NORTH EAST QUALITY OBSERVATORY SERVICE

(NATIONAL COLLABORATING CENTRE FOR INDICATOR DEVELOPMENT)

FOR

NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

INDICATOR DEVELOPMENT PROGRAMME

Data Analysis paper

Topic area: Frailty and age stratification

IAC meeting date: December 2022

Output: Data analysis paper

To explore the number of patients that:

- Could be at risk of under-treatment by existing diabetes indicators because people with moderate frailty are excluded.
- Could be at risk of overtreatment by existing diabetes indicator NM159/QOF DM019 because it does not use age stratification.
- Could be at risk of overtreatment by other existing indicators on blood pressure targets (excluding diabetes) because they do not use frailty stratification.

Contents

Acknowledgements

We thank Dr Martin Vernon for his specialist clinical advice and guidance with regard to frailty assessment and coding. We also thank the North East Commissioning Support Unit (NECS) for the provision of data from clinical searches to support with reporting, and the 31 GP practices from within the North East of England who agreed to provide data for analysis within this paper.

Overview

The purpose of this paper is to provide an analysis for discussion of the patient populations who could be at risk of under or overtreatment as a result of the QOF and NICE menu indicators and the impact of age or frailty stratification. This is explored across six disease areas, which are diabetes, hypertension, coronary heart disease (CHD), peripheral arterial disease (PAD), stroke/transient ischaemic attack (STIA) and chronic kidney disease (CKD).

The paper provides an overview of current methods of frailty identification in general practice and issues with batch coding and quality of frailty coding. This highlights the issues surrounding the use of frailty identification tools and disparities between frailty identification and clinical validation in general practice.

A summary of the current NICE guidance documents that contain recommendations with reference to age and frailty stratification is provided for the disease areas of interest in addition to details of existing QOF and NICE menu indicators that utilise frailty or age stratification, some of which have been recently updated.

Contextual information relating to current variation in frailty coding taken from the national frailty profiles (GMS Contract data) in addition to findings from a frailty case-finder tool used in the North East of England which demonstrate the potential under identification of patients with moderate or severe frailty.

An exploration of under and overtreatment of patients is described, based on patient-level disease register profiles which have been stratified by age and frailty status. This provides an estimate of the patient populations who could be at risk of over or under treatment because current indicators do not stratify for age and/or frailty.

The issues discussed within the paper highlight the problems with current indicator design and stratification of patients based on age and frailty status, which can result in the risk of under or overtreatment of patients within the six disease areas investigated.

Summary of findings

Frailty coding in GP clinical systems

- There are inconsistencies in frailty assessment and variation in moderate and severe frailty coding at GP practice level
- There is an unknown impact of batch coding with regard to frailty diagnosis (and lack of clinical validation of frailty diagnosis and grading by severity)
- There is potential under-identification of patients with moderate (and severe) frailty (based on frailty modelling data) across practices.
- Work is required to improve frailty diagnosis and coding in general practice.

Existing QOF indicator achievement and exception rates

- Where QOF indicators contain stratification for age or frailty status, the proportion of patients receiving the intervention is higher (and personalised care adjustment rates are lower) in those indicators relating to the higher need groups (those with moderate or severe frailty, or those aged 80 years and over).

Disease register patient profiles

For current diabetes and chronic kidney disease indicators that exclude moderate and severely frail patients, approximately 7.9 – 11.7% of patients with moderate frailty could be at risk of under-treatment (and may benefit from the intervention), as shown in Table a.

In relation to the diabetes indicator DM019/NM159 over 11.5% of patients aged 80 and over could be at risk of overtreatment due to the absence of age stratification (Table A), and may receive unnecessary or potentially harmful interventions.

Regarding the four disease areas containing blood pressure indicators which are stratified by age and not frailty (CHD, hypertension, PAD and STIA) the population aged 79 years and under and severely frail who could be at risk of overtreatment ranges from 0.97% to 3.44%. In patients aged 80 and over with severe frailty, the potential risk of overtreatment ranges from 7.67% to 13.44% (Table B).

In patients aged 79 years and under and moderately frail, the population who could be at risk of overtreatment for blood pressure due to the lack of frailty stratification ranges from 3.35% to 8.16%. The risk of potential overtreatment is greater in patients aged 80 and over, ranging from 16.13% to 20.99% of patients with moderate frailty (Table B).

Estimated percentage of patients who could be at risk of under or overtreatment

A) Indicators relating to diabetes and chronic kidney disease

	Diabetes **HbA1c indicators**	**Diabetes** **Blood pressure indicators**	**Diabetes** **CVD risk and statins indicators**	**CKD** **Blood pressure indicators**
Risk of under-treatment due to current exclusion of moderate frailty	DM020/NM157 7.88% (moderate)	-	DM022/NM162 7.88% (moderate) NM160, NM161 8.34% (moderate)	NM217 11.70% (moderate)
Risk of overtreatment in patients aged 80 and over with no/mild frailty due to no age stratification	-	DM019/NM159 (updated to NM218) 11.51%	-	-

B) Indicators relating to hypertension, CHD, PAD and stroke and TIA

	Hypertension **Blood pressure indicators**	**Coronary heart disease** **Blood pressure indicators**	**Peripheral arterial disease** **Blood pressure indicators**	**Stroke / TIA** **Blood pressure indicators**
Risk of overtreatment in patients aged 79 and under due to no frailty stratification	HYP003/NM223 3.35% (moderate) 0.97% (severe)	CHD008/NM225 6.06% (moderate) 2.42% (severe)	NM67/NM229 8.16% (moderate) 3.00% (severe)	STIA010/NM227 6.72% (moderate) 3.44% (severe)
Risk of overtreatment in patients 80 and over due to no frailty stratification	HYP007/NM224 16.13% (moderate) 7.67% (severe)	CHD009/NM226 18.41% (moderate) 9.57% (severe)	NM193/NM230 20.99% (moderate) 12.97% (severe)	STIA011/NM228 17.14% (moderate) 13.44% (severe)

Background

Requests from June 2022 Indicator Advisory Committee

At the June 2022 Indicator Advisory Committee, committee members highlighted that some indicators that use moderate frailty as a diagnostic code to identify populations could be risking under-treatment as the classification has poor diagnostic accuracy and some patients with moderate frailty may be excluded unnecessarily because they may benefit from the interventions or treatment described within the indicators.

Existing NICE menu diabetes indicators NM157 to NM162 (excluding NM158) remove patients with moderate or severe frailty, with NM159 not using an age cut-off that is currently recommended by NICE guidance. These indicators cover HbA1c measurement, cardiovascular disease risk assessment, blood pressure monitoring and treatment with statins.

In July 2022, NHS England asked NICE whether NM159 (also indicator DM019 in QOF), which relates to blood pressure monitoring, should exclude people aged over 80 years in line with NICE guidance and whether other existing blood pressure indicators in other disease areas that currently use age-dependent targets should also use frailty stratification similar to NM159/DM019.

NICE has requested that NCCID produce an analysis paper to explore the number of patients that could be:

- at risk of under-treatment by existing diabetes indicators because people with moderate frailty are excluded;
- at risk of overtreatment by existing diabetes indicator NM159/QOF DM019 because it does not use age stratification;
- at risk of overtreatment by other existing indicators on blood pressure targets (excluding diabetes) because they do not use frailty stratification.

NICE will supplement this work with a summary on the clinical validity of excluding or including people with moderate frailty.

Identification of frailty in primary care in England

Frailty is defined as a condition characterised by loss of biological reserves across multiple organ systems and vulnerability to physiological decompensation after a stressor event[1]. Frailty (rather than age) has been identified as an effective way of identifying people who may be at a greater risk of future hospitalisation, care home admission or death. As reported by NHS England, identification and stratification of frailty prevalence on a population level can help plan for future health and social care demand to help people age well.

NHS England has recommended the use of appropriate tools such as the electronic Frailty Index (eFI) to systematically identify people aged 65 and over, who might be living with moderate or severe frailty. The eFI is a population-based segmentation tool, which utilises routine health record data to automatically calculate the risk of an individual being mild, moderate, or severely frail. The eFI was developed and validated by Clegg et al. in 2016[1], using the cumulative deficit model for frailty. Health records from over 900,000 patients aged 65 and over were used to confirm the common characteristics that are indicative of frailty.

As stated by NHS England, the eFI should be used as a segmentation tool and is not intended as a diagnostic tool, and eFI frailty status does not necessarily correlate to outcome risk for individuals, only for the cohorts identified by the tool. Upon identification of potential frailty using the eFI tool, confirmation of frailty should be undertaken by a clinician using a validated tool as recommended by NHS England, and the Clinical Frailty Scale (CFS) is currently the preferred NHS frailty grading validation tool. It should also be acknowledged that deficits within patient records may persist despite the clinical codes no longer being relevant due to recovery. This is likely to impact on the robustness of the clinical data that is utilised by the eFI model to calculate frailty risk. High quality, up to date clinical data is therefore essential for quality frailty identification.

Frailty identification in the GMS Contract

In 2017/18, the NHS England Standard General Medical Services Contract (GMS Contract) introduced routine frailty identification for patients aged 65 and over using an appropriate tool. For patients most at risk of adverse events, such as those with severe frailty, general practices are required to conduct medication reviews and falls

risk assessments and to promote this information in the patient summary care record. Although a contractual requirement, no specific payment is associated with identifying and coding frailty within GP practices. A study examining the extent of implementation of the GMS contract frailty requirements identified that GP practice engagement, in addition to the quality and accuracy of frailty coding, varied widely nationally[2].

Batch coding of frailty diagnosis

After the initiation of the 2017/18 core contract, NHS England identified that some GP clinical systems were configured to convert the eFI directly into a diagnostic code within patient electronic health records, effectively automating the clinical diagnosis of frailty without clinical review and verification. NHS England reported that this results in batch coding, a process which has been strongly advised against, as this inadvertently increases the prevalence of frailty.

The potential issues of batch coding, combined with GP practice engagement on this topic and the variation in the accuracy of frailty coding, are likely to impact on the reporting of frailty identification and prevalence nationally. Not only does this affect the numbers of patients perceived to be eligible to receive interventions such as falls assessments or structured medication reviews as per the GMS Contract, but it may also have repercussions relating to QOF payment indicators and quality of care for patients.

Over and under-treatment of patients

According to a report by Kearney et al.[3], both overtreatment and under-treatment are examples of sub-optimal care. Inflexible, single-condition guidelines and financial incentives can perpetuate overtreatment, particularly in patients with multimorbidity. Overtreatment can result in harm to patients as a result of unnecessary interventions and can lead to higher cost implications[4]. On the other hand, under-treatment can result in the insufficient treatment of patients who may benefit from receiving an intervention.

Frailty and age stratification in NICE guidance and current indicators

NICE guidance

The following guidance documents are relevant in the context of frailty and age stratification for treatment targets of HbA1c, blood pressure and CVD risk management.

Type 1 diabetes in adults: diagnosis and management – NICE guideline NG17

This guidance was published on 26th August 2015 and last updated 17th August 2022. It covers the care and treatment of people with Type 1 diabetes and outlines the target thresholds for HbA1c and blood pressure. Recommendation 1.13.8 states that for blood pressure targets, clinical judgement should be used for adults with frailty.

Type 2 diabetes in adults: management - NICE guidance NG28

This guidance was published on 2nd December 2015 and was last updated on 29th June 2022. The guidance covers the management of people with Type 2 diabetes and outlines the treatment targets for HbA1c and blood pressure. Recommendation 1.6.9 states that HbA1c targets should be relaxed on a case-by-case basis in people who are older or frailer if they are unlikely to achieve longer term risk reduction benefits, if patients are at a higher risk of developing hypoglycaemia, or if intensive management would not be appropriate.

Chronic kidney disease: assessment and management – NICE guideline NG203

This guideline was published on 25th August 2021 and was last updated on 24th November 2021. The guidance covers the assessment and management of chronic kidney disease in adults and refers to blood pressure targets. Recommendation 1.6.1 states that in adults with CKD and an albumin: creatinine ratio (ACR) under 70 mg/mol, clinical systolic blood pressure should be below 140 mmHg and the clinical diastolic blood pressure should be below 90 mmHg. In relation to management of blood pressure in patients with frailty and multimorbidity, the NICE guideline NG203 states that the guidance within the NICE guideline NG136 should be followed.

Hypertension in adults: diagnosis and management – NICE guideline NG136

This guidance was published on 28th August 2019 and last updated on 18th March 2022. This guidance covers the diagnosis and management of hypertension in adults and refers to blood pressure targets, including those with diabetes or CKD. Recommendations 1.4.20 - 1.4.22 refer to adjusted blood pressure targets for people aged 79 years and under and for people aged 80 years and over. With reference to frailty, recommendation 1.4.21 (that focuses on hypertension in patients aged 80 and over) states that clinical judgement should be used for people with frailty or multimorbidity and refers to the NICE guideline on multimorbidity.

Multimorbidity: clinical assessment and management – NICE guideline NG56

This guidance was published on 21st September 2016. With reference to management of conditions in people with frailty, NG56 advises that the possibility of lower overall benefit of continuing treatments that aim to offer prognostic benefit should be taken into account in people with frailty. In addition, it is recommended that discussions surrounding the continuation of treatments recommended within guidance on single health conditions which may offer limited overall benefit should be undertaken in patients with frailty.

Cardiovascular disease: risk assessment and reduction, including lipid modification – Clinical guideline CG181

This clinical guidance was published on 18th July 2014 and last updated on 27th September 2016. The guidance outlines the formal CVD risk assessment to be used for the primary prevention of CVD in people with type 2 diabetes (recommendation 1.1.10) and relates to the indicator NM160. The guidance also provides recommendations for the use of statins to reduce CVD risk and cardiovascular events (relating to indicators NM161 and NM162). As documented in the Indicator Equality Impact Assessments for NM160, NM161 and NM162 (QOF indicator DM022), the focus on people without moderate or severe frailty aims to reduce under-treatment and support better control of biomedical targets through individualised patient-centred care.

NICE indicators

Frailty stratification

Several NICE menu indicators that are suitable for QOF utilise frailty stratification in patients with diabetes and CKD to guide treatment targets and (if appropriate) QOF payments in relation to HbA1c levels, blood pressure and cardiovascular disease (CVD) risk. Table 1 contains the current diabetes indicators and Table 2 details the new indicators for CKD and diabetes which were discussed at June 2022 IAC and subsequently progressed to the NICE Menu.

To note that NM218 (Table 2) updates existing indicator NM159 (in Table 1) to use a blood pressure target in line with NICE guidance for people aged under 80 with type 2 diabetes, as NM159 (which is QOF indicator DM019) uses a target that is now not in line with NICE guidance for type 1 or type 2 diabetes.

Table 1: Diabetes indicators that utilise frailty stratification suitable for use in QOF

QOF / NICE Indicator ID	Indicator description
DM019 / NM159	The percentage of patients with diabetes, on the register, without moderate or severe frailty, in whom the last blood pressure reading (measured in the preceding 12 months) is 140/80 mmHg or less.
DM020 / NM157	The percentage of patients with diabetes without moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 58 mmol/mol or less in the preceding 12 months
DM021 / NM158	The percentage of patients with diabetes with moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 75 mmol/mol or less in the preceding 12 months
DM022 / NM162	The percentage of patients with diabetes aged 40 years and over, with no history of CVD and without moderate or severe frailty, currently treated with a statin (excluding patients with type 2 diabetes and a CVD risk score of less than 10% recorded in the preceding 3 years)
NM160	The percentage of patients aged 25–84 years, with a diagnosis of type 2 diabetes, without moderate or severe frailty, not currently treated with a statin, who have had a consultation for a cardiovascular risk assessment using a risk assessment tool agreed with the NHS Commissioning Board in the last 3 years

QOF / NICE Indicator ID	Indicator description
NM161	The percentage of patients with a diagnosis of type 2 diabetes and a recorded CVD risk assessment score of 10% or more (without moderate or severe frailty), who are currently treated with a statin (unless there is a contraindication or statin therapy is declined)

Table 2: Diabetes and CKD indicators that utilise frailty stratification suitable for use in QOF, updated at June 2022 IAC

Indicator ID	Indicator description
NM217	The percentage of patients with CKD on the register and with an ACR of less than 70 mg/mmol, without moderate or severe frailty, in whom the last blood pressure reading (measured in the preceding 12 months) is less than 135/85 mmHg if using ambulatory or home monitoring, or less than 140/90 mmHg if monitored in clinic
NM218	The percentage of patients with diabetes without moderate or severe frailty, on the register, in whom the last blood pressure reading (measured in the preceding 12 months) is less than 135/85 mmHg if using ambulatory or home monitoring, or less than 140/90 mmHg if measured in clinic.

Age stratification

Several NICE menu indicators that are suitable for QOF use age stratification in patients with hypertension, CHD, PAD and STIA in relation to blood pressure targets. These indicators have undergone recent amendments in line with the new guidance targets for home and ambulatory blood pressure monitoring (as shown in Table 3) and all except NM230 are suitable for use in QOF.

To note that as described above, the current associated blood pressure QOF indicator DM019 (linked to NM159, now updated to NM218) and the NICE indicator menu CKD indicator NM217 (Table 2) which were recently updated as part of the June 2022 NICE IAC, currently stratify blood pressure targets by frailty and not age.

Table 3: Blood pressure indicators that utilise age stratification (reviewed and updated at June 2022 IAC)

Indicator ID	Indicator description	New NICE Indicator ID	Updated indicator description
QOF HYP003	The percentage of patients aged 79 years or under, with hypertension, in whom the last blood pressure reading (measured in the preceding 12 months) is 140/90 mmHg or less.	NM223	The percentage of patients aged 79 years or under with hypertension in whom the last blood pressure reading (measured in the preceding 12 months) is less than 135/85 mmHg if using ambulatory or home monitoring, or less than 140/90 mmHg if monitored in clinic
QOF HYP007	The percentage of patients aged 80 years or over, with hypertension, in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less.	NM224	The percentage of patients aged 80 years or over with hypertension in whom the last blood pressure reading (measured in the preceding 12 months) is less than 145/85 mmHg if using ambulatory or home monitoring, or less than 150/90 mmHg if monitored in clinic
QOF CHD008	The percentage of patients aged 79 years or under, with coronary heart disease, in whom the last blood pressure reading (measured in the preceding 12 months) is 140/90 mmHg or less.	NM225	The percentage of patients aged 79 years or under with coronary heart disease in whom the last blood pressure reading (measured in the preceding 12 months) is less than 135/85 mmHg if using ambulatory or home monitoring, or less than 140/90 mmHg if monitored in clinic
QOF CHD009	The percentage of patients aged 80 years or over, with coronary heart disease, in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less.	NM226	The percentage of patients aged 80 years or over with coronary heart disease in whom the last blood pressure reading (measured in the preceding 12 months) is less than 145/85 mmHg if using ambulatory or home monitoring, or less than 150/90 mmHg if monitored in clinic

Indicator ID	Indicator description	New NICE Indicator ID	Updated indicator description
QOF STIA010	The percentage of patients aged 79 years or under, with a history of stroke or TIA, in whom the last blood pressure reading (measured in the preceding 12 months) is 140/90 mmHg or less.	NM227	The percentage of patients aged 79 years or under with a history of stroke or TIA in whom the last blood pressure reading (measured in the preceding 12 months) is less than 135/85 mmHg if using ambulatory or home monitoring, or less than 140/90 mmHg if monitored in clinic
QOF STIA011	The percentage of patients aged 80 years or over, with a history of stroke or TIA, in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less.	NM228	The percentage of patients aged 80 years or over with a history of stroke or TIA in whom the last blood pressure reading (measured in the preceding 12 months) is less than 145/85 mmHg if using ambulatory or home monitoring, or less than 150/90 mmHg if monitored in clinic
NM67 Peripheral arterial disease (not in QOF)	The percentage of patients aged 79 years or under with peripheral arterial disease in whom the last blood pressure reading (measured in the preceding 12 months) is 140/90 mmHg or less.	NM229	The percentage of patients aged 79 years or under with peripheral arterial disease in whom the last blood pressure reading (measured in the preceding 12 months) is less than 135/85 mmHg if using ambulatory or home monitoring, or less than 140/90 mmHg if monitored in clinic
NM193 Peripheral arterial disease (not in QOF)	The percentage of patients aged 80 years or over with peripheral arterial disease in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less.	NM230	The percentage of patients aged 80 years or over with peripheral arterial disease in whom the last blood pressure reading (measured in the preceding 12 months) is less than 145/85 mmHg if using ambulatory or home monitoring, or less than 150/90 mmHg if monitored in clinic

Exploration of under and overtreatment of patients

The following section of this paper describes the acquisition of data and data models from various sources and the subsequent analysis of these in support of the exploration of the extent of the impact of frailty or age stratification by existing indicators on the under or overtreatment of patients.

1. National frailty profiles

The latest published frailty data from the GMS Contract (2021/22) relating to frailty assessments done and frailty diagnoses for each region in England has been analysed and reported to demonstrate the extent of variation in the recording of frailty coding nationally and the impact this may have on patient interventions and treatment.

2. Regional frailty case-finding tools

Key findings from the Frailty Finder tool, developed by the North of England Commissioning Support Unit (NECS), are described to demonstrate disparities between modelled and recorded frailty in GP practices from the North East and North Cumbria and the potential variation in frailty coding accuracy and consistency.

3. QOF indicator achievement and personalised care adjustments

The use of frailty and age as modifiers to address overtreatment in existing QOF indicators is examined from the latest QOF data (2021/22) using the four diabetes indicators detailed in Table 1 and the six blood pressure-related indicators in Table 3 (relating to the hypertension, CHD and stroke and TIA disease areas).

4. QOF disease registers: patient age and frailty profiles

There are five disease areas in QOF which contain blood pressure indicators (diabetes, hypertension, CHD, CKD and stroke and TIA) and NICE menu indicators relating to blood pressure in PAD patients which are suitable for QOF. A patient profile of each disease register (in terms of age and frailty severity) was created using local data from GP practices in the North East of England and used to estimate the proportion of patients included in or excluded from specific indicators due to age or frailty status and the potential extent of this on under and overtreatment of patients.

National frailty profiles

General practice-level indicators that include stratification by frailty are dependent on the presence of frailty coding within patient electronic records. Complete, reliable and accurate frailty identification and coding is therefore essential to correctly exclude or include patients in indicators and treatment targets, as described in the section 'Frailty Identification in the GMS Contract' above.

In this section, the latest published frailty data at region and national level are presented relating to frailty assessments done and frailty diagnoses from the GMS Contract (2021/22) to demonstrate the degree of variation in data recording across England.

GMS contract relating to frailty

The current indicators in the GMS Contract data collection for 2021/22 that relate to frailty assessment and diagnosis in registered patients aged 65 and over are shown in Table 4. The indicators are defined as management information counts and are used to support reporting but not for payment. The reporting period is defined as the period between 1st April and the end of each financial quarter, as per the GMS Core Contract Business Rules. The data from these indicators (Table 4) from the Quarter 4 reporting period are shown below, and contain cumulative counts from 1st April 2021 – 31st March 2022, i.e. the 2021/22 financial year, and therefore presents the annual representation of frailty only.

Table 4: GMS Contract indicators relating to frailty assessment

Indicator code	Indicator description
CCDCC03	The number of registered patients aged 65 years or over at the end of the reporting period.
CCDCMI10	Quarterly (cumulative) count of the number of registered patients aged 65 years or over, who have had a frailty assessment using an appropriate tool up to the end of the reporting period.
CCDCMI12	Quarterly (cumulative) count of the number of registered patients aged 65 years or over, who have a diagnosis of moderate frailty, diagnosed using an appropriate tool up to the end of the reporting period.
CCDCMI13	Quarterly (cumulative) count of the number of registered patients aged 65 years or over, who have a diagnosis of severe frailty, diagnosed using an appropriate tool up to the end of the reporting period.

Variation in frailty in England

To note that the findings reported from the GMS Contract in 2021/22 are based solely on data recorded by GP practices relating to frailty assessments and frailty diagnosis in primary care in that financial year, and data relating to the total number of frailty assessments done and diagnoses recorded ever (or since the GMS Contract frailty requirement commenced in 2017/18) is not reported. This is therefore considered to be an underrepresentation of the true prevalence of frailty as patients with a frailty diagnosis from outside this period are not included in the reporting, yet could also be an overrepresentation if the data includes patients identified by a segmentation tool who have not had their frailty diagnosis confirmed in a subsequent clinical assessment.

The proportion of patients with a frailty assessment done, and with a moderate or severe frailty diagnosis were calculated for England overall and for each region, using data from NHS Digital. Indicator CCDCC03 was used as the denominator (patients aged 65 years or over, registered with a GP practice in 2021/22). The key findings are summarised in Table 5.

England: As at the end of Q4 2021/22, there were 8,265,813 registered patients aged 65 and over in England, of these, 1,187,074 (14.36%) had received a frailty assessment in the previous 12 months (between 1st April 2021 and 31st March 2022).

Of the patients registered aged 65 and over in England, 141,419 (1.71%) had a severe frailty code and 236,635 (2.86%) had a moderate frailty code. Similar frailty prevalence rates in 2018 were reported by Alharbi et al.[2], with 1.8% of patients coded as severely frail and 3.2% as moderately frail.

Regional level: The percentage of patients who received a frailty assessment between 1st April 2021 and 31st March 2022 (Table 5) varied from 12.13% in the North East and Yorkshire region to 18.11% in the North West. The percentage of patients with a severe frailty code varied from 1.31% in the South West, to 2.10% in the North West. The regional variation for patients with a moderate frailty code ranged from 2.41% in the South West, to 3.50% in London.

Other studies have highlighted substantial geographic variations in frailty prevalence, with older people in urban and coastal areas disproportionately frail relative to those in rural and inland areas[5].

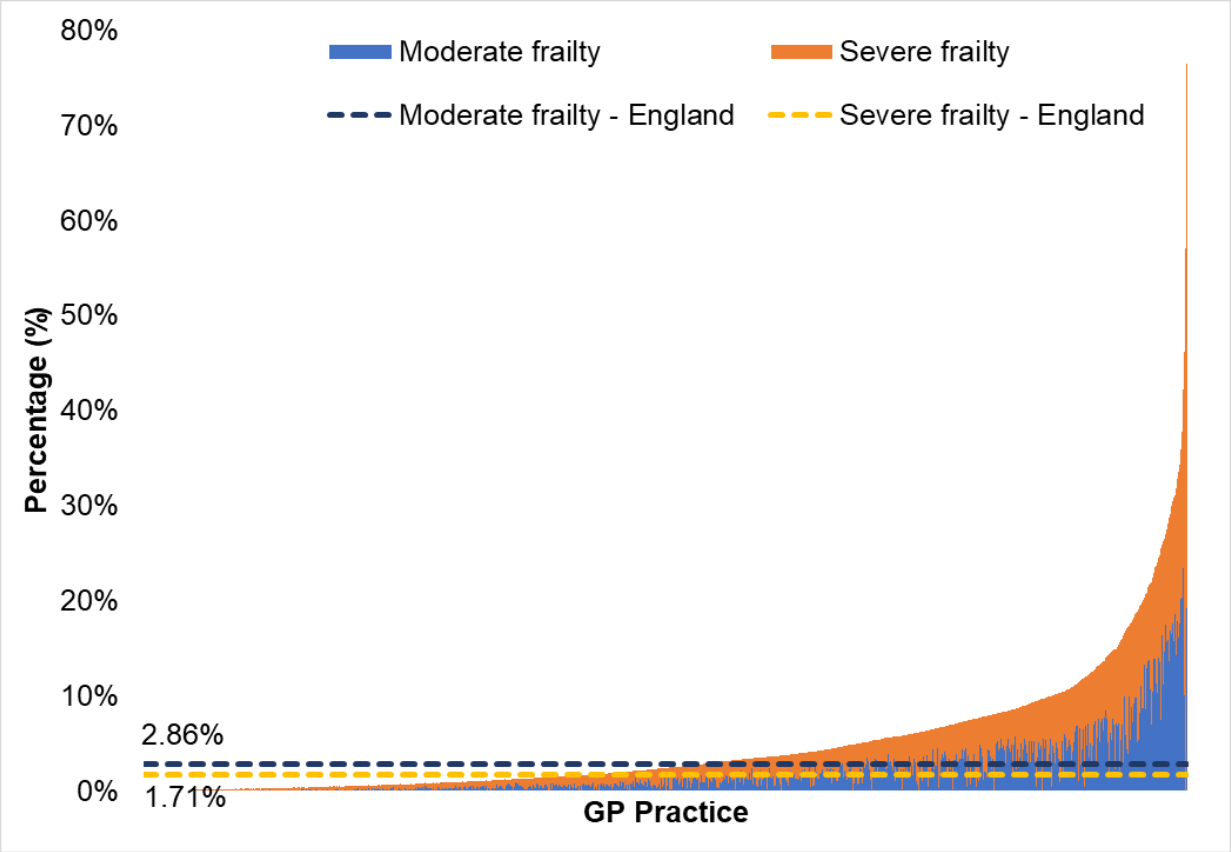
Table 5: Patients aged 65+ with a frailty assessment done or a moderate or severe frailty diagnosis recorded in 2021/22

	Registered patients aged 65 and over (CCDCC03)	Patients aged 65+ who received a frailty assessment (CCDCMI10)	Patients aged 65+ with moderate frailty (CCDCMI12)	Patients aged 65+ with severe frailty (CCDCMI13)
England	**8,265,813**	**1,187,074 (14.36%)**	**236,635 (2.86%)**	**141,419 (1.71%)**
North East and Yorkshire	1,695,646	205,733 (12.13%)	44,191 (2.61%)	29,644 (1.75%)
South East	1,471,097	184,765 (12.56%)	36,060 (2.45%)	22,908 (1.56%)
South West	1,297,731	172,719 (13.31%)	31,322 (2.41%)	17,022 (1.31%)
North West	1,340,017	242,612 (18.11%)	41,896 (3.13%)	28,088 (2.10%)
London	1,135,714	199,537 (17.57%)	39,774 (3.50%)	22,773 (2.01%)
East of England	1,325,608	181,708 (13.71%)	43,392 (3.27%)	20,984 (1.58%)

GP practice level: Between 1st April 2021 and 31st March 2022, data from NHS Digital shows that the mean proportion of patients aged 65 and over with a frailty assessment carried out at GP practice level across England was 14.36%, ranging from 0% (in 45 practices) to 100% (in 7 practices).

The variation in the proportion of patients aged 65 and over coded with either moderate or severe frailty at GP practice level across England, between 1st April 2021 and 31st March 2022 is shown in Figure 1. This ranges from 0.00% to 64.11% of patients in a GP practice recorded with moderate frailty (England average 2.86%), and from 0.00% to 51.67% of patients recorded with severe frailty recorded in the last 12 months (England average 1.71%).

Figure 1: Proportion of patients aged 65 and over with either a moderate or severe frailty diagnosis recorded in 2021/22 (GP practice level across England)



The data presented in Table 5 and Figure 1 indicates that there is a wide variation at GP practice level in frailty assessments carried out, as well as with moderate and severe frailty coding across England. This suggests that there are inconsistencies with the number of frailty assessments undertaken and the assessment methodology applied at GP practice level with regard to making a frailty diagnosis as it is not

known whether recorded frailty was based on the eFI tool alone or whether further clinical validation had been used to confirm the frailty diagnosis.

It is likely that frailty diagnosis coding on patient records varies in accuracy and there is the possibility that batch coding has taken place in some cases. Demographic variances between GP practices are also likely to contribute to the variation in the number of frailty assessments undertaken and the prevalence of moderate and severe frailty. It should be noted that the GMS contract data is likely to under estimate frailty as the indicators are limited to patients aged 65 and over, and although frailty is more common in older people, it is not entirely age dependent.

Although values cannot be directly compared as the GMS contract data only presents the annual representation of frailty assessment, there are substantial differences in moderate and severe frailty levels from the GMS Contract data when compared to the Clegg et al.[1] study, which was undertaken to estimate frailty prevalence and validate the eFI tool. The Clegg study estimated that 3 – 4% of patients aged 65 and over were estimated to have severe frailty with an additional 12 – 16% in the same age group estimated to be moderately frail. The GMS contract data presented here suggests that people who are moderately frail appear currently to be considerably under-identified.

The issues described above will impact on the proportion of patients subsequently removed or included in QOF indicators where frailty stratification is used, inevitably resulting in variation in QOF achievement and the potential for under or overtreatment of patients, with implications for patient care and health inequalities.

Regional frailty case-finding tools

This section describes work undertaken within the North East and North Cumbria (NENC) to develop a case-finding tool to systematically identify a high risk population cohort that was likely to have undiagnosed frailty. The purpose of this tool was to create a patient cohort list for clinical review and secondary validation by GP practices in the NENC, and to assist practices to investigate and understand disparities between modelled and recorded frailty at practice level.

Frailty Case Finder Tool

The North of England Commissioning Support Unit (NECS) has developed a Frailty Case Finder to support GP practices across the NENC in the identification of patients who should be assessed for frailty. This was created based on similar criteria to a previously validated model, termed the Pathfields tool[6]. The criteria for inclusion in the Frailty Case Finder included all registered patients aged 65 years and over within a GP practice in NENC, and any of the following criteria:

- Palliative care requirement
- Dementia diagnosis
- Care home resident
- Housebound
- >90 years old

Patient data relating to the above criteria, in addition to existing frailty diagnosis codes on the patient records, was extracted from 95% of GP practices in NENC in May 2022. Patient data relating to care home residents was extracted from the Patient Demographic Service (April 2022) and linked to the extraction. To note that accuracy of this model relies on the robustness and consistency in clinical coding of the five frailty case finder criteria, and also that this approach may overestimate frailty as not all patients meeting these criteria will be frail.

NECS provided NCCID with aggregate data at NENC Clinical Commissioning Group (CCG) level relating to the number of patients identified as having an existing frailty diagnosis code, and those additionally estimated to be likely to have frailty based on the presence of at least one of the five criteria, outlined above, in the clinical record.

Comparison of frailty prevalence between coded and modelled estimates

Across the NENC area, 81,497 patients were identified in the Frailty Case Finder, meaning these patients had one or more of the five criteria described above, indicative of the presence of frailty. Nearly half of these patients (49.2%, n=40,063) did not have an existing frailty diagnosis code on their patient record. This suggests that on average, half of patients aged 65 and over within NENC who have at least one feature indicative of frailty, do not currently have a frailty diagnosis recorded (Table 6).

At CCG level, there is a wide range across the NENC CCGs in the proportion of patients identified within the Frailty Case Finder cohort without an existing frailty diagnosis recorded, ranging from 29.5% to 62.6% across the CCGs. For this analysis, the lower the proportion suggests a greater level of agreement between existing frailty diagnosis and the presence of at least one Frailty Case Finder criterion in the patient record.

When focusing on the three distinct frailty severity levels, only 17.6% of the 81,497 patients in the NENC identified in the Frailty Case Finder (i.e. with at least one frailty case finder criterion) had an existing severe frailty diagnosis code, and this ranged from 13.1% to 21.8% across the CCGs. For moderate frailty, 19.8% of patients in the NENC identified in the Case Finder had an existing moderate frailty diagnosis code, and this ranged from 12.9% to 26.8% across the CCGs. Finally, in terms of mild frailty, 13.5% of patients across the NENC from the Case Finder had an existing mild frailty diagnosis code, with a range of 6.2% to 21.9% across the CCGs (Table 6).

The data presented here suggests that across the NENC area there is wide variation between modelled estimates of frailty (based on the presence of one or more of the five criteria that predict frailty) and existing frailty diagnoses recorded (although it must be noted that this model is likely to overestimate the number of people with possible frailty). The data suggests that a large proportion of patients with predicted frailty do not have a current diagnosis of frailty (or do not have frailty based on a clinical review) and that frailty recording is not consistent.

This may have implications for QOF indicators that exclude or include patients based on frailty level as frailty may be underdiagnosed. As a result, consideration of the

impact of moderate and/or severe frailty exclusion in indicators where frailty is not consistently being recorded, is essential.

Table 6: Number of patients in the NENC area identified using the frailty case finder criteria, with and without an existing frailty diagnosis, by CCG

	Number of patients identified in the frailty case finder criteria	Number of patients with existing severe frailty diagnosis	% patients with existing severe frailty diagnosis	Number of patients with existing moderate frailty diagnosis	% patients with existing moderate frailty diagnosis	Number of patients with an existing mild frailty diagnosis	% patients with an existing mild frailty diagnosis	Overall number of patients without a frailty diagnosis	Overall % of patients without a frailty diagnosis	**Rank** (highest % without a frailty diagnosis 1st)
CCG - 1	7,150	1,310	18.3%	922	12.9%	443	6.2%	4,475	62.6%	1
CCG - 2	9,768	1,280	13.1%	1,674	17.1%	733	7.5%	6,081	62.3%	2
CCG - 3	17,264	3,088	17.9%	2,868	16.6%	1,649	9.6%	9,659	55.9%	3
CCG - 4	6,222	1,153	18.5%	1,304	21.0%	461	7.4%	3,304	53.1%	4
CCG - 5	4,276	593	13.9%	851	19.9%	757	17.7%	2,075	48.5%	5
CCG - 6	15,768	3,032	19.2%	3,029	19.2%	2,412	15.3%	7,295	46.3%	6
CCG - 7	12,149	1,943	16.0%	3,064	25.2%	2,596	21.4%	4,546	37.4%	7
CCG - 8	8,900	1,939	21.8%	2,385	26.8%	1,948	21.9%	2,628	29.5%	8
NENC	**81,497**	**14,338**	**17.6%**	**16,097**	**19.8%**	**10,999**	**13.5%**	**40,063**	**49.2%**	-

QOF achievement and PCA rates for indicators using age or frailty stratification

This section describes the 2021/22 QOF achievement and personalised care adjustment (PCA) rates for the ten QOF indicators described in Table 1 (four diabetes indicators) and Table 3 (six blood pressure-related indicators relating to the hypertension, CHD and stroke and TIA disease areas) where age or frailty stratification is currently used to try and address under or overtreatment.

QOF allows patients to be excluded from indicators using personalised care adjustments (PCAs). Patients can be excluded for several reasons including that they are new or newly diagnosed, the lack of available services locally, clinical unsuitability of intervention, patient choice and patient non-response to invitations.

Table 7 shows the 2021/22 QOF achievement for each of the ten indicators, presented as achievement net of PCAs (i.e. where patients are removed from the denominator with regard to QOF achievement), as the intervention rate (which covers all patients to whom the indicator applies), and the PCA rate (percentage of patients to whom the indicator applies with a PCA code present). The PCA codes that are most commonly used (and their frequency) are reported for each indicator (to note that it is possible for one patient to have multiple PCA codes recorded).

Key findings

In the diabetes indicators relating to HbA1c measurement (DM020 for patients without moderate or severe frailty, and DM021 for those with moderate or severe frailty), the intervention rate for 2021/22 is higher for DM021 (82.73% vs 57.14%) and the PCA rate is lower, compared to DM020 (Table 7). It is possible that unidentified frail (or complex) patients remain in the DM020 denominator and these are excepted using PCA coding.

Similar patterns (to a lesser extent) are present in QOF indicators that focus on blood pressure targets, stratified by age (Table 7). For example with HYP003 and HYP007, which stratify by patients aged 79 and under and 80 and over respectively, the intervention rate is higher in the indicators that focus on patients aged 80 and over, and the PCA rates are lower. The most common PCA codes include where the patient declined the invite to attend an appointment, registration or diagnosis within last 9 months and where the patient is on the maximum tolerated treatment.

Table 7: 2021/22 QOF achievement and PCA rates, England level

QOF Indicator	% Achievement net of PCAs	PCA rate	% patients receiving intervention	Summary of most commonly used PCA codes	% of all PCAs recorded
DM019 The percentage of patients with diabetes, on the register, without moderate or severe frailty in whom the last blood pressure reading (measured in the preceding 12 months) is 140/80 mmHg or less	61.70%	9.80%	55.65%	Review invite declined Diagnosis within last 9 months Registration date within last 9 months	32.90% 29.28% 14.47%
DM020 The percentage of patients with diabetes, on the register, without moderate or severe frailty in whom the last IFCC-HbA1c is 58 mmol/mol or less in the preceding 12 months	57.14%	10.38%	51.21%	Review invite declined Max tolerated treatment Diagnosis within last 9 months	28.47% 21.95% 17.53%
DM021 The percentage of patients with diabetes, on the register, with moderate or severe frailty in whom the last IFCC-HbA1c is 75 mmol/mol or less in the preceding 12 months	82.73%	4.81%	78.76%	Max tolerated treatment Review invite declined Registration date within last 9 months	30.23% 22.58% 20.07%
DM022 The percentage of patients with diabetes aged 40 years and over, with no history of cardiovascular disease and without moderate or severe frailty, who are currently treated with a statin (excluding patients with type 2 diabetes and a CVD risk score of less than 10% recorded in the preceding 3 years)	85.71%	17.53%	70.69%	Did not receive statin prescription* Review invite declined Expiring statin contraindication* **within the 12 months*	41.80% 18.69% 17.01%

QOF Indicator	% Achievement net of PCAs	PCA rate	% patients receiving intervention	Summary of most commonly used PCA codes	% of all PCAs recorded
HYP003 The percentage of patients aged 79 years or under with hypertension in whom the last blood pressure reading (measured in the preceding 12 months) is 140/90 mmHg or less	61.19%	6.51%	57.20%	Diagnosis within last 9 months Monitoring invite declined Registration date within last 9 months	36.70% 28.23% 18.07%
HYP007 The percentage of patients aged 80 years and over with hypertension in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less	74.57%	3.21%	72.17%	Registration date within last 9 months Monitoring invite declined Max tolerated treatment	28.83% 20.84% 18.39%
CHD008 The percentage of patients aged 79 years or under with coronary heart disease in whom the last blood pressure reading (measured in the preceding 12 months) is 140/90 mmHg or less	70.93%	5.21%	67.24%	Diagnosis within last 9 months Review invite declined Registration date within last 9 months	34.04% 22.08% 17.94%
CHD009 The percentage of patients aged 80 years and over with coronary heart disease in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less	79.87%	3.17%	77.33%	Registration date within last 9 months Max tolerated treatment Diagnosis within last 9 months	25.41% 18.00% 15.93%
STIA010 The percentage of patients aged 79 years or less with a history of stroke or TIA in whom the last blood pressure reading (measured in the preceding 12 months) is 140/90 mmHg or less	67.10%	6.72%	62.59%	Diagnosis within last 9 months Invite declined Registration date within last 9 months	40.52% 18.51% 18.22%
STIA011 The percentage of patients aged 80 years and over with a history of stroke or TIA in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less	78.61%	4.28%	75.24%	Diagnosis within last 9 months Registration date within last 9 months Max tolerated treatment	31.74% 24.12% 14.36%

QOF disease registers: patient profiles

As discussed previously in this paper, there are six disease areas which contain indicators which are stratified by age or frailty and are included in QOF (or are suitable for inclusion). These are detailed in Tables 1-3 of the paper and include:

- Diabetes
- CKD
- Hypertension
- CHD
- Stroke and TIA
- Peripheral arterial disease

In order to estimate the proportion of patients included in or excluded from specific QOF indicators due to age or frailty status and to understand the potential impact of this on the under and overtreatment of patients, a patient profile of each disease register (in terms of age and frailty severity) was created using local data from GP practices in the North East of England via a bespoke data extraction. This was a separate request to the data and findings described in Section 2 (Frailty Case Finder tool) above.

Analysis of record level data from GP practices in North East England

Data extraction

There were over 287,000 patients aged 18 years and over registered at one of the 31 participating GP practices from the North East of England (i.e. the NE sample). Data relating to these patients was extracted for NCCID by NECS in October 2022 once all appropriate governance and data sharing agreements were put in place.

Table 8 indicates how the NE sample compared to England in terms of list size and deprivation (based on GP practice level IMD2019 scores) across the 9 strata. There were considerably more ‘most deprived’ and ‘medium deprived’ small practices in the NE sample compared to nationally. There were notably fewer ‘least deprived’ practices in the NE sample, in particular fewer small practices. It is acknowledged that data collected from the NE sample may not be entirely representative of the general population.

Table 8: List size and deprivation for the NE sample compared to England

England	Least deprived	Medium deprivation	Most deprived	Total
Large	14%	11%	8%	**33%**
Medium	11%	11%	11%	**33%**
Small	8%	11%	14%	**33%**
Total	**33%**	**33%**	**33%**	**100%**

NE sample population (%, no. practices)	Least deprived	Medium deprivation	Most deprived	Total
Large	6.5%, 2	9.7%, 3	9.7%, 3	**25.8%, 8**
Medium	6.5%, 2	12.9%, 4	9.7%, 3	**29.0%, 9**
Small	3.2%, 1	22.6%, 7	19.4%, 6	**45.2%, 13**
Total	**16.1%, 5**	**45.2%, 14**	**38.7%, 12**	**100%, 31**

A set of clinical system queries was developed by NECS (based on a data specification produced by NCCID) to run in the participating 31 practices to produce a data extraction, which was based on SNOMED codes and was available at pseudonymised patient level. The latest code in the patient record (ever) was extracted. There were 19 practices using EMIS as their clinical system and 12 practices used TPP SystmOne.

The extraction included fields containing the following:

- Patient age (limited to those aged 18 years and over),
- Frailty codes (taken from the GMS PMS Core Contract Data Collection Business Rules for 2021/22) to indicate those with a frailty assessment done, latest eFI or other frailty tool value recorded, and those who were mild, moderate or severely frail,
- Disease codes (taken from the QOF Business Rules for 2021/22) indicating inclusion on the diabetes, hypertension, CHD, PAD, STIA and CKD disease registers.

GP practice codes where patients were registered were obtained in order to calculate the Index of Multiple deprivation (IMD) decile for each GP practice.

Frailty coding analysis

Analysis to try to determine the extent to which batch coding may have taken place in the data extraction was planned, using the clinical system dates associated with SNOMED codes relating to eFI values, frailty assessment done and diagnosis of frailty severity (at patient level). However, due to data quality issues with this part of the extraction, this analysis was not possible.

Disease prevalence (NE sample compared to England)

The prevalence of each disease relating to the NE sample (patients aged 18 years and over) was calculated using corresponding patient list sizes as published in the 2021/22 QOF. These were compared to the national QOF disease prevalence rates (Table 9). It should be noted that diabetes prevalence at England level is based on those aged 17 years and over*.

To also note that the data extraction represents a snapshot in time and disease prevalence calculated from the extract cannot be directly equated to the QOF register data for 2021/22 as patients who have died or moved from the GP practice since 1st April 2022 would not be included in the NE sample data extraction.

The prevalence of each of the six disease areas within the sample data are broadly similar to the prevalence presented at England level. Within the sample data, the prevalence of diabetes, STIA and CKD is slightly lower than the England prevalence as reported in QOF 2021/22, whereas prevalence of hypertension, CHD and PAD across the NE sample of GP practices are higher than the England average.

Table 9: Estimated prevalence of diseases from the NE sample population, compared to England as reported in the 2021/22 QOF

-	NE sample practices (31) Count	NE sample practices (31) Prevalence	England as reported in QOF Count	England as reported in QOF Prevalence
Diabetes*	16,086	6.95%	3,625,401	7.26%
Hypertension	41,685	14.97%	8,604,825	13.97%
CHD	10,124	3.64%	1,856,476	3.01%
PAD	2,155	0.77%	335,295	0.58%
STIA	3,890	1.40%	1,117,509	1.81%

-	NE sample practices (31) Count	NE sample practices (31) Prevalence	England as reported in QOF Count	England as reported in QOF Prevalence
CKD	8,895	3.84%	1,962,990	3.98%

Patient profiles at disease register level

Summary of NE sample population: patients on one or more disease register

Across the 31 practices in the NE sample, there were 54,905 patients who were identified as being on at least one of the disease registers of interest. Table 10 presents a summary of these patients, stratified by age and frailty diagnosis codes.

Overall, 44,191 (80.49%) patients were aged 79 years and under and 10,714 (19.51%) were aged 80 years or over. In total, 83.78% of patients in the NE sample and on at least one disease register had no frailty diagnosis, 5.78% had a moderate frailty diagnosis and 2.30% had a severe frailty diagnosis.

Of those in this patient cohort aged 79 years and under, 3.37% had moderate frailty and 0.99% had severe frailty, compared to those aged 80 years and over, where 15.73% of the cohort had moderate frailty and 7.70% had severe frailty.

Table 10: Number of patients from the 31 practices present on at least one disease register, stratified by age and frailty

Frailty diagnosis code	Total	No. aged 79 or under	No. aged 80 or over	Total %	% aged 79 or under	% aged 80 or over
No frailty code	45,997	39,620	6,377	83.78%	89.66%	59.52%
Mild frailty	4,471	2,644	1,827	8.14%	5.98%	17.05%
Moderate frailty	3,176	1,491	1,685	5.78%	3.37%	15.73%
Severe frailty	1,261	436	825	2.30%	0.99%	7.70%
Total	**54,905**	**44,191**	**10,714**	**-**	**80.49%**	**19.51%**

Disease register specific patient profiles

The number and percentage of patients on each of the six disease registers, stratified by both age and frailty level, is shown (Table 11). Patients could be present

on multiple disease registers. Patients with diabetes were further disaggregated into those with Type 1 and Type 2 (where clinical coding allowed).

This data provides an indication of the patient populations who could be at risk of under or overtreatment from the existing QOF/NICE menu indicators. To note, values presented here relating to frailty coding must be considered in terms of the potential issues described earlier in this paper such as batch coding, the extent of clinical verification of frailty, the level of GP practice engagement and data quality variation in clinical systems.

1. Diabetes profile

In total there were 16,086 patients with a diabetes diagnosis. Of these, 13,388 (83.23%) patients had a Type 2 diabetes diagnosis code, and 1,020 (6.34%) patients had a Type 1 diabetes diagnosis code. It was not possible to determine the type of diabetes for the remaining 1,678 (10.43%) of patients on the diabetes register.

Of the 16,086 patients with a diabetes diagnosis, 83.33% were aged 79 or under and 16.67% aged 80 and over. The majority of patients with diabetes had no frailty diagnosis (80.17%), with 8.62%, 7.88% and 3.34% of patients diagnosed with mild, moderate or severe frailty, respectively.

When stratified by both frailty and age, a greater proportion of patients aged 80 and over with diabetes had mild frailty (18.24%), moderate frailty (20.33%) and severe frailty (10.63%) compared with patients aged 79 and under (6.69%, 5.39% and 1.88%, respectively).

1.1 Diabetes patients at risk of under-treatment by existing diabetes indicators due to the exclusion of moderate frailty

In relation to the current QOF/NICE menu diabetes indicators that relate to all patients with diabetes and use frailty stratification (DM020/NM157, DM022/NM162 and DM019/NM159, updated to NM218), 7.88% of patients with diabetes and a moderate frailty diagnosis coded could be at risk of under-treatment by being excluded from these indicators.

With regard to the NICE menu indicators which relate specifically to patients with Type 2 diabetes (NM160, NM161), 8.34% of patients with Type 2 diabetes and moderate frailty could be at risk of under-treatment through exclusion from these indicators.

If indicators were available relating specifically to patients with Type 1 diabetes, 2.16% of patients with Type 1 diabetes and moderate frailty could be at risk of under-treatment by being excluded from the indicators.

1.2 Diabetes patients at risk of overtreatment by existing diabetes indicator DM019 (NM159) due to the absence of age stratification

In relation to the indicator DM019/NM159 (updated to NM218) that focuses on blood pressure targets in patients with diabetes, 1,851 (11.51%) patients with diabetes aged 80 and over with no frailty or a mild frailty diagnosis could be at risk of overtreatment by the existing diabetes indicator DM019/NM159 because the indicator does not use an age stratification (but those with moderate or severe frailty are already excluded).

If blood pressure indicators were developed relating specifically to diabetes type, excluding moderate or severely frail patients, the estimated extent of those at risk of overtreatment due to the absence of age stratification could be 12.13% of patients with Type 2 diabetes (aged 80 and over with no frailty or a mild frailty diagnosis) and 1.76% of patients with Type 1 diabetes (aged 80 and over with no frailty or a mild frailty diagnosis), data not shown. Due to relatively small patient numbers for Type 1 diabetes, age stratification is not shown in Table 11 (and to note that a potential indicator at this level of disaggregation may not be suitable for QOF).

2. Chronic kidney disease profile

There were 8,895 patients with a diagnosis of CKD. Of these, 54.90% were 79 or under and 45.10% were 80 and over. Overall, 1,041 (11.70%) patients with CKD had a moderate frailty diagnosis, and 584 (6.57%) patients with CKD had a severe frailty diagnosis. These represent the patient population who could be at risk of under-treatment in relation to the indicator NM217, as they are currently excluded from this indicator.

Patients at risk of overtreatment by existing indicators on blood pressure targets (4 disease areas) due to the absence of frailty stratification

3. Hypertension profile

In total, 41,685 patients had a diagnosis of hypertension. 79.44% were aged 79 and under and 20.56% were aged 80 and over. The majority of these patients had no frailty diagnosis (83.16%), 3,549 patients (8.51%) had mild frailty, 2,492 (5.98%) had moderate frailty, and 978 (2.35%) had severe frailty.

When stratified by age and frailty level, 16.13% of patients with hypertension aged 80 and over had a moderate frailty diagnosis and 7.67% had severe frailty. These patients could be at risk of overtreatment in relation to the indicator HYP007.

In addition, the 3.35% of patients aged 79 and under with moderate frailty and the 0.97% with severe frailty represent the patient population who could be at risk of overtreatment in relation to the indicator HYP003 as a result of no frailty stratification used alongside the existing age stratification.

4. Coronary heart disease profile

In total, 10,124 patients had a diagnosis of CHD. Of these, 7,093 (70.06%) were aged 79 and under and 3,031 (29.94%) were aged 80 and over. Across the frailty stratum, the majority of these patients had no frailty diagnosis (74.83%), 10.85% had mild frailty, 9.76% had moderate frailty and 4.56% had severe frailty.
When further stratified by both age and frailty, just over half of patients with a CHD diagnosis aged 80 and over had no frailty diagnosis, compared to over 80% of patients aged 79 and under.
Of the patients with CHD aged 79 and under, 6.06% and 2.42% of patients had a moderate or severe frailty diagnosis, respectively. These patients could be at risk of overtreatment in relation to the indicator CHD008, as a result of no frailty stratification used in addition to the age stratification already in place.
Of the patients with CHD aged 80 and over, 18.41% had a moderate frailty diagnosis and 9.57% had a severe frailty diagnosis. These patients could be at risk of overtreatment in relation to the indicator CHD009.

5. Peripheral arterial disease profile

Of the 2,155 patients with a diagnosis of PAD, 1,569 (72.81%) were aged 79 and under and 586 (27.19%) were aged 80 years and over. Overall, 70.90% of these patients had no frailty diagnosis, and similar proportions (just over 11.5%) had a mild or a moderate frailty diagnosis. In total, 123 (5.71%) patients with PAD had severe frailty.
In patients with a PAD diagnosis aged 79 and under, 8.16% had a moderate frailty diagnosis, and 3.00% had a severe frailty diagnosis. These represent the patients who could be at risk of overtreatment in relation to the indicator NM67, which focuses on blood pressure targets in patients aged 79 and under with PAD, as a result of no current frailty stratification.

In patients with a PAD diagnosis aged 80 years and over, 20.99% had a moderate frailty diagnosis, and 12.97% had a severe frailty diagnosis. These patients could be at risk of overtreatment in relation to the indicator NM193 as a result of no current frailty stratification.

6. Stroke and TIA profile

In the NE sample 3,890 had a diagnosis of STIA. In total, 67.30% were aged 79 and under and 32.70% were aged 80 and over. The majority of patients with STIA had no frailty diagnosis (71.90%), with 11.26%, 10.13% and 6.71% of these patients diagnosed with mild, moderate or severe frailty, respectively.

When stratified by both age and frailty level, 81.55% of patients with STIA aged 79 and under had no frailty diagnosed, compared with 52.04% of these patients aged 80 and over.

Of the 2,618 STIA patients aged 79 and under, 6.72% of patients had a moderate frailty diagnosis and 3.44% had a severe frailty diagnosis. These patients represent the patients who could be at risk of overtreatment in relation to the indicator STIA010 as a result of no current frailty stratification.

In patients aged 80 and over, 17.14% of patients with an STIA diagnosis also had a moderate frailty diagnosis, and 13.44% had a severe frailty diagnosis. These patients could be at risk of overtreatment in relation to the indicator STIA011 as a result of no current frailty stratification used.

Table 11: Estimated number of patients within each disease area, stratified by age and frailty level

	Total count	Total %	No frailty count	No frailty %	Mild frailty count	Mild frailty %	Moderate frailty count	Moderate frailty %	Severe frailty count	Severe frailty %
Diabetes (all)	**16,086**	**-**	12,896	80.17%	1,386	8.62%	1,267	7.88%	537	3.34%
79 years and under	13,405	**83.33%**	11,534	86.04%	897	6.69%	722	5.39%	252	1.88%
80 years and over	2,681	**16.67%**	1,362	50.80%	489	18.24%	545	20.33%	285	10.63%
Type 1 only (all)	1,020		967	94.80%	21	2.06%	22	2.16%	10	0.98%
Type 2 only	13,388		10,593	79.12%	1,204	8.99%	1,116	8.34%	475	3.55%
79 years and under	11,008	82.22%	9,396	85.36%	777	7.06%	618	5.61%	217	1.97%
80 years and over	2,380	17.78%	1,197	50.29%	427	17.94%	498	20.92%	258	10.84%
Hypertension	**41,685**	**-**	34,666	83.16%	3,549	8.51%	2,492	5.98%	978	2.35%
79 years and under	33,115	**79.44%**	29,636	89.49%	2,048	6.18%	1,110	3.35%	321	0.97%
80 years and over	8,570	**20.56%**	5,030	58.69%	1,501	17.51%	1,382	16.13%	657	7.67%
Coronary heart disease	**10,124**	**-**	7,576	74.83%	1,098	10.85%	988	9.76%	462	4.56%
79 years and under	7,093	**70.06%**	5,907	83.28%	584	8.23%	430	6.06%	172	2.42%
80 years and over	3,031	**29.94%**	1,669	55.06%	514	16.96%	558	18.41%	290	9.57%
Peripheral arterial disease	**2,155**	**-**	1,528	70.90%	253	11.74%	251	11.65%	123	5.71%
79 years and under	1,569	**72.81%**	1,236	78.78%	158	10.07%	128	8.16%	47	3.00%
80 years and over	586	**27.19%**	292	49.83%	95	16.21%	123	20.99%	76	12.97%

	Total count	Total %	No frailty count	No frailty %	Mild frailty count	Mild frailty %	Moderate frailty count	Moderate frailty %	Severe frailty count	Severe frailty %
Stroke/TIA	**3,890**	**-**	2,797	71.90%	438	11.26%	394	10.13%	261	6.71%
79 years and under	2,618	**67.30%**	2,135	81.55%	217	8.29%	176	6.72%	90	3.44%
80 years and over	1,272	**32.70%**	662	52.04%	221	17.37%	218	17.14%	171	13.44%
Chronic kidney disease	**8,895**	**-**	6,022	67.70%	1,248	14.03%	1,041	11.70%	584	6.57%
79 years and under	4,883	**54.90%**	3,847	78.78%	519	10.63%	350	7.17%	167	3.42%
80 years and over	4,012	**45.10%**	2,175	54.21%	729	18.17%	691	17.22%	417	10.39%

Conclusions and recommendations

Patients with frailty are an important and vulnerable group, and given the ageing population, numbers are likely to grow. This paper examines the scale of under or overtreatment relating to QOF/NICE menu indicators which include age or frailty stratification.

Data presented within this paper highlights several key points that should be considered when determining whether to stratify patients based on frailty severity for QOF/NICE indicators, which are:

- The extent of quality of coding of frailty in clinical systems. Several factors that impact on the quality of frailty coding have been highlighted in this paper, including the unknown extent of batch coding, the potential disparity between frailty identification based on a segmentation tool and the clinical validation stage, and irrelevant (resolved) codes for deficits remaining in patient health records.

- The potential of under identification of patients with moderate or severe frailty highlighted based on the modelled data from NENC presented within this paper.

- The wide variation at GP practice level in frailty assessments carried out and moderate and severe frailty coding highlight inconsistencies in frailty identification and GP engagement across the country. These factors are likely to contribute to reduced quality of frailty coding in clinical practice and exacerbate variation nationally, which have subsequent implications on patient care, including under or overtreatment, as well as affecting QOF reimbursement. To note that data reporting the total number of patients aged 65 years and over with a frailty assessment done (ever) and the prevalence of frailty (moderate and severe) is not currently available.

Taking into account the key points above, the patient populations who could be at risk of under or overtreatment should be considered. For current diabetes and CKD indicators that currently exclude moderate and severe frailty patients, approximately 7.9 – 11.7% of patients with moderate frailty (and potentially still eligible for treatment) could be at risk of under-treatment. In addition, over 11.5% of patients could be at risk of overtreatment (due to inappropriate interventions) in relation to the diabetes QOF indicator DM019/NM159 due to no age stratification.

Regarding the four disease areas containing indicators relating to blood pressure targets (CHD, hypertension, PAD and STIA), the population aged 79 years and under and severely frail who could be at risk of overtreatment ranges from 0.97% to 3.44%. In patients aged 80 and over with severe frailty, the potential risk of overtreatment ranges from 7.67% to 13.44%.

In patients aged 79 years and under and moderately frail, the population who could be at risk of overtreatment for blood pressure due to the lack of frailty stratification ranges from 3.35% to 8.16%. The risk of potential overtreatment is greater in patients aged 80 and over, ranging from 16.13% to 20.99% of patients who have moderate frailty.

The issues highlighted throughout this paper demonstrate the ongoing importance of clinical judgement and personalised care adjustments based on shared decision making, rather than clinician over-reliance on the eFI or other population segmentation tools in isolation. Further work is required to improve frailty diagnosis and coding to enable quality of care for the patient populations included within this paper to avoid under or overtreatment.

The data presented within this paper should be considered along with the additional paper produced by NICE, which reports on the clinical validity of excluding/including people with moderate frailty.

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