and shared decision-making;

- the **NHS Business Services Authority's polypharmacy prescribing comparators**[34] and other NHS BSA prescribing dashboards to support CCGs to reduce unwarranted variation in primary care prescribing;

- **NHS RightCare**[35] which involved teams working collaboratively with systems to review indicative data on prescribing to identify opportunities to reduce unwarranted variation and improve population healthcare on a wide range of conditions including respiratory illnesses and diabetes.

"GPs have got better. They won't give you medicines they don't think you need." (G2)

There are also initiatives aimed at tackling overprescribing for specific classes of medicine. For example, the UK's first five-year national action plan on antimicrobial resistance (AMR), from 2013-18, was an extensive programme and showed that a significant reduction in the prescribing of antibiotics in primary care can be achieved as can be seen in Figure 6.[36]

Annual Rate of Antibiotic Prescribing per 1,000 Population

(All antibacterial items prescribed and dispensed in primary care, per 1,000 population)

Source: ePACT2, ONS mid-year population estimates
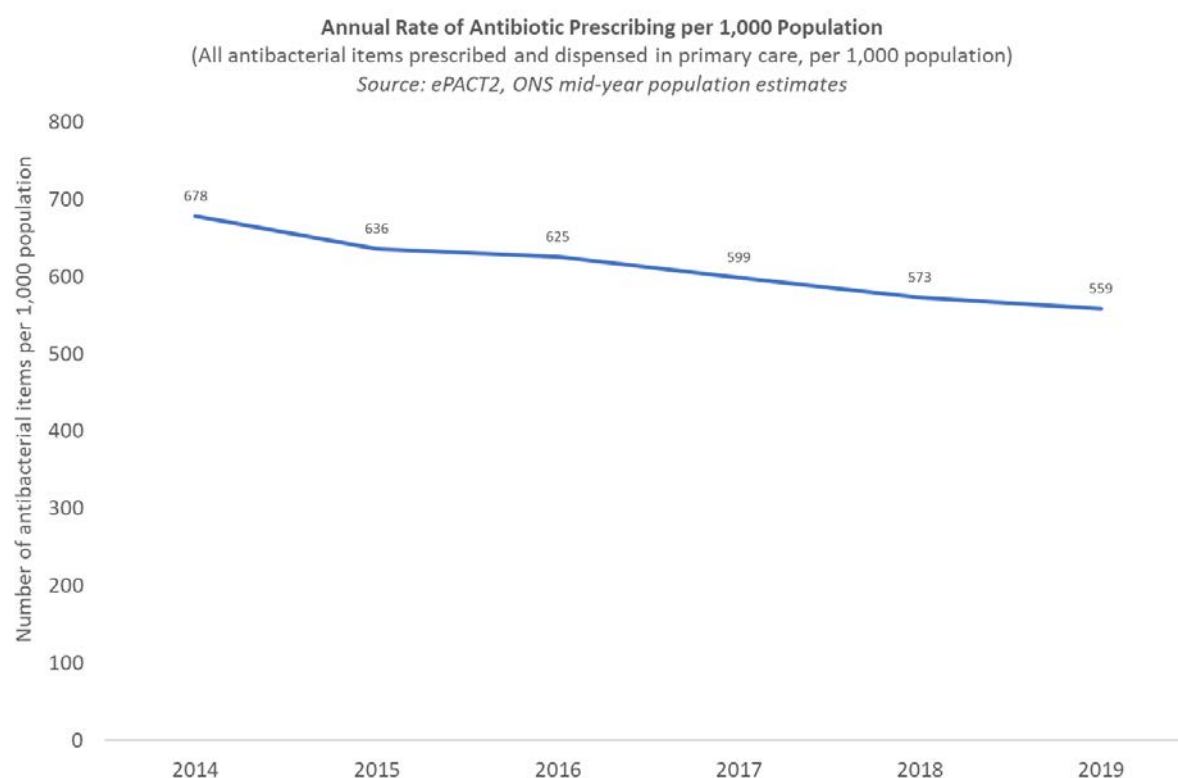
Figure 6: the annual rate of antibiotic prescribing per 1,000 people, 2014-19.

There are similar examples of progress with specific groups of patients. For example, the **Stopping Overmedication of People with a Learning Disability, autism or both (STOMP) initiative**[37] targets the overuse of psychotropic medications for people with a learning disability, autism or both. If children or young people do need psychotropic medication, it should be seen as the last resort. Medication should be regularly reviewed to make sure it is still the right thing for them and they do not stay on the medication for longer than is necessary. The **Supporting Treatment and Appropriate Medication in Paediatrics (STAMP)** initiative[38] aims to make sure that children and families can access other treatment and support when children display behaviours that challenge, for example Positive Behaviours Support or other therapeutic support.

4.3 Patient-level medicines optimisation

Pharmacists are also working more closely with other prescribers and individual patients. For example, the Northumbria SHINE quality improvement project found that clinical pharmacists undertaking structured medication reviews within a shared decision-making framework were able to safely reduce prescribing by 17.4% through stopping medicines that were no longer indicated or were causing harm.

In 2015, NHS England commissioned 50 Vanguard[39] sites to test new care models; and the sites where pharmacy professionals were integrated into the wider multidisciplinary team showed medicines optimisation benefits, in particular to patients in care home settings. The care homes work showed pharmacists reviewing medicines improved patients' quality of life by reducing unnecessary use and bringing down emergency admissions, with less time spent in hospitals. This approach also led to meaningful savings in unnecessary prescribing costs of £249 per patient in one pilot over a year.

Initiatives such as these led to the national commissioning of two complementary programmes: Clinical Pharmacists in General Practice (CPGP) in 2016 and Medicines Optimisation in Care Homes (MOCH) in 2018.[40] Both programmes showed that embedding clinical pharmacists in patient-facing roles in primary care improved quality of care, reduced harm from medicines and increased efficiencies. The MOCH programme further highlighted the impact pharmacy technicians could make on medicines optimisation and management. Both roles have now been successfully embedded into the new Primary Care Networks' (PCNs) Additional Roles Reimbursement Scheme.[41] Currently around 2,000 clinical pharmacists and pharmacy technicians, funded by NHS England and NHS Improvement are working in teams in primary care networks, and thousands more are due to be appointed by 2024 under the NHS Long Term Plan. Each receives 18 months of additional clinical training to enable them to work safely with patients to review medicines use and support deprescribing where appropriate.

4.4 Structured Medication Reviews

A Structured Medication Review (SMR) is a comprehensive review of all a patient's medicines and detailed aspects of their health. It is a clinical intervention approved by NICE and delivered via a shared decision-making conversation with a patient that ensures their medication is working well for them. If problems are identified, options are considered such as changing the dosage, finding additional support or stopping a medicine. The patient is involved throughout the discussion and in any changes to their medication. This makes SMRs an ideal tool to help people with problematic polypharmacy. This is different to the check-ups or other reviews that clinicians conduct with those with long-term health conditions and which may involve their medicines.

4.5 Medicines reconciliation

Medicines reconciliation[10] identifies anomalies in what the prescribing records says a patient should be taking, compared to the medicines the patient is in fact receiving and taking. As well as improving patient safety and reducing harm from medicines, this also provides a valuable opportunity to identify those who may benefit from a structured medication review, for example because they are taking multiple medication or are vulnerable or have been taking their medication incorrectly or not at all.

4.6 Deprescribing

Prescribing can be seen as a form of problem-solving, with a medical condition as the problem and a medicine as the solution. But more often than not medicines can only manage a condition, not cure it, and the wider needs and preferences of the patient may change.

> "I was taking folic acid tablets, but I stopped after six months as the GP said I could get the same benefits from eating more vegetables!"

> "I was given anti-depressants for five years and no one checked on me."

Stopping a medication may be just as challenging in terms of weighing the benefits or providing support as starting it. Deprescribing seeks to apply best practice in prescribing to the process of stopping a medicine. It needs the same skill and experience from prescribers, and the same level of support from pharmacists, and from guidance, data and insight, even from the pharmaceutical manufacturers, to get the best results. And just as with prescribing, it should place patients at the centre of the process, to ensure medicines optimisation.

4.7 Variation and data analytics

There are significant variations in the way in which certain medicines are prescribed in one geographical area compared to another. For example, prescribing rates for antibiotics differ by as much as two and a half times between one part of the country and another. There may be good reasons for such differences, and higher rates of prescribing are not necessarily a bad thing. For example, if one CCG is more likely to prescribe a medication than another, this may indicate overprescribing, or may indicate better patient care that other areas could learn from. What we can say is that identifying unwarranted variations in prescribing can help ensure medicines optimisation and improve patient safety. This is part of the work of the Regional Medicines Optimisation Committees, and the Getting It Right First Time (GIRFT)[42] programme.

The more we know about what is actually being prescribed and dispensed, the more we can spot trends and unwarranted variation. Better use of data has led to better insights into overprescribing, and how to tackle it more effectively. [43] For example, the NHS Business Services Authority and Wessex AHSN Polypharmacy Prescribing Comparators[34],[44] were developed to help CCGs and general practices identify patients most likely to be exposed to the risks associated with taking multiple medicines or certain combinations of medicines. The comparators enable GP practices and CCGs to:

- see variations in prescribing across GP practices, and within and across CCGs

- identify if polypharmacy is an area to be investigated in the practice or CCG

- help prioritise potential areas of activity and better target areas where improvement is needed to reduce the risk to patients

In addition, data analytics and analysis can directly assist prescribers by identifying individual patients who may be at risk of overprescribing. This allows the prescriber to review their case or ask the patient to take part in a medication review. The NHS Business Services Authority's ePACT 2 system gives authorised users access to prescribing data at a variety of levels, from data summaries to individual prescription items. Data can be exported to form reports and dashboards and used to view patterns of prescribing at patient level.[45]

More recently, sophisticated data science techniques have been applied to prescribing data, revealing even more insights, with the leading group being the EBM DataLab at the University of Oxford. Their OpenPrescribing tool is now widely used across the NHS.[46] But the challenge remains of how to help prescribers and those conducting SMRs to make full use of this new abundance in data and insight.

5.   Our strategy

5.1 In this section:

- NHS long term plan

- Personalised care and shared decision-making

- Pharmacists and medicines optimisation

- Medicines reconciliation

- Social prescribing

- Our ambition

5.2 NHS Long Term Plan

Overprescribing is a major issue in healthcare with a serious impact on clinicians, patients and resources. Trends in healthcare have the potential to exacerbate the problem because there will be more people living longer and coping with multiple conditions, and with their care shared between more clinicians and services. As we look to learn from and respond to the effects of COVID-19, we need to be ready to do things differently – as with the accelerated progress in in electronic prescribing and telemedicine resulting from the pandemic. It's important therefore that we act now on overprescribing through a comprehensive and coordinated strategy that everyone can buy into.

The NHS Long Term Plan (LTP)[47] was developed to shape the development of the NHS over ten years from 2019, covering principles and priorities, ways of working, investment in people and systems and the deployment of healthcare resources. It is a framework, with specific reviews, plans and programmes that further flesh out the strategy and provide the detail of implementation. This Review was launched just before the LTP was published, and therefore we have used it as the foundation for our strategy to tackle overprescribing.

The LTP also sets out initiatives in areas such as making better use of data and digital technology and improving electronic health records which are vital to tackling overprescribing. Part of the task of the Review has been to identify where further action is needed to ensure that this investment will grasp the opportunities to reduce overprescribing. Our strategy for tackling overprescribing therefore combines two strands:

- acknowledgement of where the LTP is already delivering directly on the overprescribing agenda, to show how this will help deliver our strategy (this section)

- recommendations for where we need to go further to build on the LTP to tackle weaknesses in the prescribing system (Section 6) and culture (Section 7); and to develop key areas that support implementation such as research and training (Section 8)

The LTP seeks to change the culture within healthcare, and two of its deliverables – **personalised care** and **shared decision-making** – will help improve the culture of prescribing. It also directs more resources into primary care, including expanding **medicine optimisation, Structured Medication Reviews, medicines reconciliation** and **social prescribing**. All these are discussed below.

5.3 Personalised care

This has been shown to help reduce health inequalities, giving people choice and control over the way their care is planned and delivered based on 'what matters' to them and their individual strengths, needs and preferences. It tailors health information to people's level of health literacy and increases peoples' capacity to use health information effectively and to identify the issues that most affect their wellbeing. The Comprehensive Model of Personalised Care[48] draws on and is supported by the Personalised Care Institute for training healthcare professionals and the National Academy for Social Prescribing to provide development and support to teams in the NHS. The LTP will extend personalised care to an additional 2.5 million people by 2024.

> "You know your body the most, especially around your pain levels."

> "I feel like if you just go to one GP for a very long time then you have that connection and relationship, so they are very attentive to you. But when I was referred sometimes, I felt they could listen better or treat me better."

5.4 Shared decision-making

A better prescribing culture, together with improved systems for information and support, should allow prescribers and patients to come to a shared decision about a course of action, based on the evidence and on the preferences of the individual. Shared Decision Making (SDM), which is a key part of the Comprehensive Model of Personalised Care, is a collaborative process between a clinician and a patient, where the clinician supports the patient to reach a decision about their treatment that is right for them. It brings together the

clinician's expertise about treatment options, evidence, risks and benefits and the patient's circumstances, goals, values and beliefs.

> "We have more responsibility than our parents had for taking their medication. We are less deferential today, which is a good thing. Seeing a doctor these days is more about having a discussion with them."

> "It feels like a joint thing and we talk."

The Review heard from many people who welcomed the greater availability of online consultations resulting from the COVID-19 pandemic, particularly because of their convenience. As this change is likely to continue, the impact on the quality of diagnosis and prescribing, and on shared decision-making, will need to be monitored.

We heard in the Review from people who did not want to take a more active role in decisions about their care, or who felt they did not have the capacity to do so. One of our recommendations is that there should be more information and encouragement for people to help make shared decision-making a reality. But this should be empowering, not compulsory: no-one will be asked or required to take on more responsibility for decisions about their care than they are comfortable with. Equally, any system of shared decision-making must take into account the cognitive functioning of people, not least in older patients, and the role of carers in this regard becomes critical.

5.5 Pharmacists and medicines optimisation

The LTP will support expansion of pharmacy professionals in Primary Care Networks in England, funding the deployment and specialist training of thousands of clinical pharmacists and pharmacy technicians. By 2024, each of England's over 1,200 PCNs could have as many as seven clinical pharmacists or pharmacy technicians to support improvements to prescribing and medicines safety to benefit patients. This will allow clinical pharmacists to provide much more effective support to GPs and other prescribers across the practices in the PCN. In particular, they will be able to provide comprehensive reviews of the medication regimes for the most vulnerable patients through Structured Medication Reviews.

> "Anything that means you don't need medication is a good thing. The medicine might work, but your liver and kidneys are not going to be happy."

The expansion of clinical pharmacist-led structured medication reviews will improve care, particularly for specific groups such as those living in care homes, those with complex and problematic polypharmacy, and those with severe frailty. These groups are likely to include

patients with multiple long-term conditions, in particular respiratory disease and cardiovascular disease. The service guidance for SMRs and medicines optimisation in PCNs also sets out how reviews can reduce unnecessary hospital admissions and events such as falls and help the £20.9 billion NHS medicines budget go further by reducing the proportion of medicines that are not taken by patients as prescribed.[26]

The LTP also promotes medicines optimisation to reduce inappropriate prescribing of (a) antimicrobials, (b) medicines that can cause dependency, (c) higher-carbon inhalers and (d) nationally identified medicines of low priority. To help achieve these outcomes longer-term, pharmacy and medical leadership at Regional and Integrated Care System level must actively work with their PCNs, CCGs and hospitals, to share expertise and lessons learned: for example, to integrate national-level programmes, such as the AMR action plan and optimising medicines in people with learning disabilities and/or autism, including implementing STOMP, into their local implementation of SMRs, medicines optimisation and related work.

Most CCG Medicine Optimisation teams have particular strengths in different areas, such as engagement with their local networks, or using data to identify problems, but their impact has been hampered by the lack of formal structure. There is no textbook or standard procedure for their work, while reflection and insight is exchanged more through 'grey' literature such as conference presentations than academic studies, and there is a lack of formal core competencies, training and targeted professional development.

5.6 Medicines reconciliation

NICE guidance[10] recommends that medicines reconciliation processes should be in place for all persons discharged from a hospital or another care setting back into primary care and the act of reconciling the medicines should happen within a week of the patient being discharged.

To implement these recommendations requires health and care professionals across hospitals, PCNs and community pharmacy to work together much more effectively. Under the LTP, Academic Health Science Networks have been supporting NHS trusts to put in place communication systems with the patient's community pharmacy, through their work on Transfers of Care Around Medicines (TCAM)[49]. This involves patients who have been identified as being at risk from adverse effects or needing support with their medicines on discharge, being referred for advice and support from their usual community pharmacy. As a result of the TCAM work, NHS England and NHS Improvement is introducing the NHS Discharge Medicines Service from January 2021. This will allow secondary care clinicians to refer patients to a local community pharmacist to review medication changes at discharge, to reduce harm from medicines that can occur at transfers of care, so ensuring better patient outcomes and reducing hospital readmissions.

5.7 Social prescribing

People's health is influenced by a range of social, economic and environmental factors such as housing, economic resources, pollution, health behaviours and diet. Often, medicines only deal with symptoms, and do not tackle the underlying causes of illness or effect a cure. Medicines are sometimes prescribed where the patient would benefit from other forms of advice and support to tackle or alleviate these underlying causes.

> "I was sent to a COPD 'breathe easy' clinic. It was absolutely brilliant. It helped me to reduce from four to two inhalers over six weeks."

Prescribers have always known and acted on this. During the review we heard from many people whose prescriber had recommended changes in diet, ways to reduce stress or increase exercise, or recommendations to take part in group activities. Sometimes this was presented as a direct alternative to a medicine, for example, discussing changes in diet to reduce cholesterol as an alternative to a prescription for statins. But prescribers have not had systematic guidance and support. For example, 40% of GPs say they would refer patients if they had more available information about services.[50]

> "My consultant told me that I needed to exercise for 30 minutes every day. So I got myself a dog. It's the biggest positive thing I've done."

> "At my GP surgery there is someone to help you with benefits and advice."

Increasing the uptake of social prescribing requires prescribers to have a better evidence base to draw on, including treatment guidelines that set out these alternatives alongside the medication options. Under the LTP, there are hundreds of social prescribing link workers now based in primary care networks to build and maintain a set of options available locally, integrated with national resources such as health apps. The patient may be referred to the social prescribing link worker by their GP or another prescriber to discuss specific options and preferences, and the link worker can then arrange for the patient to participate in activities. Alongside the prescriber, social prescribing link workers can also provide advice, support and encouragement.

Over 1,000 trained social prescribing link workers will be in place by April 2021, rising further by April 2024, with the aim that over 900,000 people are able to be referred to social prescribing schemes by then. This will mean many more patients who wish to take more responsibility for their health and well-being, while still receiving care, support and encouragement from the NHS, will be able to do so.

Social prescribing relies on there being a good supply of safe and effective third sector provision, including information provision (local and national), online peer support and health coaching, talking therapies, self-management education programmes (generic and

conditions specific, face to face and online), 'alternative' health therapists and apps that are supported or endorsed by the NHS underpinned by the new Digital Assessment Criteria for Health and Care (DTAC). Many CCGs are already working in partnership with local authorities to co-commission community activities. However, voluntary community and social enterprise (VCSE) investment needs to be systematically supported across every local area.

5.8 Our ambition

The Review has avoided setting targets for the reduction of overprescribing. This is in part because of the difficulty of identifying the extent of overprescribing particularly with the current state of knowledge and research. However, the Review concluded that it was necessary to provide a benchmark, to give a sense of the scale of the problem and the benefits that would flow from implementing our strategy. The work on tackling overprescribing already underway – for example, the reductions achieved on antibiotics and the reductions in overprescribing in care homes through the Medicines Optimisation in Care Homes Programme – suggests that a reduction in the volume of prescription items in primary care of 10% is realistic. This would be equivalent to a reduction of around 110 million items a year. One of the challenges for the implementation phase of the Review is to build up the analysis and evidence base sufficiently to allow this yardstick to be tested and refined, particularly as potential reductions are likely to vary in different care settings and for different medicines.

6.   The system

6.1 In this section:

- Patient records, discharge letters and clinical indications

- Treatment guidelines, clinical evidence and alternatives to medicine

- Transfer of care, repeat prescriptions and regular reviews

6.2 Patient records and discharge letters

Although there is a great deal of work underway to improve the way patient records are kept and shared, we still have a national healthcare system where there is no single, complete comprehensive record of a patient's medical history. The ability to view such an integrated record would allow practitioners to prescribe more safely and review medicines with more confidence. It would also make it easier for people receiving care to be more informed about, and involved in, decisions about that care, and better able to engage with care providers, including being able to add information to their own record. There are several ways to achieve this, all of which will require interoperability standards, coupled with adoption, to enable data to be shared and to ensure that full electronic records of individual patient's medicines can be accessed and updated in real time by all those providing care.

If we are to make shared decision-making a reality, there are symbolic and practical changes that need to be made to discharge letters to involve patients and carers. But they will remain a vital channel to communicate clinical information to GPs and others. The universal availability of a single, consolidated patient record which can be accessed and amended by all those providing health and social care may allow the clinical and patient-facing elements of a discharge letter to be separated at some future point.

For now, we can only set the desired outcome, which is that discharge letters and similar clinical communications are addressed to the patient, are written in clear, non-clinical language, are sent within the specified time and shared with all those providing care as appropriate, and which use mandated fields to ensure continuity of care on medicines. This work will also need to take account of the potential for discharge letters to help meet other parts of this strategy: for example, how best to use clinical and discharge letters to facilitate structured medication reviews and deprescribing by including a recommended minimum review period for hospital-initiated medicines.

R1. NHSX should develop open standards and guidelines to ensure that records can be safely shared and accessed across care settings by patients and health and care professionals ultimately creating an interoperable consolidated patient medication record, and work with the Professional Record Standards Body to develop further mandatory standards for discharge letters.

6.3 Clinical indications

If the recording of clinical indications is to be improved, then prescribers need to have IT systems that make this as straightforward as possible. More training and guidance would also help ensure that prescribers appreciate how full and effective record-keeping helps their colleagues to manage treatment safely when care is shared or transferred. This should be underpinned by updating the Prescribing Competency Framework[51] developed by the Royal Pharmaceutical Society, working alongside the other professional bodies, and the professional regulators, which sets out the standards expected of all prescribers.

R2. The Royal Pharmaceutical Society should revise the Prescribing Competency Framework to take account of the findings of this review and the increase in remote consultations and emphasise further that clinical indications must be routinely recorded at the point of prescribing; and NHSX and NHS Digital should work with stakeholders and system vendors to support the recording of indications within digital systems.

6.4 Treatment guidelines

These are vital tools for informing clinicians – and, increasingly, patients – about the ways in which a condition can be treated, and the benefits, risks and likely outcomes of different approaches. Guidance should be reviewed and extended so that it routinely sets out alternatives to medication, linked where available to clinical pathways and to improvement programmes such as GIRFT. Further, guidance should not only provide information on starting a medicine, but also how and when to stop a medicine, including review periods and indications for stopping.

R3. In developing and updating guidelines, NICE and professional bodies should include recommendations for reviewing and discontinuing medicines, where appropriate, and in the context of shared decision-making supported by decision aids.

6.5 Clinical evidence

The limitations on data from clinical trials, particularly for older patients and those with multiple conditions, can be supplemented by monitoring of health outcomes across all patient groups once a medicine is in general use (known as, post-market surveillance). This information can then be made available to prescribers, particularly when considering when a medicine should be deprescribed.

R4. As part of its regulatory activity, MHRA should work with the pharmaceutical industry and clinicians to find a way for licensing and post marketing surveillance arrangements to generate information and insights that support deprescribing.

6.6 Alternatives to medicines

To take full advantage of social prescribing, the evidence and national and local options for non-medicine alternative treatments need to be fully integrated into prescribing systems as they develop. The evidence needs to be incorporated into national guidelines on conditions, and clinical practice templates should be adapted to ensure easy access to tools and resources to support decision-making by clinicians and patients with direct read-across to menus of options across a range of conditions.

R5. NHSX and NHS Digital should work with GP IT system providers to develop integrated templates that support referrals for culturally competent, evidence-based alternatives to a medicine (including physiotherapy, talking therapies, local social prescribing options) which support Shared Decision Making and which can be adapted for local use.

6.7 Transfer of care

Although Medicines Reconciliations are usually performed by a pharmacist or pharmacy technician, other health and social care professionals may be well-placed to carry them out, given the right training and support. For example, a district nurse may see a patient to change a dressing and realise there is a discrepancy. The scope for extending Medicines Reconciliation will vary in different settings but there is a still a need for concerted action to extend the use of Medicines Reconciliation in Health and Justice settings and other non-hospital sectors such as GP practices and care homes. Although there are new developments underway, such as the community pharmacy Discharge Medicines Service, current guidance on what constitutes Medicines Reconciliation still needs to be updated.

R6. NHS England and NHS Improvement should support the expansion of medicines reconciliation at care transitions, including for a wider range of professionals, for example care home staff, through producing updated guidance and commissioning training within specific sectors.

6.8 Repeat prescriptions

When a course of medicine proves effective, it is natural for clinicians to continue to prescribe and patients to continue to take the medicine over an extended time. One way to improve the repeat prescribing system is to use Electronic Repeat Dispensing (eRD). This is more flexible for patients, who can gain confidence that the medicines they need will be there when they need them and will have less incentive to stockpile. It can also save a lot of time at GP surgeries: in one study, freeing up GPs by up to 45 minutes a day.[11] This allows prescribers more time to concentrate on the prescriptions that require their input. COVID-19 has accelerated this process, and this should be encouraged and extended.

There are also information, resources and training needs for reception team members and other non-clinical staff, so they are confident to support better repeat prescribing processes and deal with patient enquiries. Information and training will also help staff communicate other developments such as structured medication reviews and social prescribing to patients. The training would include cultural competency and safety as well as local procedures.

Alongside this, Electronic Health Records (EHR) need to be analysed in each GP practice to help identify patients where patterns in their repeat prescriptions may make them suitable for a structured medication review or who have transferred from one care setting to another. EHRs should also be set up to provide structured data to support the evaluation of effectiveness and surveillance for unintended consequences.

R7. The Royal College of General Practitioners and the Royal Pharmaceutical Society should develop a national toolkit to help practices improve the consistency of repeat prescribing processes and support this with training resources for GP practice reception and administration teams.

6.9 Regular reviews

Expanding the number of clinical pharmacists in Primary Care Networks and widening the use of Structured Medication Reviews (SMRs) are key approaches in the LTP aimed at addressing overprescribing. [52] SMRs have not been defined too closely, to allow for flexibility in how they are provided in different settings and circumstances. For example,

there is currently no fixed length for a SMR, though they are expected to last at least 30 minutes. It is important that SMRs are maintained in terms of their quality, including the time allocated for each one and the experience of patients taking part.

SMRs need to be conducted in a way that maximises the scope for shared decision-making. For example, we heard from patients about how they prepared for reviews of their treatment by thinking about what they wanted from the session, including noting down in advance any questions or areas of concern. The NHS England and NHS Improvement guidance states that this should be a standard suggestion in the information provided to patients and the communication inviting participants to attend a SMR.

PCNs are required to identify and prioritise patients who would most benefit from a SMR. It is intended that over the duration of the LTP the number of patients who can be offered an SMR will expand. Clinical areas such as problematic prescriptions of dependence-forming medicines will require additional time and trust between the patient and professionals, and the timely availability of alternatives and support services.

Those most in need of SMRs may be concentrated in deprived areas, and unless SMRs are adequately supported this may widen health inequalities. In addition, some patients, such as those with learning disabilities, or who face language or cultural barriers, may find it more difficult to engage in SMRs. Those providing SMRs may need to offer additional support for patients who may require an interpreter or wish to be accompanied by an advocate or carer, and ensure that information is provided in an accessible form and where possible in a range of languages.[53]

R8. NHS England and NHS Improvement should expand the use of SMRs in primary care networks to benefit those target groups most at risk of overprescribing, with resources to support practice teams and maintain standards. Appointments must be long enough to allow for shared decision-making – typically at least 30 minutes – and social prescribing link workers should be trained to help support patients after a SMR.

7. Culture

7.1 In this section:

- Awareness and behavioural change

- Patient engagement and cultural competence

- Human factors

- Industry transparency

7.2 Awareness and behavioural change

Alongside changes to structures and systems, we need to help healthcare professionals and the public to work together to change the culture of prescribing. The immediate task is to identify the drivers for and barriers to behavioural change, and the culturally competent messages and other interventions that would help. Much of the additional insight will come through the research programme outlined in Section 8, but there is also a need to set a baseline and track awareness, understanding and behaviour change though an annual survey.

This insight will help inform a national conversation about the limits to medicines and the efficacy of alternatives, including the role people can play in their own health and wellbeing. Prescribing is familiar to every clinician and every patient, and there are therefore many opportunities to use existing channels and messages to promote behaviour change, and for a National Clinical Director for Prescribing guided by stakeholders including the NHS Assembly to engage with the media and opinion-formers to explain and discuss a set of issues that are often of very great interest to their audiences.

Rather than duplicate work already underway, the focus on professional engagement should be to work with and support existing channels and bodies, notably the Academy of Medical Royal Colleges. This would include support for the development of a national strategy for the implementation of the Rethinking Medicine approach, which could include one or more medical/clinical fellow appointments.

R9. NHS England and NHS Improvement guided by the NHS Assembly should lead changes in awareness, understanding and behaviour amongst healthcare professionals and the public, tracked by an annual survey of behaviour change on prescribing, and supported by work with the Academy of Medical Royal Colleges to develop a strategy that encourages the Rethinking Medicine initiative and supports its implementation, including encouraging multi-professional leadership.

7.3 Patient engagement and cultural competence

Medication reviews, shared decision-making, social prescribing and other ways to reduce overprescribing depend critically on people being confident to challenge and be more involved in decisions about their care. Developing a simple tool to give patients and their carers better information about the medicines they are taking, or being advised to take, is a clear priority, while also considering language, culture and other barriers to communication.

Cultural competency and sensitivity is of particular importance for the successful uptake of social prescribing and shared decision-making across all communities and this includes ensuring that those providing services or activities through social prescriptions are also inclusive and show cultural sensitivity. This should include wide consultation with sources of advice and expertise, including the new NHS Race and Health Observatory, the Health and Wellbeing Alliance and other stakeholders.

R10. NHSX and NHS Digital should ensure the NHS website and the NHS App give people culturally competent information about their medication, initially covering the majority of medicines being prescribed in primary care and allowing them to feedback adverse reactions.

7.4 Human factors

Electronic health records increasingly use 'flags' (automatic prompts or 'pop-ups') and other digital tools to guide prescribers towards specific decisions regarding prescribing or treatment. These tools aim to ensure that each prescription is appropriate, is as safe as possible, and gives the best value to the NHS. An example would be where a medicine safety bulletin is turned into a flag in the prescribing software rather than relying on a prescriber reading the bulletin itself.

However, there is currently no assessment of the quality of these digital tools, no national standards relating to their design or technical implementation, and no large-scale monitoring or evaluation of their impact on clinical care. Development tends to take place in isolation, with a lack of openness, rather than through a community of developers, users and researchers sharing evidence on effectiveness. There is also a lack of underlying evidence and research, particularly on issues such as alert fatigue and human factors. The risks include:

- fatal medication errors linked to poor design of Electronic Health Records, as highlighted by the Healthcare Safety Investigation Branch[54]

- 'alert fatigue', where over-use reduces their effectiveness

- ensuring that all prescribers receive an alert

- poor design leading to missed information or misinterpretation

- the lack of an audit trail to record whether a prescriber has seen or acted on a flag when prescribing for a particular patient

R11. NHSX and NHS Digital should commission research teams to review, develop and evaluate digital decision-support tools; and work with GP IT system providers to ensure that these products support safe and appropriate prescribing. They should also ensure that digital systems and records make structured medication reviews a simple task.

7.5 Industry transparency

Medicines optimisation depends on clinicians making unbiased decisions on the medicines they prescribe and patients having confidence that these decisions are not distorted by commercial influences. Transparency initiatives such as Disclosure UK, where pharmaceutical companies, NHS organisations and health care professionals openly list pharmaceutical industry sponsorship, are very welcome and should be encouraged further as the pharmaceutical industry reacts to new forms of clinical practice. The NHS too will need to ensure its policies on conflict of interest remain fit for purpose and are adequately implemented.

R12. The Association of the British Pharmaceutical Industry should ensure Disclosure UK becomes the global lead in transparency of pharmaceutical industry sponsorship.

8.   Implementation

8.1 In this section:

- Leadership

- Research and evaluation

- Workforce, training and development

- Data analytics

- Sustainability

8.2 Leadership

In normal times, we would have included indicative deadlines or milestones in our recommendations. The COVID-19 pandemic prevents this, but this work programme needs a sense of urgency as well as the commitment of partner organisations. This will need to take account of the changes that COVID-19 have brought about in the NHS and to how people think about their own health and wellness. The Short Life Working Group has offered to reconvene within a year of this report's publication to review implementation. In the meantime, the early implementation phase will need to establish where existing targets and metrics may need to be updated and new ways of measuring success put in place.

Our strategy for tackling overprescribing is deliberately designed to work with and through a range of other initiatives and work streams, and within the overall framework of the Long Term Plan. This is a strength: but it brings with it the risk of the Strategy losing focus or momentum. The Review has concluded that it is essential that a senior individual at National Clinical Director level takes the lead in implementing the strategy, including liaison with others whose work will contribute to its overall success.

R13. NHS England and NHS Improvement should develop a funded programme of work in partnership with relevant national organisations to implement this review over the next three years. Led by a new National Clinical Director for Prescribing, implementation should be co-ordinated with other workstreams, including the NHS Long Term Plan medicines optimisation and personalised care work, PHE's Prescribed Medicines Review Report, and the UK National Action Plan on Antimicrobial Resistance. To support the National Clinical Director, and working with the Regional Medical Directors and Regional Chief Pharmacists, Integrated

Care Systems should appoint senior, experienced and authoritative pharmacy leadership.

8.3 Research and evaluation

We do not yet fully understand the causes of overprescribing, both at the individual and system level, or the consequences. Even varied and inconsistent use of terminology (as with the term polypharmacy) can hamper consistency in the interpretation of data and for commissioning future research. We also need new ways of measuring overprescribing which account for the appropriateness or otherwise of prescribing, and that can be implemented using routine clinical data.

Although reductions in prescribing can be achieved, there is as yet no conclusive evidence for whether overprescribing interventions lead to improvements in clinical and patient outcomes. There is also limited robust evidence telling us how best to manage overprescribing, and this is reflected in a lack of relevant evidence-based clinical guidance. This does not in any way undermine concepts such as medicines optimisation or social prescribing. Instead, it reflects a need to better understand how we design and deliver interventions.

Solutions for overprescribing need to be placed within a system-wide context to address the many different factors that lead to overprescribing. This includes understanding which patients are most affected, which stakeholders are involved, the impact of different clinical or cultural factors, and the nature of resource constraints. This will enable clinicians and policy makers to identify underlying causal factors, which can be used to support change in service design and delivery.

All this points to the need for substantial co-ordinated research. This should inform: the adoption of a consensus definition of polypharmacy, and include analysis and segmentation of those who experience polypharmacy to support the targeting and evaluation of interventions; mapping health systems to understand the causes of overprescribing and prioritise solutions; understanding the consequences of overprescribing; and evaluation of the impact and outcomes of the interventions for overprescribing set out in this report.

R14. The Department of Health and Social Care and the National Institute for Health Research should establish substantial co-ordinated research to strengthen the evidence base for overprescribing, including setting research priorities and providing coordination across the research community.

We saw in section two that the available evidence on overprescribing suggests it is linked to deprivation and to ethnicity as well as to age. It is urgent that we explore these links further and so can understand how to reduce health inequalities in different areas and between different patient groups.

R15. NIHR should prioritise further research into the links between overprescribing, deprivation, ethnicity and inequalities and the impact this has on the health of the population.

8.4 Workforce, education and training

The principles of good prescribing and diagnosis are already to be found in the education and training provided to clinicians – and every day, clinicians apply them. Prescribers do not need to be trained to do something fundamentally new. Rather, the task is to update training and development to reflect the growing understanding of overprescribing – its causes, consequences and remedies.

This should cover all healthcare professionals, from undergraduate level through to Continuing Professional Development, and include:

- identification of patients who would benefit from a Structured Medication Review

- how to conduct a Structured Medication Review and complete medicines optimisation

- encouraging and facilitating shared decision-making, the importance of listening to patients, and cultural competency

- deprescribing and identifying adverse drug events and instances where harm outweighs benefit

R16.   The health professional regulators, drawing on the advice of professional leadership bodies and Health Education England, should ensure their professional standards and outcomes for initial education and training, and standards or processes influencing professional development, including revalidation, supports the implementation of this review.

The NHS Long Term Plan is increasing the number of posts for pharmacists and pharmacy technicians in the NHS and our recommendations would extend this demand further. It is vital that the workforce is able to expand to fill these extra roles without any

dilution of quality. This means the healthcare system as a whole will need to expand provision of training and development, including upgrading existing skills.

R17. The Department of Health and Social Care should work with the General Pharmaceutical Council, and wider stakeholders to support the safe and rapid implementation of the pharmacist initial education and training reforms, including allowing for more extensive clinical placements. The General Pharmaceutical Council should develop a similar programme for pharmacy technicians.

R18. HEE should develop an educational framework that facilitates the current registered pharmacy professional workforce to have their enhanced and standard level of clinical skills recognised. This framework should include the opportunity to extend independent prescribing by pharmacists. It should also introduce a standard of practice and professional development for those in population health roles, such as medicines optimisation teams, and include data science skills.

8.5 Data analytics

Data on NHS prescriptions dispensed in primary care is collected via the system for reimbursing community pharmacists and dispensing doctors. In secondary care, Electronic Prescribing and Medicines Administration (ePMA) is being introduced by individual Trusts but does not have universal coverage. In other areas, such as where prescriptions are issued by private providers or in the criminal justice system, there is no single system. Furthermore, available data is not consistently shared with third-party researchers.

In order to better understand prescribing data, it is important to analyse the data to provide effective insights into how medicines are prescribed. This can often be achieved by creating an environment where data is de-identified and can be safely and appropriately accessed in order to do so, such as in a Trusted Research Environment. An example of the intended approach would be the data analytics platform of OpenSAFELY. This will enable the benefits that come from having "many eyes" on the data, without compromising confidentiality or privacy, and will support the development of a diverse 'ecosystem' of analytic approaches and more research. Any move to increase appropriate and safe access to health data has to maintain public trust and confidence. The best way to do this is to be open about the aims, benefits and any risks, and engage with the public and patient groups from the start.

Unfortunately, data is often held in silos which can make it difficult to access for open analysis and analysis can be conducted behind closed doors. In addition, Information Governance (IG) – which is intended to facilitate the safe and appropriate use of data – can be seen as confusing by staff and so they may become more risk averse to sharing, even when it is appropriate to do so. IG has become an excuse to block the sharing of data, particularly where the data holders overstate the risks and underplay the benefits. By continuing to increase access to prescribing data and supporting staff to navigate IG and become confident to do so, NHSX can help foster the development of an effective, open 'ecosystem' of data analytics.

Similarly, services such as PrescQIPP and OpenPrescribing have shown the value of drawing on the experience and creativity of independent commercial and not-for-profit providers. This approach should be extended to include funding for nationally-accessible data audit and feedback tools. Toolkits (for example, for repeat prescribing) and learning sets (for example, for deprescribing) may also help to accelerate the uptake of new approaches, alongside formal training and CPD. The review also heard that there was a potential gap in provision of training in the skills needed to use data better to improve care; again, this could be addressed by bringing in new organisations.

R19. NHSX and NHS England and NHS Improvement should lead on improving appropriate access to data on patient treatment, engaging early on with patients and patient groups on risks and benefits; help empower staff to become confident navigating the IG landscape; foster a diverse data analytics community and further research; and support the development of data analysis skills across all care settings.

8.6 Sustainability

Waste medicines are a significant burden and need to be disposed of carefully, to avoid harm to patients and the public, and to minimise harm to the environment. The manufacture and distribution of medicines, and the use of some medicines, has a significant impact on greenhouse gases. It is estimated that medicines account for 25% of the NHS carbon footprint. The NHS commitment to become carbon net zero is a great step forward, and commitments on reducing use of specific medicines, such as inhalers and anaesthetics, with high carbon impacts risks are important, but it could go further in reducing unnecessary prescribing and reducing waste, and ensuring medicines procurement policies take into account manufacturers, suppliers and distributors commitment to sustainability. Equally, the government must make sure that it adds its weight to medicines sustainability as part of the NHS's ambitious and world leading plan to tackle carbon emissions.

R20. NHS England and NHS Improvement should assess and support system action to address the carbon impact of unnecessary prescribing and medicines waste. This should include using procurement leverage to influence medicines manufacturers, suppliers and distributors to ensure they are aligned to the NHS net zero carbon ambition. Alongside this, DHSC should continue to support NHS England and NHS Improvement's important work on sustainable medicines use across government, ensuring there is sufficient senior leadership through the NHS Chief Sustainability Officer and working closely with NHS leaders on medicines sustainability.

Annex A: How the review operated

A.1 Our approach

The formal remit for the Review was:

- addressing inappropriate polypharmacy – where a patient is taking multiple medicines unnecessarily

- creating a more efficient handover between primary and secondary care, for example ensuring General Practitioners (GPs) have the data they need and feel able to challenge and change prescribing initiated in hospitals

- improving management of non-reviewed repeat prescriptions – including encouraging patients to ask questions about their treatment to ensure they don't remain on repeat prescriptions which are no longer needed

- the role of digital technologies in reducing overprescribing

- the increased role for other forms of care, including social prescribing

The Review ran an Opening Symposium to gather initial thinking, particularly on scope and priorities, from a wide range of stakeholders. This report was provided to the Short Life Working Group (SLWG) for consideration.

Five subgroups of the SLWG were set up, each chaired by an expert member of the SLWG. Subgroup membership was determined by the subgroup chair and consisted of healthcare professionals across specialisms and included representation from primary and secondary care and from patients. Each subgroup was provided with a problem and brief and their members used their experience and networks to develop evidence-based recommendations to reduce overprescribing nationally. These were presented and discussed at SLWG meetings. The chairs worked together to ensure the final recommendations covered all key areas and recognised the overlap between key areas within their subgroups.

Subgroups were provided with the following reports, commissioned and completed on behalf of the review, to aid them in developing recommendations:

- the National Overprescribing Review Opening Symposium Report

- the Patient Experience Based Co-Design Event report

- patient focus groups and in-depth interviews

- the Economic Methods of Evaluation Policy Research Unit report: Evidence for the impact of interventions for, and medicines reconciliation in, problematic polypharmacy

A.2 Short Life Working Group membership

Name	Job title	Affiliation
Chair: Dr Keith Ridge	Chief Pharmaceutical Officer	NHS England and NHS Improvement
Professor Natalie Armstrong	Professor of Healthcare Improvement Research	University of Leicester
Gareth Arthur	Director of Strategy and Policy, Specialised Commissioning	NHS England and NHS Improvement
Professor Darren Ashcroft	Professor of Pharmacoepidemiology	University of Manchester
Emma Baker	Professor of Clinical Pharmacology	British Pharmacological Society
Richard Cattell	Deputy Chief Pharmaceutical Officer	NHS England and NHS Improvement
Dr Paul Chrisp	Director of the Centre for Guidelines	National Institute for Health and Care Excellence
Professor Alf Collins	Clinical Director, Personalised Care Group	NHS England and NHS Improvement
Tim Donaldson	Chief Pharmacist	Northumberland Tyne and Wear NHS Foundation Trust
Tom Gentry	Senior Lead - Health and Care Policy	AgeUK
Dr Ben Goldacre	Director, EBM DataLab	University of Oxford
Richard Goodman	Regional Chief Pharmacist (London)	NHS England and NHS Improvement
Katherine Le Bosquet	Chief Pharmaceutical Officer's Clinical Fellow 2018/19 and Clinical Lead, National Overprescribing Review	NHS England and NHS Improvement
Professor Martin Marshall	Chair	Royal College of General Practitioners

Name	Job title	Affiliation
Dr Yvonne Morrissey	Consultant Geriatrician	British Geriatrics Society and the Royal College of Physicians
Dr Shaba Nabi	General Practitioner and member of the General Practitioners' Committee	British Medical Association
Lelly Oboh	Consultant Pharmacist – Care of Older People, Guy's and St Thomas's NHS Foundation Trust	Royal Pharmaceutical Society
Dr Raliat Onatade	Group Chief Pharmacist and Clinical Director for Medicines Optimisation	Barts Health NHS Trust
Dr Raj Patel	Deputy Director of Primary Care	NHS England and NHS Improvement
Dr Rupert Payne	Consultant Senior Lecturer in Primary Health Care	University of Bristol
Claire Potter	Head of Prescribing Policy and Legislation	Department of Health and Social Care
Heather Randle	Professional Lead for Education (including Medicines Management) and Primary Care	Royal College of Nursing
Keith McDonald	Deputy Director, Licensing Division	Medicines and Healthcare products Regulatory Agency
Elaine Trainor	Senior Nurse, System Transformation	NHS England and NHS Improvement
Professor Martin Vernon	National Clinical Director for Older People	NHS England and NHS Improvement
Ed Waller	Director for Primary Care Strategy and NHS Contracts	NHS England and NHS Improvement
Dr Patricia Wilkie	President	National Association for Patient Participation
Steve Williams	Senior Clinical Pharmacist	Poole Bay and Bournemouth Primary Care Network
Julie Wood	Former Chief Executive (up to 30 June 2020)	NHS Clinical Commissioners

A.3 Sub-groups

The subgroups were chaired by members of the SLWG:

- Culture and practice of prescribing including social prescribing – Professor Alf Collins

- The role of digital technologies – Dr Ben Goldacre

- Transfer of care – Dr Raliat Onatade

- Improving the management of repeat prescribing – Dr Raj Patel

- Research and Evidence – Dr Rupert Payne

Over 90 people were members of the subgroups, advising on the recommendations on behalf of healthcare and other professionals. This included:

- clinicians

- policy makers

- patient representatives

- ALB representatives

- professional body representatives

We would like to thank the chairs and participants of the subgroups for giving their time and for their expert advice.

A.4 Summary of consultation and engagement

The Review's professional and patient engagement activity included:

- the five subgroups: combining the expertise of a pool of 90 members, formed from experts, interested professionals and patient representatives

- examples of good practice: over 70 submissions received and presented at the Opening Symposium

- the Opening Symposium: 150 delegates across medicine, nursing and pharmacy, alongside arm's length bodies (ALBs), patients, patient representatives and charities

- Patient Experience Based Co-Design Event: held in conjunction with Health Watch Leeds, HealthWatch Calderdale, the Yorkshire and Humber AHSN and Me and My Medicines

- patient research: focus groups and in-depth interviews with targeted segments of the population including underserved groups, conducted by an independent research agency

- patient and professional engagement to review the final recommendations from all subgroups

Focus groups were held to explore the attitudes of patients with serious and long-term conditions towards medicines and prescribing, and the concepts of overprescribing, medicine reviews and social prescribing, to inform the National Overprescribing Review. The groups were configured as below:

Group	Date	Place	Demographic Split	No. of participants
G1	22/1/2020	London	ABC1	6
G2	22/1/2020	London	C2DE	6
G3	23/1/2020	Leeds	ABC1	6
G4	23/1/2020	Leeds	C2DE	6
G5	29/1/2020	Rochdale	All female C2DE	6
G6	29/1/2020	Rochdale	All male C2DE	6
G7	30/1/2020	Long Eaton	ABC1	6
G8	30/1/2020	Long Eaton	C2DE	6

In-depth interviews were undertaken to allow people who had shown an interest in participating in the groups but were unable to attend an external venue to take part.

Individual	Gender	Age	Demographic
D1	Male	43	D
D2	Female	78	C1
D3	Female	45	C2
D4	Female	53	C2
D5	Male	54	C1
D6	Female	29	C2
D7	Male	50	C1
D8	Female	24	D
D9	Male	66	B
D10	Female	20	C1

In addition to the original research, six further groups were held to ensure that the perspectives of Black, Asian and Minority Ethnic patients were fully included in the National Overprescribing Review.

Group	Date	Gender
G1	30/07/2020	1 female, 3 male,
G2	31/07/2020	3 female, 2 male
G3	03/08/2020	2 female, 2 male
G4	04/08/2020	3 female, 1 male
G5	05/08/2020	2 female, 1 male
G6	06/08/2020	1 female, 3 male

Participants self-selected the description of their ethnicity and the totals were:

- Asian / Asian British (including mixed race) 9

- Black / Black British (including mixed race) 13

- Other (non-white) 2

A Patient Experience Based Co-Design Event was run in Leeds in conjunction with Health Watch Leeds, Healthwatch Calderdale, the Yorkshire and Humber AHSN and Me and My Medicines. There was a mixed demographic of 25 (13 men, 12 women) patients and carers who attended the event. The range of conditions included diabetes, mental ill-health, HIV, osteoarthritis, atrial fibrillation, chronic pain and Raynaud's disease. The number of medications taken daily was between five and fifteen.

Analysis and case studies were considered for groups where data or focus groups were not undertaken, including the Stopping over medication of people with a learning disability, autism or both (STOMP) and STOMP-STAMP (Supporting Treatment and Appropriate Medication in Paediatrics) programmes.

Annex B: Equality and health inequalities

The NHS has a moral and legal duty to tackle health inequalities, particularly where they are caused by discrimination by age, gender, ethnicity or other protected characteristics.

NHS England and NHS Improvement: Equality and Health Inequalities Impact Assessment (EHIA) template:

A completed copy of this form must be provided to the decision-makers in relation to your proposal. The decision-makers must consider the results of this assessment when they make their decision about your proposal.

1.   Name of the proposal (policy, proposition, programme, proposal or initiative): National Overprescribing Review

2.   Brief summary of the proposal in a few sentences

The Secretary of State for Health and Social Care commissioned a review to be led by Dr Keith Ridge, the Chief Pharmaceutical Officer for England, to evaluate the extent of overprescribing in the NHS and recommend what might be done to reduce this problem, particularly in primary care.   The National Overprescribing Review was set up to develop a strategy to reduce overprescribing, where people are given medicines they don't need or want, or which may do them harm. The review sets out a number of recommendations which aim to reduce overprescribing.

3. Main potential positive or adverse impact of the proposal for protected characteristic groups summarised

Please briefly summarise the main potential impact (positive or negative) on people with the nine protected characteristics (as listed below). Please state **N/A if your proposal will not impact adversely or positively on the protected characteristic groups listed below. Please note that these groups may also experience health inequalities.**

Protected characteristic groups	Summary explanation of the main potential positive or adverse impact of your proposal	Main recommendation from your proposal to reduce any key identified adverse impact or to increase the identified positive impact
Age: older people; middle years; early years; children and young people. **Disability:** physical, sensory and learning impairment; mental	The main positive impact of the proposal is that all patients, particularly groups with a higher prevalence of polypharmacy are able to benefit from the implementation of the	All recommendations are proposed to reduce overprescribing, where people are given medicines they don't need or want, or which may do them harm.

Protected characteristic groups	Summary explanation of the main potential positive or adverse impact of your proposal	Main recommendation from your proposal to reduce any key identified adverse impact or to increase the identified positive impact
health condition; long-term conditions.	recommendations to make sure that medicines they don't need or want, or which may do them harm are reduced. Overprescribing can have a physical and mental impact of on patients, it can lead to more hospital visits and preventable admissions, even premature deaths. Reducing overprescribing aims to achieve better patient outcomes for all.

The recommendations to reduce overprescribing will also benefit all groups as the cost of wasted medicines diverts money from paying for the medication people really need and can cause harm to the environment.

The recommendations also support implementation and roll out of existing initiatives such as; social prescribing, personalised care, including shared decision making and structured medication reviews.

Personalised care has been shown to help reduce health inequalities, giving | The recommendations have been developed taking account of:
- Data on protected characteristics and other groups that face health inequalities where this was available (age, sex, ethnicity and deprivation).

- Feedback from patients, particularly those that the data demonstrates may be more likely to have problematic polypharmacy e.g. older people, people with disabilities and those from communities with high levels of deprivation.

- Feedback and advise from a range of other sources as detailed in section 6. |
Gender Reassignment and/or people who identify as Transgender		
Marriage & Civil Partnership: people married or in a civil partnership.		
Pregnancy and Maternity: women before and after childbirth and who are breastfeeding.		
Race and ethnicity[2]		
Religion and belief: people with different religions/faiths or beliefs, or none.		
Sex: men; women		
Sexual orientation: Lesbian; Gay; Bisexual; Heterosexual.		

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[2] Addressing racial inequalities is about identifying any ethnic group that experiences inequalities. Race and ethnicity includes people from any ethnic group incl. BME communities, non-English speakers, Gypsies, Roma and Travelers, migrants etc who experience inequalities so includes addressing the needs of BME communities but is not limited to addressing their needs, it is equally important to recognise the needs of White groups that experience inequalities. The Equality Act 2010 also prohibits discrimination on the basis of nationality and ethnic or national origins, issues related to national origin and nationality.

Protected characteristic groups	Summary explanation of the main potential positive or adverse impact of your proposal	Main recommendation from your proposal to reduce any key identified adverse impact or to increase the identified positive impact
	people choice and control over the way their care is planned and delivered based 'what matters' to them and their individual strengths, needs and preferences. It tailors health information to people's level of health literacy and increases peoples' capacity to use health information effectively and to identify the issues that most affect their wellbeing[55].	

4. Main potential positive or adverse impact for people who experience health inequalities summarised

Please briefly summarise the main potential impact (positive or negative) on people at particular risk of health inequalities (as listed below). Please state **N/A if your proposal will not impact on patients who experience health inequalities.**

Groups who face health inequalities[3]	Summary explanation of the main potential positive or adverse impact of your proposal	Main recommendation from your proposal to reduce any key identified adverse impact or to increase the identified positive impact
Looked after children and young people	As above for section 3.	As above for section 3.
Carers of patients: unpaid, family members.		
Homeless people. People on the street; staying temporarily with friends /family; in hostels or B&Bs.		
People involved in the criminal justice system: offenders in		

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[3] Please note many groups who share protected characteristics have also been identified as facing health inequalities

Groups who face health inequalities[3]	Summary explanation of the main potential positive or adverse impact of your proposal	Main recommendation from your proposal to reduce any key identified adverse impact or to increase the identified positive impact
prison/on probation, ex-offenders.		
People with addictions and/or substance misuse issues		
People or families on a low income		
People with poor literacy or health Literacy: (e.g. poor understanding of health services poor language skills).		
People living in deprived areas		
People living in remote, rural and island locations		
Refugees, asylum seekers or those experiencing modern slavery		
Other groups experiencing health inequalities (please describe)		

5. Engagement and consultation

a. Have any key engagement or consultative activities been undertaken that considered how to address equalities issues or reduce health inequalities? Please place an x in the appropriate box below.

Yes X	No	Do Not Know

b. If yes, please briefly list up the top 3 most important engagement or consultation activities undertaken, the main findings and when the engagement and consultative activities were undertaken.

	Name of engagement and consultative activities undertaken	Summary note of the engagement or consultative activity undertaken	Month/Year
1	**Focus groups and depth interviews with patients**	In total, fourteen patient/public focus groups and ten in depth interviews to cover targeted segments of the population, including hard to reach groups.	**January – August 2020**
		The eight initial focus groups were held with patients who met one or more of the following criteria - had serious, long-term conditions; were taking multiple (5+) medications; had poor experiences with long-term medication. The ten in-depth interviews were with people who expressed an interest in participating in the groups but were not able to take part, for health reasons.	**January 2020**
		Six further focus groups focused on health inequalities and BAME communities with regard to access to healthcare and prescribing. Participants in these groups were all from BAME communities who had multiple or long-term conditions or who had used healthcare services within the previous 12 months, and also resident in an area of high deprivation (using the highest 6,000 sub-wards from the Index of Multiple Deprivation).	**July – August 2020**
2	**Co-designed event with patients**	Patient Experience Based Co-Design event in conjunction with Health Watch Leeds, HealthWatch Calderdale, the Yorkshire and Humber AHSN and Me and My Medicines.	**January 2020**
		There was a mixed demographic of 25 (13 men, 12 women) patients and carers who attended the workshop. The range of conditions included diabetes, mental ill-health, HIV, osteoarthritis, atrial fibrillation, chronic pain and Raynaud's disease. The number of medications taken daily was between five and fifteen.	
3	**Patient and professional engagement sessions**	Discussions of the draft recommendations developed by the	**August 2020**

Name of engagement and consultative activities undertaken	Summary note of the engagement or consultative activity undertaken	Month/Year
	SLWG subgroups with healthcare professionals and with patient group representatives and patients to sense-check the recommendations with people who will be affected by them.	

6. What key sources of evidence have informed your impact assessment and are there key gaps in the evidence?

Evidence Type	Key sources of available evidence	Key gaps in evidence
Published evidence	• The Review bibliography contains a full list of published evidence. • The Review aligns with and builds on several other plans and initiatives that affect the provision of healthcare in England. These include the NHS Long Term Plan, Public Health England's Prescribed Medicines Review Report, NHS England and NHS Improvement's Medicines Safety Improvement Programme, and the current UK National Action Plan on Antimicrobial Resistance.	See section 9 for Review recommendations to address research gaps.
Consultation and involvement findings	• The Review ran or commissioned: • An Opening Symposium with around 150 delegates from the medicine, nursing and pharmacy professions, from academia and from patient groups and charities;	

Evidence Type	Key sources of available evidence	Key gaps in evidence
	• A Patient Experience Based Co-design event with patients, in partnership with HealthWatch, the campaigning group Me and My Medicines, and the Yorkshire and Humber Academic Health Science Network; • Subgroup engagement with over 90 members, formed from experts, interested professionals and patient representatives; • 14 focus groups and 10 in-depth interviews with patients and the public from an independent research agency.	
Research	• Research commissioned from EEPRU (The Policy Research Unit in Economic Methods of Evaluation in Health and Social Care Interventions, a collaboration between the Universities of Sheffield and York and the National Institute for Health Research).[1]	
Participant or expert knowledge **For example, expertise within the team or expertise drawn on external to your team**	• The Review was guided by a Short Life Working Group (SLWG). This brought together senior stakeholders from across the healthcare system, together with patient and third sector representation. The membership of the SLWG is set out in Annex A of the review.	

Evidence Type	Key sources of available evidence	Key gaps in evidence
	- Five subgroups, each one chaired by an expert member of the SLWG, developed the detailed recommendations. The subgroups drew on the expertise of ninety healthcare professionals and patient representatives. - A review team from NHS England and NHS Improvement provided support including a: Regional Chief Pharmacist, clinical, policy, communications and analytical leads. - Policy feedback was obtained through wider consultation with other NHSEI policy leads on draft recommendations.	
Data	As described in the review technical annex (Annex E), data was utilised from multiple sources to understand: - Trends of prescribing over time in primary care. - Scale of polypharmacy including by age, sex, ethnicity and level of deprivation. - Links to prescribed medicines that may cause dependence and withdrawal. - Impact of other initiatives to tackle overprescribing e.g. antimicrobial resistance.	Data for prescribing activity was not available for all protected characteristics and there are limitations of the data available on ethnicity as described in the review technical annex (Annex E).

7. Is your assessment that your proposal will support compliance with the Public Sector Equality Duty? Please add an x to the relevant box below.

	Tackling discrimination	**Advancing equality of opportunity**	**Fostering good relations**
The proposal will support?	X	X	X
The proposal may support?			
Uncertain whether the proposal will support?			

8. Is your assessment that your proposal will support reducing health inequalities faced by patients? Please add an x to the relevant box below.

	Reducing inequalities in access to health care	**Reducing inequalities in health outcomes**
The proposal will support?	X	X
The proposal may support?		
Uncertain if the proposal will support?		

9. Outstanding key issues/questions that may require further consultation, research or additional evidence. Please list your top 3 in order of priority or state N/A

	Key issue or question to be answered	Type of consultation, research or other evidence that would address the issue and/or answer the question
1	The Review recommends that the evidence base for overprescribing requires strengthening, including setting research priorities and providing coordination across the research community. Its recommends that a programme would include the adoption of a consensus definition of polypharmacy, analysis and segmentation of those who experience polypharmacy to support the targeting and evaluation of interventions, mapping health systems to understand the causes of overprescribing and prioritise solutions, understanding the consequences of overprescribing, and evaluation of the impact and outcomes of the interventions for overprescribing set out in this report.	The review recommends that that Department of Health and Social Care should establish a funded research programme working with the Clinical Director for Optimised Prescribing.
2	Further research needs to be undertaken into the links between overprescribing, deprivation, ethnicity and inequalities and the impact this has on the health of the population.	The review recommends that NIHR should undertake this further research. This may also require access to more robust data on some of the protected characteristics e.g. ethnicity. As acknowledged in the report there are limitations of this data. The Unified Information Standard for Protected Characteristics (UISPC) is currently being developed which would aim to help monitor the impact of interventions on equality and health inequalities.
3	The review implementation plan will need to ensure that there is adequate involvement of patients and other stakeholders in the design and rollout or any new interventions and that a robust evaluation process is integrated from the outset.	Stakeholder engagement – a stakeholder engagement plan would be developed to support implementation of the recommendations to ensure that all patients impacted are able to contribute effectively. Further equality and health inequalities impact assessment would be required for implementation policy and plans.

10. Summary assessment of this EHIA findings

The EHIA summarises the equality and health inequalities findings from the review used to develop recommendations which aim to reduce overprescribing.

Everyone has a minimum of five characteristics given protection under the Equality Act 2010, and we are conscious that our strategy to reduce overprescribing needs to take full account of the needs of groups with different protected characteristic. For example, good prescribing, social prescribing and structured medication reviews all depend on prescribers and patients having the best possible relationship with open communication, and we identify ways in which fostering the right culture in healthcare will help ensure that no protected characteristic group is disadvantaged. This includes, but is not restricted to, the discussion and recommendations on cultural competency. Although these are primarily focused on race and ethnicity, and to some extent on religion and belief, the approach we have recommended should also address the risk of exclusion or discrimination that might relate to sex, sexual orientation, gender reassignment and transgender groups, and pregnancy and maternity, particularly as there are some medicines or treatments that are particularly relevant to these groups.

The Review recommendations apply to all patients, although particularly to those groups with a higher prevalence of polypharmacy. Successful implementation of the recommendations will mean that all patients are able to benefit from them, to make sure that medicines they don't need or want, or which may do them harm are reduced to achieve more favourable outcomes. Reducing medicines waste also has a positive impact on ensuring that money is not diverted from medicines that people need and has environmental benefits which impact the whole population.

Further EHIA will be required on development of an implementation plan to ensure that suitable engagement is undertaken nationally and locally, where appropriate to deliver effective and inclusive change and improvements.

11. Contact details re this EHIA

Team/Unit name:	Medicines Policy Unit
Division name:	Policy & Strategy
Directorate name:	Specialised Commissioning
Date EHIA agreed:	
Date EHIA published if appropriate:	

Annex C: Case studies

Title	Organisation(s) /area	Case study links
Me and My Medicines campaign	Leeds, supported by the Yorkshire and Humber Academic Health Science Network	https://meandmymedicines.org.uk/
Our Healthier Fleetwood healthy living and social prescribing initiative	Fleetwood	https://www.england.nhs.uk/gp/case-studies/improving-access-to-general-practice-demonstrating-the-power-of-community-engagement-in-transforming-general-practice-fleetwood/
Health Connections Mendip and the Frome Model	Frome, Somerset	https://shiftdesign.org/case-study-compassionate-frome/
Social Prescribing in Tower Hamlets: evaluation of borough-wide roll-out	Tower Hamlets Together	https://towerhamletstogether.com/resource-library/1/download
Prescribing Quality Scheme Polypharmacy and Deprescribing Review to address problematic polypharmacy	Camden CCG	https://www.prescqipp.info/community-resources/innovation-and-best-practice/prescribing-quality-scheme-polypharmacy-and-deprescribing-review-2019/
High dose opiate reduction in Great Yarmouth and Waveney	Great Yarmouth and Waveney	https://www.prescqipp.info/community-resources/innovation-and-best-practice/winner-high-dose-opiate-reduction-in-great-yarmouth-and-waveney-2019/
Reviewing medication in care homes	Northumbria NHS Trust	https://www.health.org.uk/news-and-comment/featured-content/power-of-people/pills
Targeted structured polypharmacy reviews in older people	North East Hampshire and Farnham CCG	https://www.prescqipp.info/community-resources/innovation-and-best-practice/targeted-structured-polypharmacy-reviews-in-older-people-2019/

Title	Organisation(s) /area	Case study links
Medicines Optimisation in Care Homes	Mid Essex CCG	https://www.prescqipp.info/community-resources/innovation-and-best-practice/medicines-optimisation-in-care-homes-2019/
Addressing Problematic Polypharmacy	East and North Herts CCG	https://www.prescqipp.info/community-resources/innovation-webinars/innovation-award-winner-addressing-problematic-polypharmacy-east-and-north-herts-ccg/
Medicines Optimisation Review Programme	Swale CCG	https://www.prescqipp.info/community-resources/innovation-and-best-practice/medicines-optimisation-review-programme-morp-2019/
The introduction of a STOMP service into primary care	Durham Dales, Easington and Sedgefield and North Durham CCGs	https://www.prescqipp.info/community-resources/innovation-and-best-practice/the-introduction-of-a-stomp-service-into-primary-care-2019/
Clinical Pharmacist Medication Review Service in Primary Care	Brighton and Hove CCG - part of the Central Sussex and East Surrey Commissioning Alliance	https://www.prescqipp.info/community-resources/innovation-and-best-practice/an-evaluation-of-a-clinical-pharmacist-medication-review-service-in-primary-care-2018/
Implementation of STOMP	Kent Surrey Sussex Academic Health Science Network in partnership with Sussex Partnership NHS Foundation Trust and Hastings and Rother CCG	https://improvement.kssahsn.net/wp-content/uploads/2020/03/STOMP-v.03.pdf
Use of the Polypharmacy prescribing comparators	North East Hampshire and Farnham CCG	https://wessexahsn.org.uk/img/projects/NE%20Hants%20and%20Farnham%20success%20in%20Comparators%20FINAL.%20docx%20JF%20JC.pdf

Annex D: Key papers

- Age UK report: [More harm than good](#)

- The Canadian Deprescribing Network (CaDeN): [Deprescribing Guidelines](#)

- Choosing Wisely UK initiative: [Choosing Wisely UK](#)

- EEPRU report: [Evidence for the impact of interventions for, and medicines reconciliation in, problematic polypharmacy: A rapid review of systematic reviews and scoping searches](#)

- EEPRU report: [Prevalence and economic burden or medications errors in the NHS in England](#)

- The King's Fund report: [Polypharmacy and Medicines Optimisation](#)

- London Regional Medicines Optimisation Committee (RMOC) and SPS: [Polypharmacy Working Group Report](#)

- National Institute for Health and Care Excellence (NICE) Guidance: [Medicine Optimisation: the safe and effective use of medicines to enable the best possible outcomes](#)

- National Institute for Health and Care Excellence (NICE) Guidance: [Multimorbidity: clinical assessment and management](#)

- Public Health England: [Prescribed Medicines Review Report](#)

- The Quality Use of Medicines to Optimise Ageing in Australian Adults: [Recommendations for a national strategic action plan to reduce inappropriate polypharmacy](#)

- [Realistic Medicine Scotland](#)

- [Rethinking Medicine](#)

- Royal Pharmaceutical Society: [Polypharmacy – Getting our medicines right](#)

- [The SIMPATHY project](#) (Stimulate Innovation in the Management of Polypharmacy and Adherence in The Elderly). Results at: http://simpathy.eu/

- World Health Organisation global campaign: [Medication Without Harm](#)

Annex E: Technical information

Some tables and data have already appeared in the main text

Before we can fully understand the consequences of polypharmacy for overprescribing, we need more research and evidence. Current methods for measuring polypharmacy (such as counting medicines) are limited and may either fail to identify those patients most likely to benefit from optimisation of care, or are limited to narrow aspects of therapeutic management. Varied and inconsistent use of terms such as overprescribing, polypharmacy and inappropriate prescribing also make it difficult to quantify the issue.

Problematic polypharmacy is a complex problem and each patient experiences it in a different way. There is a lack of understanding of the causes of overprescribing and problematic polypharmacy at both individual and system levels. This makes it more challenging to know which patients to target and why, and which aspects of prescribing to focus on. It is also unclear which outcomes should be the goal of service evaluations and interventions.

E.1 The scale of polypharmacy

In the primary care system in England between October and December 2019, approximately 27 million people were taking one medicine regularly, 8.4 million were taking five or more medicines and 3.8 million were taking eight or more unique medicines. Some people were supplied with more than forty medicines.

Table 1: Spread of medications by number and rate per population.

	Number of patients (millions)	**Rate per 1,000 population**
At least one medicine	27.0	480
One medicine only	8.1	143
Five or more	8.4	149
Eight or more	3.8	68
10 or more	2.2	38

The average number of medicines dispensed to patients has been consistent over the last five years. For all patients, the mean number of medicines dispensed has consistently been around 3.9 and the median has been five. For patients on eight or more medicines, the mean has consistently been 10.9 and the median has been 12.

This suggests that polypharmacy – and by extension, problematic polypharmacy – is relatively stable for the average patient. However, it is clear that polypharmacy increases with age (Figure 2), most notably from the age of 40. By the age of 80, more than a third of all people are on eight or more medicines. As the population in England ages, with more people living longer, polypharmacy is forecast to increase as well. Unless action is taken, this will mean more problematic polypharmacy, more overprescribing and greater burdens on patients.
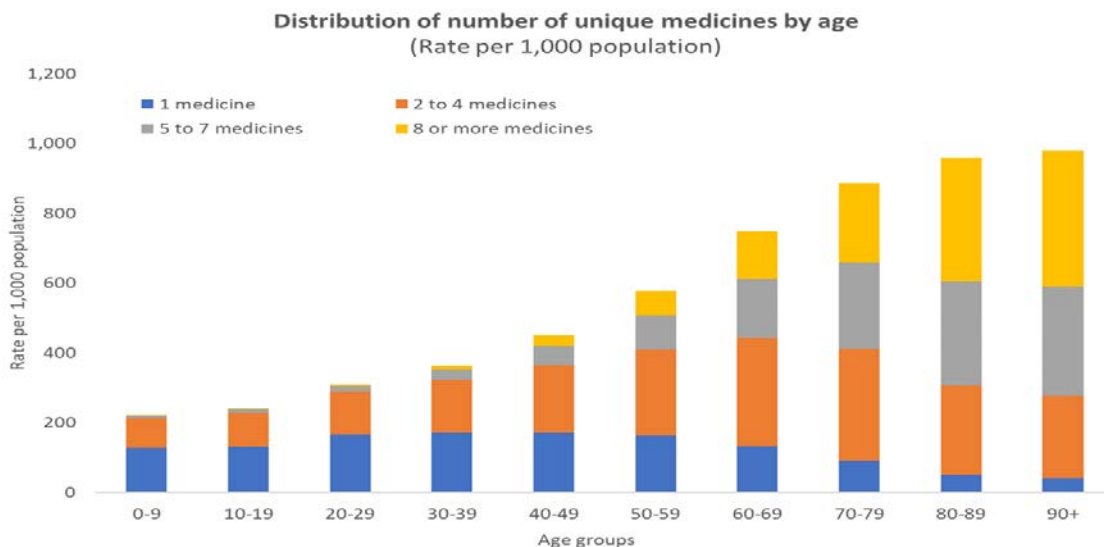

Distribution of number of unique medicines by age
(Rate per 1,000 population)

Legend: 1 medicine, 2 to 4 medicines, 5 to 7 medicines, 8 or more medicines

Figure 2: Distribution of number of unique medicines by age (rate per 1,000 population)

E.2 Polypharmacy and deprivation

As Figure 3 shows, the number of people taking one or more medicine does not vary significantly between the areas of highest and lowest social and economic deprivation. In other words, those living in a relatively poorer area are not that much more likely to be taking medicine than the average. But those living in the most deprived areas are much more likely to be taking eight or more medicines (shown by the red line), and this difference is not down to the age or sex of the local population. Clearly, polypharmacy increases with relative deprivation, and the rate of those on eight or more medicines is 2.8 times greater in the most deprived areas compared to the least deprived. What we cannot say from the data is the proportion of polypharmacy that is problematic: it could be that some or all of the difference is down to a higher rate of illness in more deprived areas. But it certainly increases the risk of overprescribing: for example, almost two in three people who are taking eight or more medicines are on at least one drug that may cause dependency.
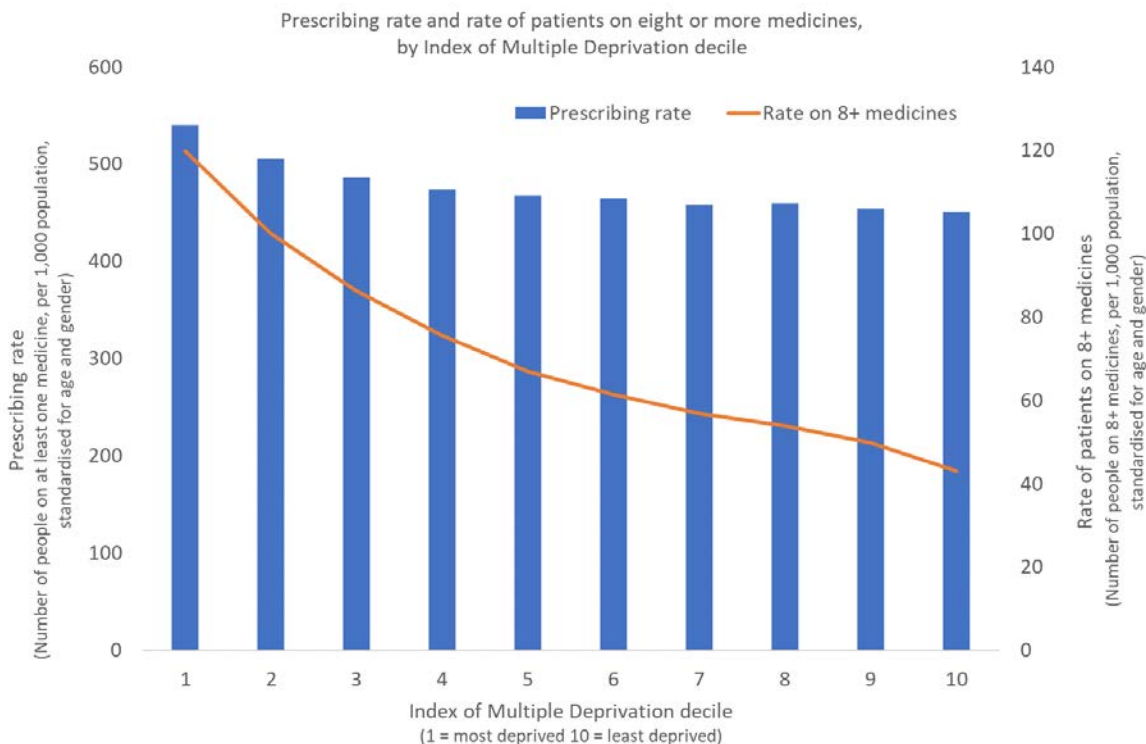
Prescribing rate and rate of patients on eight or more medicines,
by Index of Multiple Deprivation decile

Figure 3: Prescribing rate and rate of patients on eight or more medicines by IMD decile, standardised by age and gender.

E.3 Polypharmacy and ethnicity

The work on polypharmacy and ethnicity is still very preliminary, but we have enough data and insight to suggest there are issues to be explored further. For example, we can see that from a sample in June 2019 of patients taking at least one medicine, that the proportion of patients on eight or more medicines varies by ethnicity, even allowing for differences in age. The group with the highest proportion of those on 8 or more medicines (13.9%), are those who reported themselves as of Asian/Asian British ethnicity. The sample is broadly representative of ethnicity in the population at large but we don't know the extent of any sampling bias in CPRD that might mean that for example the Asian group in the sample need more medicines than Asians in the country as a whole. The differences between some ethnic groups are not statistically significant, as shown by the confidence intervals, due to relatively low numbers of patients in these groups. Again, we cannot say from this data what proportion of polypharmacy amongst Black, Asian and Minority Ethnic communities is problematic, only that there might be differences that are worth investigating.
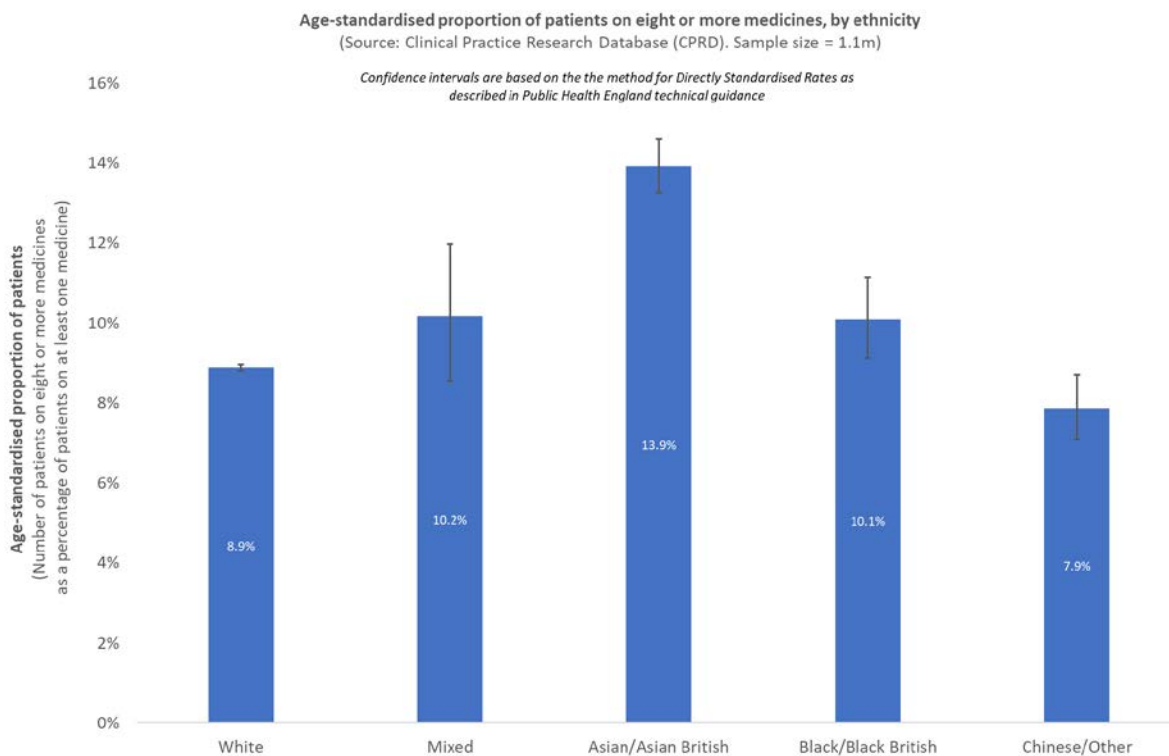
Age-standardised proportion of patients on eight or more medicines, by ethnicity
(Source: Clinical Practice Research Database (CPRD). Sample size = 1.1m)

Confidence intervals are based on the the method for Directly Standardised Rates as described in Public Health England technical guidance

Figure 4 – Age-standardised proportion of patients on eight or more medicines, by ethnicity

E.5 Description of data sources and method for prevalence of polypharmacy

The data comes from NHS Business Services Authority (BSA) Prescription Services and is derived from products prescribed on prescriptions and dispensed in the community. The database is taken to be a complete record of all prescriptions submitted for reimbursement by NHS BSA, excluding items identified as not dispensed, disallowed or returned.

The number of medicines per person is specified by:

- unique chemical substance for the prescription item. For example, Simvastatin and Atorvastatin are two separate chemical substances. The chemical substance is taken from the structure of the 2016 British National Formulary (BNF)

- dispensed in any month of the three-month period

- appliances are excluded, for example oxygen masks, dressings, or catheters

For example, a person on eight medicines is defined as having had eight unique chemical substances dispensed to them at some point between October and December 2019,

though they may also have had appliances dispensed and several different presentations of the same medicine.

The data relies on a successful match of prescription items dispensed to individual patients. The matching is done by NHS BSA using NHS Personal Demographic Service. Not all items can be successfully matched. The dataset used is based on successful matches that covers 95.0% of all prescription items. The patients included in the dataset cover 98.8% of all identified patients and 99.7% of all items linked to identified patients. The number of medicines per patient is therefore highly accurate but 1.2% of patients are missing from the dataset.

Rates are expressed per 1,000 population. Population figures are taken from ONS mid-year estimates (2019) except for analysis by deprivation where population figures for 2017 are used as the latest available population data.

The data for the analysis by ethnicity comes from the Clinical Practice Research Database (CPRD). It is based on the GOLD sample. The analysis is based on prescriptions made in June 2019 for medicines from BNF chapters 1 to 10 excluding chapter 5. Ethnicity information is available for half of patients in the sample. The total number of patients included in the analysis is 549,676. Confidence intervals have been applied to account for the smaller numbers of patients in certain ethnicity groupings.

The GOLD sample is representative of the UK population in terms of age, gender and ethnicity[56]. However, we don't know the extent of any sampling bias which might bias the prescribing pattern by ethnicity. For example, the sample suggests that those reporting themselves as of Asian/Asian British ethnicity have the highest proportion of patients on eight or more medicines, but this might be because these patients are sicker than the Asian group in the population at large. Preliminary analysis, using a multi-level Poisson model, suggests that these differences are not due to clustering of patients by GP practice.

The table below shows the number of patients prescribed a medicine in June 2019, by ethnicity group:

	Number of patients	Proportion of patients
White	515,659	47.2%
Mixed	3,602	0.3%
Asian/Asian British	16,992	1.6%
Black/Black British	6,993	0.6%
Chinese/Other	6,430	0.6%
Missing	543,395	49.7%
Total	1,093,071	100%

The ethnicity groups are comprised as follows as per 2001 ONS census categories[57]:
White

- Welsh/English/Scottish/Northern Irish/British

- Irish

- Gypsy or Irish Traveller

- Any other White background

Asian or Asian British

- Indian

- Pakistani

- Bangladeshi

- Any other Asian background

Other ethnic group

- Chinese

- Any other ethnic group

Mixed

- White and Black Caribbean

- White and Black African

- White and Asian

- Any other mixed background

Black or Black British

- Black - Caribbean

- Black - African

- Any other Black background

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