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Cohort profile: The SAIL long-term conditions e-cohort (SLTC cohort) investigating area-level changes in healthcare resource use in Wales

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Abstract

Introduction

The prioritisation of acute cases of coronavirus during the pandemic caused significant disruption to non-urgent healthcare services, creating a backlog of undiagnosed and untreated individuals with long-term conditions. Previous research has explored the impact of the pandemic on long-term conditions in Wales, but not the geographic variation or underlying area-level characteristics associated with these changes.

Objectives

We created the SAIL long-term conditions e-cohort (SLTC cohort) within the Secure Anonymised Information Linkage (SAIL) Databank to describe changes in healthcare service use of individuals living with long-term conditions during the COVID-19 pandemic, and to facilitate future investigations into the underlying reasons for these changes.

Methods

Individuals were included in the cohort if they interacted with health services with a long-term condition between January 2017 and December 2022. Interactions were identified using primary and secondary care datasets within the SAIL Databank. We linked this interaction level data with individual, residence, and area-level demographic data. We calculated area-level age-sex-standardised rates of interactions, based on an individual's address at the time of interaction, for the 3 years pre-COVID-19 (2017-2019) and during-COVID-19 (2020-2022). Percentage changes in rates between these time periods were calculated, and we investigated the underlying area-level characteristics associated with these differences.

Results

The SLTC cohort contains 1,277,532 individuals. Age-sex standardised interaction rates varied by Welsh Index of Multiple Deprivation (WIMD) quintiles and Rural-Urban Classification. Areas in the most deprived WIMD quintile had the greatest median percentage decrease (23.5%) in primary care rates of interactions from pre- to during-COVID-19, and the least deprived overall WIMD quintile had the smallest (16.9%). Areas classified as 'Urban city & town in a sparse setting' had the greatest decrease in primary care interactions (29.7%), and 'Rural village' areas had the smallest decrease (17.1%). Secondary care rates of interactions showed less variation in rates of interactions between the two time periods.

Conclusion

We have created a cohort that links area-level characteristics and measures of healthcare resource use, in a study period that covers pre- and during-COVID-19, which will allow researchers to investigate geographic variation of changes in healthcare resource use over this time period and the underlying influences. This cohort can also be further linked to other area-level characteristics of interest, such as travel times to general practices, or access to green space measures.

Keywords

long-term conditions; healthcare utilisation; COVID-19; data linkage; geographic variation

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Introduction

The COVID-19 pandemic caused worldwide disruption to healthcare services. While demand for healthcare surged amid pressures to treat acute cases of the virus, research has shown that attendances to general practices, hospitals and accident and emergency departments for non-COVID-19 related healthcare decreased during the COVID-19 pandemic [1, 2]. In Wales, the first case of COVID-19 was reported on 28th February 2020, leading to significant changes in healthcare delivery. Diagnosis rates of long-term conditions decreased in 2020 and 2021 compared to previous years in Wales [3] creating a potential backlog of patients living with undiagnosed, and therefore unmanaged, conditions. It has been estimated that a typical general practice – where long-term conditions are usually diagnosed and managed – serving a population of 10,000 patients may have over 400 undiagnosed long-term conditions [3].

This backlog of undiagnosed and untreated patients was reflected worldwide, with millions of people left with delayed or postponed treatments and procedures, while services were directed towards tackling COVID-19 related illnesses [4, 5].

This is a concern for individuals' worsening prognoses and subsequent presentations to healthcare settings with more severe conditions which are harder to manage and treat effectively. Delayed diagnosis not only impacts an individual's quality of life and health outcomes but also places greater strain on secondary healthcare services, as patients are more likely to require emergency or specialised care. These challenges can lead to increased healthcare costs and exacerbate pressures on already stretched systems. In order to direct resources effectively, understanding where services were most impacted can help inform strategies to target support for the worst hit communities.

The SAIL long-term conditions e-cohort (SLTC cohort) was set up to investigate how the COVID-19 pandemic impacted non-COVID-19 healthcare service use and provision in Wales, UK, with a particular focus on how this varies at the local community level. We have used Electronic Healthcare Records (EHRs), linked to residence and area-level data to create a cohort of individuals with long-term conditions, along with the characteristics of the areas in which they live. This will allow us to identify 'hot' and 'cold' spots of healthcare resource utilisation across Wales, comparing pre- and during-COVID-19 rates of healthcare service interactions. This cohort will then facilitate investigations into which communities and subgroups of the population were at the highest risk of the indirect negative effects of COVID-19. In subsequent work, we will use the cohort to examine the underlying individual, environmental, residential, and area-level characteristics associated with the greatest impact on healthcare services.

Our research, using the SLTC cohort, will provide evidence on where policies, interventions and resources could be targeted, to address the 'undiagnosed' populations of Wales, or to identify areas where long-term conditions are more prevalent.

Methods

Data sources/datasets

The cohort was created using data accessed and analysed within the Secure Anonymised Information Linkage (SAIL) Databank (www.saildatabank.com) [6–8]. The SAIL Databank is a trusted research environment, containing anonymised individual level EHRs from primary and secondary care healthcare settings, as well as demographic data, birth, and death data, among other datasets for the entire resident population of Wales over time.

The Welsh Longitudinal General Practice (WLGP) dataset [9] and the Patient Episode Database for Wales (PEDW) dataset [9] were used to identify diagnoses of long-term conditions. These contain patient records from primary care (attendances and clinical information from General Practices (GPs)) and secondary care (hospital admissions, day case activity) health services respectively. The WLGP dataset covers 86.1% of the population and 82.4% of GP practices in Wales and records are coded using Read v2 codes. The PEDW dataset contains all inpatient and day case activity undertaken in the National Health Service (NHS) Wales, and records are coded using the International Classification of Diseases version 10 (ICD-10). PEDW contains information on patients treated by the NHS, including where treatment occurs in private care facilities but is funded through the NHS. However it does not contain information on privately funded treatments in private hospitals.

The Welsh Demographic Service Dataset (WDSD) which contains information on all individuals registered to a Welsh GP [9] was used to obtain individual-level demographic data. EHRs were linked to the WDSD using Anonymised Linking Fields (ALFs).

The WDSD also contains details of residential address history. Individual addresses are replaced with a Residential Anonymous Linking Field (RALF) [10, 11], that allows for further linkage to geospatial characteristics at the household level.

RALFs are mapped to Lower Layer Super Output Areas (LSOAs) [12] which are small area statistical geographies and comprise between 400 and 1200 households and have a resident population between 1000 and 3000 persons.

The Welsh Index of Multiple Deprivation (WIMD) is the Welsh Government's official measure of relative deprivation for small areas in Wales [13]. It contains measures across the following domains: Income, Employment, Health, Education, Access to Services, Community Safety, Physical Environment, and Housing. Each of the 1909 LSOA's in Wales has domain-specific measures of deprivation and are then ranked from 1 (most deprived) to 1909 (least deprived) within each domain, and across overall deprivation. They can be further grouped into deciles and quintiles.

The Rural/Urban Classification is the UK Government's categorisation of geographic areas by population density, subdivided into six settlement types; Urban city and town, Urban city and town in a sparse setting, Rural town and fringe, Rural town and fringe in a sparse setting, Rural village and dispersed, Rural village and dispersed in a sparse setting [14].

The matching process and assignment of unique ALFs to person-based records has been previously reported [8], demonstrating high quality and enabling accurate linkage.

Study population

The SLTC cohort is population level containing all individuals living in Wales and diagnosed with at least one of 17 long-term conditions any time up until December 2022, and a long-term condition related interaction with healthcare services between January 2017 and December 2022. These interactions could be the initial diagnosis of the long-term condition, or a subsequent interaction with health services where the long-term condition was recorded.

The time periods were selected based on data completeness and availability. The pre- and during-COVID-19 periods were designed to be of equal length to allow for comparisons. The entirety of 2020 was included in the during-COVID-19 period to account for potential behavioural and service utilisations changes prompted by awareness of the pandemic, prior to the first confirmed case in Wales.

The long-term conditions were defined using the general practice 'Quality and Outcomes Framework' [15]. The selection of conditions was informed by collaboration with NHS clinical colleagues to ensure a focus on conditions that are generally managed rather than cured, and to ensure high data quality. Records of interactions were extracted from routinely collected EHRs from the NHS, UK.

The long-term conditions included were: anxiety disorders, asthma, atrial fibrillation, coronary heart disease, chronic kidney disease, chronic obstructive pulmonary disease, dementia, depression, diabetes mellitus, epilepsy, heart failure, hypertension, inflammatory bowel disease, osteoporosis, peripheral vascular disease, rheumatoid arthritis, and stroke and transient ischaemic attack.

Variables

Individual health records for primary care were extracted from WLGP where the Read code matched with a Read code for long-term conditions. We extracted all records recorded between 1st January 2017 and 31st December 2022. Multiple records for an individual (indicated by variable ALF) were retained. Records related to the same long-term condition with the same event date were counted as a single interaction with primary care. The list of Read codes used to define long-term conditions can be found in Supplementary Appendix 1.

Individual health records for secondary care were extracted from PEDW where the ICD-10 code matched with an ICD-10 code for long-term conditions. We extracted all records where the hospital spell had a start date between 1st January 2017 and 31st December 2022. Multiple records for an individual (indicated by variable ALF) were retained. Records related to the same long-term condition and the same hospital spell were counted as a single interaction with secondary care. The list of ICD-10 codes used to define long-term conditions can be found in Supplementary Appendix 1.

The WDSD contains variables shown in Table 1. The variables Anonymised Linking Field (ALF), Address Start Date, and Address End Date were used for data linkage with interaction level data. Individuals were linked to an address

based on the date of interaction with healthcare services falling between the address start date and address end date in WDSD. LSOA Codes were used for data linkage with area-level characteristic datasets. The WIMD dataset was used to extract area-level measures of deprivation for the cohort including: access to services and physical environment domains, as well as overall deprivation. Linkage to Office for National Statistics Rural Urban Classification data enabled area-level grouping of the cohort by rural-urban classes.

Linkage to individual level demographic data provided further information on individuals and allowed us to carry out exclusions of invalid records.

We calculated rates of healthcare interactions – age-sex standardised using the Welsh standard population (see Supplementary Appendix 2) – per 100 000 persons, for every LSOA in Wales, from 2017-2019 and 2020-2022.

We used these to calculate the percentage change in rates pre- and during-COVID-19, to identify which areas of Wales were most affected by the COVID-19 pandemic in terms of healthcare service use.

We further linked these area-level counts and rates to area-level socio-demographic and environmental datasets to understand which factors were associated with variation in the pre-during-COVID-19 changes between small areas across Wales. Median changes in age-sex standardised rates were also summarised by WIMD quintiles and Rural-Urban classifications to explore how healthcare utilisation changes varied across communities with different characteristics.

Analyses were performed using R 4.1.3, with the *dsr* package used to compute standardised rates.

Exclusions

The following exclusions were applied for individuals within the SLTC cohort:

- Non-Welsh address at the time of interaction (Already excluded as unable to link to WDSD data).
- Interactions occurring before week of birth.
- Interactions occurring after date of death.
- Anonymised linking field status not valid.
- Sex missing, or unknown.

Patient and public involvement

Public involvement was incorporated through the SAIL Consumer Panel. The panel provided insights into healthcare access during the COVID-19 pandemic, identifying long-term conditions as a priority for research, and highlighting regional differences in healthcare service access and use across Wales.

Results

Records relating to 1 375 055 persons were extracted from the data, 97 501 individuals could not be linked to the WDSD, and were excluded resulting in 92.9% of individuals as linkable to individual and area-level demographic level data. A further 22 individuals were excluded as shown in Figure 1.

We linked the remaining person level EHRs with individual and area-level demographic data.

Table 1: SLTC Cohort linked datasets, variables included at both individual level and area-level

Dataset	Variables	Individual/area-level
Welsh Longitudinal General Practice	Anonymised Linking Field (ALF)	Individual
	Event Date	Individual
	Read Code	Individual
	Anonymised Linking Field Status Code	Individual
Patient Episode Database for Wales	Anonymised Linking Field (ALF)	Individual
	Spell Start Date	Individual
	Spell End Date	Individual
	ICD-10 Code	Individual
	Anonymised Linking Field Status Code	Individual
Welsh Demographic Service Dataset	Anonymised Linking Field (ALF)	Individual
	Address Start Date	Individual
	Address End Date	Individual
	Residential Anonymised Linking Field (RALF)	Individual
	LSOA Code	Individual
	Week of Birth	Individual
	Date of Death	Individual
	Sex	Individual
Welsh Index of Multiple Deprivation	Lower Layer Super Output Area (LSOA) Code	Area
	WIMD Quintile	Area
	Access to Services Quintile	Area
	Physical Environment Quintile	Area
	Average travel time to pharmacy	Area
	Average travel time to GP	Area
	Proximity to accessible natural green space score	Area
	Ambient green space score	Area
Rural-Urban Classification	Lower Layer Super Output Area (LSOA) Code	Area
	Rural-Urban Classification	Area
Office for National Statistics Population Estimates	Year	Area
	Mid-year Population Estimates	Area

The final number of individuals in the SLTC cohort was 1 277 532, of these 463 218 individuals entered the cohort in the first year, then 262 485 in 2018, 197 658 in 2019, 117 406 in 2020, 118 755 in 2021, and 118 010 in 2022.

The numbers of individuals at each stage are shown in Figure 1.

A total of 7 502 485 interactions with healthcare services in Wales with a record of a long-term condition between January 2017 and December 2022 were identified.

Within the SLTC cohort, 74.1% (946 679) of individuals had at least one primary care interaction, with 2 555 732 primary care interactions in total. For secondary care, 59.5% (760 704) of individuals had at least one interaction, with 4 946 753 secondary care interactions in total.

More than half of the cohort (55.1%) had interactions relating to more than one long-term condition in the 6-year timeframe. In total, 175 798 individuals in the cohort died between January 2017 and December 2022.

Across the 6 years of coverage, the most deprived areas had the greatest number of individuals with long-term conditions who interacted with healthcare services, followed by the 2nd most deprived, 3rd most deprived, 4th most deprived, then the least deprived quintile (see Table 2).

We calculated age-sex standardised rates of interactions recorded between 2017-2019 (pre-COVID-19) and between 2020-2022 (during-COVID-19) for each LSOA and compared the differences between pre- and during-COVID-19 rates by quintiles of overall WIMD, and the domain specific indicators Access to Services, and Physical Environment (Table 3a), which were selected due to their relevance to area-level factors such as access to healthcare services, proximity to green spaces, and levels of air pollution. We also compared the differences between pre- and during-COVID-19 age-sex standardised rates by Rural-Urban groups.

Both primary care and secondary care interactions decreased during-COVID-19 across all deprivation quintiles. The most deprived overall WIMD quintile had the greatest median percentage decrease (23.5%) in primary care rates of interactions from pre- to during-COVID-19, and the least deprived overall WIMD quintile had the smallest median percentage decrease (16.9%). The pattern of decreases in primary care interactions across the Access to Services domain quintiles was not linearly correlated with deprivation (from 20.6% in the 2nd most deprived and 22.3% in the 3rd most deprived). There was less variation in the percentage change of secondary care age-sex standardised

Figure 1: Cohort inclusion flow diagram

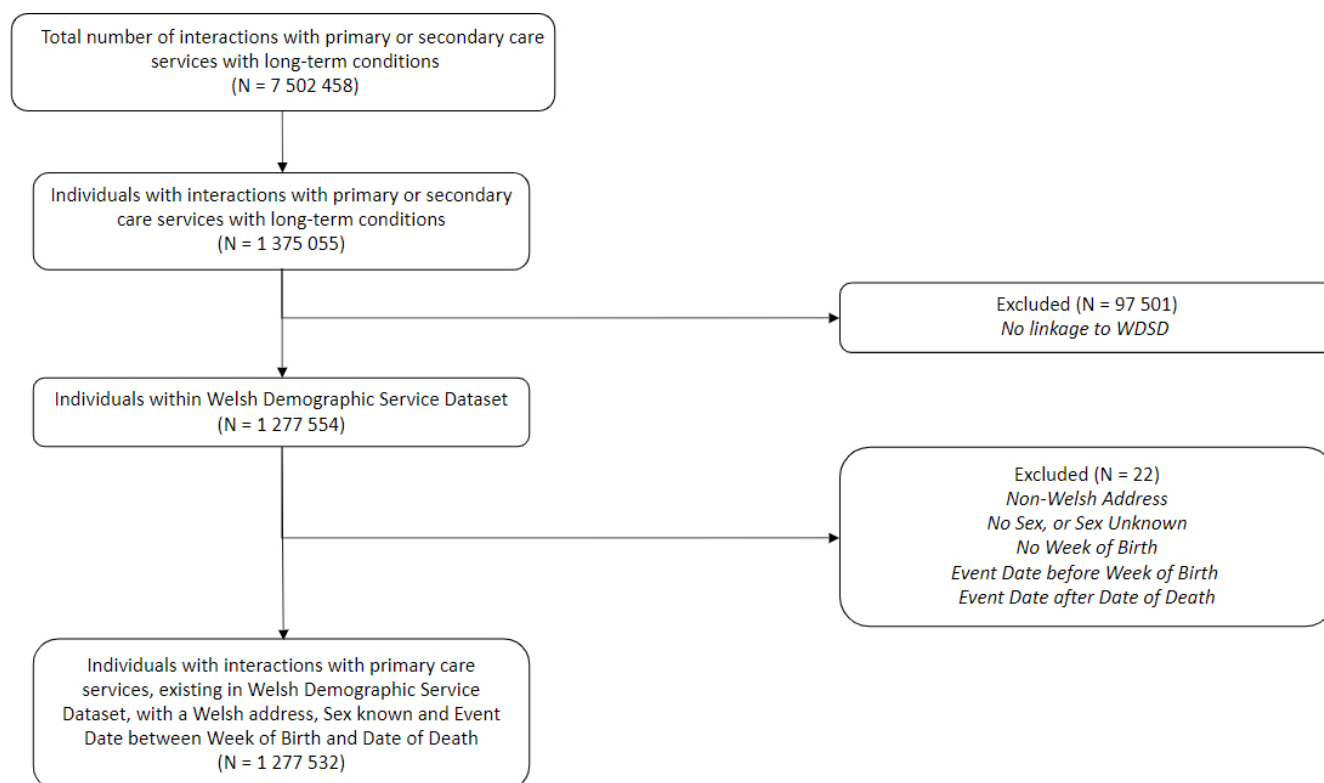


Table 2: Number of distinct individuals by WIMD deprivation quintile and Rural-Urban Classification with a long-term condition health service interaction by year of interaction

	Year					
	2017	2018	2019	2020	2021	2022
WIMD Quintile						
1 (most deprived)	104 794	106 010	106 747	80 719	85 633	92 542
2	97 808	98 738	100 624	75 457	81 143	90 045
3	92 021	92 544	93 278	70 199	76 980	85 517
4	89 406	90 068	91 083	69 537	76 318	83 619
5 (least deprived)	84 029	85 058	86 130	67 647	73 893	80 546
Rural-Urban Classification						
Urban city and town	315 749	319 592	323 174	247 746	265 077	290 578
Urban city and town in a sparse setting	9714	9755	9836	7546	8029	8675
Rural town and fringe	62 705	63 052	63 433	48 094	53 722	58 658
Rural town and fringe in a sparse setting	17 053	17 259	17 420	12 916	14 041	15 609
Rural village and dispersed	27 458	27 827	28 534	21 540	24 091	26 308
Rural village and dispersed in a sparse setting	32 403	32 147	32 807	24 236	26 930	30 297
Total	463 218	467 762	473 525	360 916	390 411	428 572

Note: Yearly counts per WIMD Quintile/Rural-Urban Classification will not sum to total yearly counts, as individuals who moved between WIMD quintiles/Rural-Urban Classifications within a year and had interactions with healthcare services in each are counted more than once.

rates, across the WIMD quintiles (between 10.9% and 14.3% decrease).

Areas classified as 'Urban city & town in a sparse setting' had the greatest decrease in primary care interactions

(29.7%) in the during-COVID-19 period compared to the pre-COVID-19 period, and 'Rural village' areas had the smallest decrease (17.1%). However, the 'Urban city & town in a sparse setting' group had the smallest decrease in secondary

Table 3: Median Percentage difference in age-sex standardised rates of primary and secondary care interactions from 2017-2019 to 2020-2022 by a) WIMD quintiles (Overall, Access to Services, and Physical Environment) - 1(most deprived) to 5(least deprived) and b) Rural-Urban Classification

(a)

WIMD Domain	Quintile	Median percentage difference age-sex standardised rates (pre to during-COVID-19) (%)	
		Primary care	Secondary care
Overall	1	-23.5	-12.3
	2	-21.7	-13.4
	3	-22.4	-13.5
	4	-20.6	-12.6
	5	-16.9	-11.2
Access to Services	1	-20.8	-12.8
	2	-20.6	-13.2
	3	-22.3	-13.5
	4	-20.7	-11.3
	5	-22.3	-12.8
Physical Environment	1	-24.1	-10.9
	2	-20.6	-12.2
	3	-21.7	-14.3
	4	-19.6	-13.6
	5	-20.9	-11.3

(b)

Rural-Urban Classification	Median percentage difference age-sex standardised rates (pre to during-COVID-19) (%)	
	Primary care	Secondary care
Urban city & town	-20.5	-11.5
Urban city & town in a sparse setting	-29.7	-8.4
Rural town and fringe	-22.6	-14.4
Rural town and fringe in a sparse setting	-28.6	-18.1
Rural village	-17.1	-11.4
Rural village in a sparse setting	-24.7	-15.0

care age-sex standardised rates of interactions (8.4%), and the 'Rural town and fringe in a sparse setting' group had the greatest decrease (18.1%). Changes in primary and secondary care age-sex standardised rates by Rural-Urban Classification are shown in Table 3B and visualised in Figure 2.

Discussion

We have created the SLTC cohort to: enable quantification of the variation in non-COVID-19 healthcare resource use geographically across Wales; identify the areas of Wales that experienced the greatest changes; and, facilitate understanding the underlying reasons.

We have found the biggest changes in primary care interactions occurred within the most deprived WIMD quintile and areas classified as 'Urban city & town in a sparse setting', while the biggest changes in secondary care interactions occurred within areas classified as 'Rural town and fringe in a sparse setting', but there was less variation between WIMD deprivation quintiles.

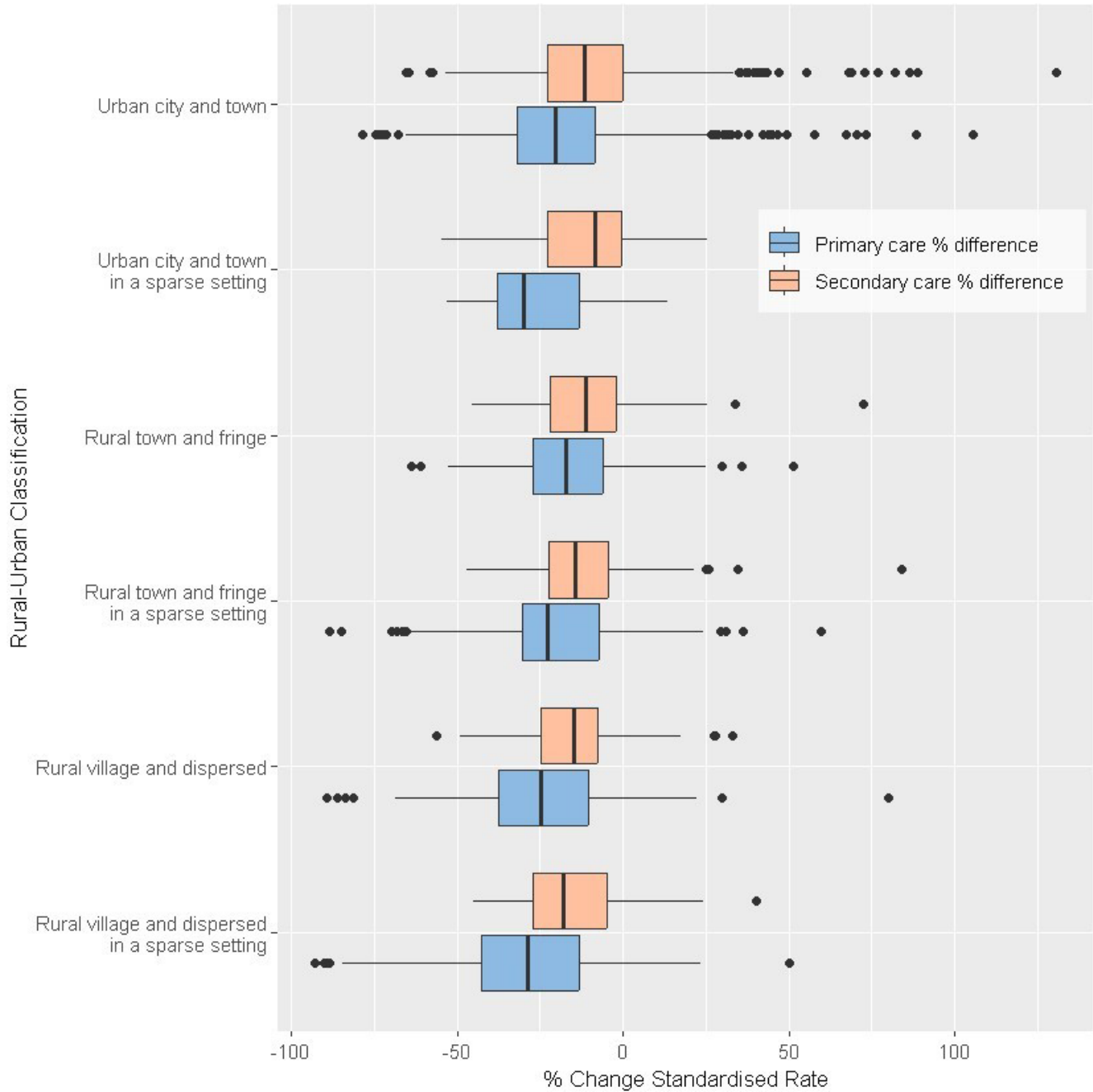
The results of this study build on the work of Moynihan et al [16], who conducted a systematic review on the impact of the COVID-19 pandemic on healthcare utilisation. While

their review highlighted trends in healthcare service utilisation, this study and cohort contribute to the existing literature by addressing a key gap, examining area-level changes in healthcare use and considering the underlying characteristics of the areas most affected. For example, we found that "Urban city & town in a sparse setting" areas experienced the greatest decrease in primary care interactions but the smallest decrease in secondary care interactions, indicating a potential shift in healthcare service utilisation from primary to secondary care. This shift is concerning, as ideally long-term conditions are mostly treated and managed in primary care. The observation that areas in the most deprived WIMD quintile experienced the greatest reduction in primary care interactions highlights a potentially disproportionate impact on these services for the most deprived populations in Wales.

In contrast to the study by Qi et al [3] which focused on diagnosis rates and found limited differences across deprivation levels, this study examined both initial diagnoses and ongoing management. While deprivation may not have significantly impacted the initial diagnosis of long-term conditions, it is likely to have influenced access to follow-up care.

These findings have implications for ongoing healthcare catch-up initiatives and provide useful insight for preparedness for potential future health crises, emphasising the importance

Figure 2: Primary and secondary care % change in age-sex standardised rates by Rural-Urban Classification



of ensuring equitable access to primary care services during times of disruption.

Future work will use the SLTC cohort to apply spatial auto-correlation methods and identify clustering of similar values of age-sex standardised rates. Geospatial analyses will enable a better understanding of the local relationships between area-level socio-demographic and environmental factors (such as distances to general practices, proximity to greenspace, Enhanced Vegetation Index (EVI)) and various healthcare resource use outcome measures. We aim to investigate which area-level characteristics had the greatest impact on the effects of the pandemic on healthcare service use. There is also potential for the cohort to be used to investigate condition-specific changes in healthcare-service use, to explore whether individuals with

specific conditions were disproportionately impacted by the pandemic.

Strengths and limitations

The main strength of the SLTC cohort is the use of longitudinal nationwide healthcare interaction records, demographic and area-level characteristic data with population-scale coverage in Wales. The use of anonymised linked datasets within SAIL Databank, a secure repository of large-scale datasets regarding the population of Wales, allows us to consider the geospatial characteristics associated with variation in healthcare resource use at a small area-level.

A further strength is the investigation of both primary care and secondary care interactions, which will help us to

understand how individuals living in different parts of Wales have changed which services they use more or less frequently during-COVID-19.

This cohort has complete population coverage for secondary care and demographic records, while primary care records cover 86.1% of the population. This provides a more representative sample of the population of Wales compared to other types of cohorts, so studies using the SLTC can inform public health strategies aimed at improving the health of the whole population, and relieve pressures on the National Health Service.

This study included healthcare interactions for individuals diagnosed with a broad range of long-term conditions. These conditions defined using the Quality and Outcomes Framework criteria were selected for comparison with previous work [3] investigating temporal trends in diagnosis rates. A limitation of using these selected conditions is that the variation in healthcare use across areas may not be representative of other healthcare conditions (e.g. cancer).

The data used to create the SLTC cohort is routinely recorded administrative data and while it is highly valuable, it does not fully capture human behaviour. We therefore cannot account for individuals' decisions not to attend primary care appointments or go to hospital for emergency or planned treatment nor understand the reasons why. As the study period of the SLTC cohort spans the peak of the COVID-19 pandemic, there may be further underlying reasons – such as fear of contracting the virus - why individuals may have avoided using healthcare services, and therefore not appear in routine data. It doesn't necessarily imply the services were not available to them.

We are currently limited to statistical geographies when creating small area estimates of clustering. In rural areas where the statistical geographies are larger, we may not be able to detect intra-small area variations in disease distribution. Area-level measures of deprivation are used to make inferences about individuals' socio-economic status, which would inevitably vary within small areas. This ecological fallacy of area-level characteristics limits the conclusions that can be drawn at an individual level; however, the purpose of this study is to help direct scarce resources to the area's most in need rather than identify individual persons most affected.

A limitation of this study is that it does not account for the effects of specific lockdown periods on healthcare utilisation. This decision reflects the study's primary focus on overall changes in service use patterns across pre- and during-COVID-19 periods, rather than a time-series analysis. Future studies could utilise this cohort to explore these temporal trends and underlying causes in greater detail.

Data availability statement

Anonymised individual-level data was extracted and linked within the SAIL Databank. Aggregated outcome data was requested out of the secure e-research platform and linked to area-level datasets.

Applications to access data within the SAIL Databank can be submitted here <https://saildatabank.com/data/apply-to-work-with-the-data/>, and will be reviewed by an independent Information Governance Review Panel.

Conflict of interest

None declared.

Ethics statement

This research was conducted within the Secure Anonymised Information Linkage (SAIL) Databank, with the permission and approval of the SAIL Independent Information Governance Review Panel (IGRP) project number 1542.

The cohort was created using anonymised data within the SAIL Databank, which is exempt from requiring individual patient consent.

Acknowledgements

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References

1. Carr A, Smith JA, Camaradou J, Prieto-Alhambra D. Growing backlog of planned surgery due to covid-19. *BMJ*. 2021 Feb 9;372(8280):n339. <https://doi.org/10.1136/bmj.n339>
2. Macdonald N, Clements C, Sobti A, Rossiter D, Unnithan A, Bosanquet N. Tackling the Elective Case Backlog Generated by Covid-19: the Scale of the Problem and Solutions. *Journal of Public Health*. 2020 Sep 15;42(4). <https://doi.org/10.1093/pubmed/fdaa155>
3. Qi C, Osborne T, Bailey R, Cooper A, Hollinghurst J, Akbari A, et al. Impact of COVID-19 pandemic on incidence of long-term conditions in Wales: a population data linkage study using primary and secondary care health records. *British Journal of General Practice*. 2023 Jan 23;73(730):e332–9. <https://doi.org/10.3399/bjgp.2022.0353>
4. World Health Organization (WHO). Addressing backlogs and managing waiting lists during and beyond the COVID-19 pandemic [Internet]. 2022. Available from: <https://euro.who.int/publications/i/addressing-backlogs-and-managing-waiting-lists-during-and-beyond-the-covid-19-pandemic>.
5. Wang J, Vahid S, Eberg M, Milroy S, Milkovich J, Wright FC, et al. Clearing the surgical backlog caused by COVID-19 in Ontario: a time series modelling study. *Canadian Medical Association Journal*. 2020 Sep 1;192(44):cmaj.201521. <https://doi.org/10.1503/cmaj.201521>

6. Jones KH, Ford DV, Thompson S, Lyons R. A Profile of the SAIL Databank on the UK Secure Research Platform. *International Journal of Population Data Science*. 2020 Oct 19;4(2). <https://doi.org/10.23889/ijpds.v4i2.1134>
7. Ford DV, Jones KH, Verplancke JP, Lyons RA, John G, Brown G, et al. The SAIL Databank: building a national architecture for e-health research and evaluation. *BMC Health Services Research*. 2009 Sep 4;9(1). <https://doi.org/10.1186/1472-6963-9-157>
8. Lyons RA, Jones KH, John G, Brooks CJ, Verplancke JP, Ford DV, et al. The SAIL databank: linking multiple health and social care datasets. *BMC Medical Informatics and Decision Making*. 2009 Jan 16;9(1). <https://doi.org/10.1186/1472-6947-9-3>
9. Health Data Research UK. HDRUK Innovation Gateway [Internet]. [cited 2024 Feb 26]. Available from: <https://www.healthdatagateway.org/>.
10. Rodgers SE, Demmler JC, Dsilva R, Lyons RA. Protecting health data privacy while using residence-based environment and demographic data. *Health & Place*. 2012 Mar;18(2):209–17. <https://doi.org/10.1016/j.healthplace.2011.09.006>
11. Rodgers SE, Lyons RA, Dsilva R, Jones KH, Brooks CJ, Ford DV, et al. Residential Anonymous Linking Fields (RALFs): a novel information infrastructure to study the interaction between the environment and individuals' health. *Journal of Public Health*. 2009 May 15;31(4):582–8. <https://doi.org/10.1093/pubmed/fdp041>
12. Office for National Statistics (ONS). 2011 Census geographies [Internet]. [cited 2024 Feb 26]. Available from: <https://www.ons.gov.uk/methodology/geography/ukgeographies/censusgeographies/2011censusgeographies>.
13. Welsh Government. Welsh Index of Multiple Deprivation 2019 [Internet]. 2019 [cited 2024 Feb 26]. Available from: <https://www.gov.wales/welsh-index-multiple-deprivation-full-index-update-ranks-2019>.
14. Department for Environment, Food & Rural Affairs. Rural Urban Classification [Internet]. 2016 [cited 2024 Feb 26]. Available from: <https://www.gov.uk/government/collections/rural-urban-classification>.
15. Quality and Outcomes Framework [Internet]. statswales.gov.wales. [cited 2024 Jun 3]. Available from: <https://statswales.gov.wales/Catalogue/Health-and-Social-Care/NHS-Primary-and-Community-Activity/GMS-Contract/quality-and-outcomes-framework>.
16. Moynihan R, Sanders S, Michaleff ZA, et al. Impact of COVID-19 pandemic on utilisation of healthcare services: a systematic review. *BMJ Open* 2021;11:e045343. <https://doi.org/10.1136/bmjopen-2020-045343>



Supplementary Appendices

Supplementary Appendix 1: clinical_code_lists.docx – lists of clinical codes used for primary care (Read codes) and secondary care (ICD-10 codes)

Condition	ICD-10 code	ICD-10 code description
Anxiety Disorders	F41	Other anxiety disorders
Anxiety Disorders	F40	Phobic anxiety disorders
Asthma	J46	Status asthmaticus
Asthma	J45	Asthma
Atrial Fibrillation	I802	Phlebitis and thrombophlebitis of other deep vessels of lower extremities
Atrial Fibrillation	I48	Atrial fibrillation and flutter
Atrial Fibrillation	I801	Phlebitis and thrombophlebitis of femoral vein
Atrial Fibrillation	I26	Pulmonary embolism
Atrial Fibrillation	I803	Phlebitis and thrombophlebitis of lower extremities, unspecified
CHD	I250	Atherosclerotic cardiovascular disease, so described
CHD	I253	Aneurysm of heart
CHD	I255	Ischaemic cardiomyopathy
CHD	I251	Atherosclerotic heart disease
CHD	I254	Coronary artery aneurysm
CHD	I256	Silent myocardial ischaemia
CHD	I258	Other forms of chronic ischaemic heart disease
CHD	I259	Chronic ischaemic heart disease, unspecified
CKD	Z940	Kidney transplant status
CKD	Z49	Care involving dialysis
CKD	Y841	Kidney dialysis
CKD	T861	Kidney transplant failure and rejection
CKD	N19	Unspecified kidney failure
CKD	N181	Chronic kidney disease, stage 1
CKD	N185	Chronic kidney disease, stage 5
CKD	N184	Chronic kidney disease, stage 4
CKD	N183	Chronic kidney disease, stage 3
CKD	N03	Chronic nephritic syndrome
CKD	N189	Chronic kidney disease, unspecified
CKD	N25	Disorders resulting from impaired renal tubular function
CKD	Z992	Dependence on renal dialysis
CKD	N074	Hereditary nephropathy, not elsewhere classified ; Diffuse endocapillary proliferative glomerulonephritis
CKD	N072	Hereditary nephropathy, not elsewhere classified ; Diffuse membranous glomerulonephritis
CKD	N10	Acute tubulo-interstitial nephritis
CKD	N053	Unspecified nephritic syndrome ; Diffuse mesangial proliferative glomerulonephritis
CKD	N073	Hereditary nephropathy, not elsewhere classified ; Diffuse mesangial proliferative glomerulonephritis
CKD	N182	Chronic kidney disease, stage 2
CKD	N01	Rapidly progressive nephritic syndrome
CKD	N056	Unspecified nephritic syndrome ; Dense deposit disease
CKD	N054	Unspecified nephritic syndrome ; Diffuse endocapillary proliferative glomerulonephritis
CKD	N052	Unspecified nephritic syndrome ; Diffuse membranous glomerulonephritis
CKD	N00	Acute nephritic syndrome
CKD	N17	Acute renal failure
CKD	N055	Unspecified nephritic syndrome ; Diffuse mesangiocapillary glomerulonephritis

Continued

Supplementary Appendix 1: Continued

Condition	ICD-10 code	ICD-10 code description
COPD	J42	Unspecified chronic bronchitis
COPD	J43	Emphysema
COPD	J440	Other chronic obstructive pulmonary disease
COPD	J41	Simple and mucopurulent chronic bronchitis
COPD	J40	Bronchitis, not specified as acute or chronic
COPD	J410	Simple and mucopurulent chronic bronchitis
COPD	J44	Other chronic obstructive pulmonary disease
Dementia	F024A	Dementia in human immunodeficiency virus [HIV] disease
Dementia	333.4	Huntingdon's
Dementia	46.19	Creutzfeldt Jacob
Dementia	F019	Vascular dementia, unspecified
Dementia	F013	Mixed cortical and subcortical vascular dementia
Dementia	331.1	Frontotemporal dementia
Dementia	F01	Vascular dementia
Dementia	F012	Subcortical vascular dementia
Dementia	F011	Multi-infarct dementia
Dementia	F018	Other vascular dementia
Dementia	F010	Vascular dementia of acute onset
Dementia	F028A	Dementia in other specified diseases classified elsewhere
Dementia	290.3	Senile dementia with delirium
Dementia	I67.3	Binswanger's disease
Dementia	F051	Delirium superimposed on dementia
Dementia	F021A	Dementia in Creutzfeldt-Jakob disease
Dementia	F02	Dementia in other diseases classified elsewhere
Dementia	290.2	Senile dementia with delusional features
Dementia	F020A	Dementia in Pick's disease
Dementia	F023A	Dementia in Parkinson's disease
Dementia	F03X	Unspecified dementia
Dementia	290.1x	Presenile dementia
Dementia	290.4	Vascular dementia
Dementia	290	Senile dementia, uncomplicated
Dementia	F022A	Dementia in Huntington's disease
Depression	F332	Recurrent depressive disorder, current episode severe without psychotic symptoms
Depression	F330	Recurrent depressive disorder, current episode mild
Depression	F334	Recurrent depressive disorder, currently in remission
Depression	F338	Other recurrent depressive disorders
Depression	F339	Recurrent depressive disorder, unspecified
Depression	F333	Recurrent depressive disorder, current episode severe with psychotic symptoms
Depression	F381	Other recurrent mood [affective] disorders
Depression	F341	Dysthymia
Depression	F331	Recurrent depressive disorder, current episode moderate
Depression	F321	Moderate depressive episode
Depression	F322	Severe depressive episode without psychotic symptoms
Depression	F323	Severe depressive episode with psychotic symptoms
Depression	F329	Depressive episode, unspecified
Depression	F328	Other depressive episodes
Depression	F320	Mild depressive episode
Diabetes Mellitus	E10	Insulin-dependent diabetes mellitus
Diabetes Mellitus	E11	Non-insulin-dependent diabetes mellitus
Diabetes Mellitus	E12	Malnutrition-related diabetes mellitus
Diabetes Mellitus	O242	Diabetes mellitus in pregnancy: Pre-existing malnutrition-related diabetes mellitus
Epilepsy	G41	Status epilepticus
Epilepsy	G40	Epilepsy

Continued

Supplementary Appendix 1: Continued

Condition	ICD-10 code	ICD-10 code description
Heart Failure	I130	Hypertensive heart and renal disease with (congestive) heart failure
Heart Failure	I500	Congestive heart failure
Heart Failure	I110	Hypertensive heart disease with (congestive) heart failure
Heart Failure	I501	Left ventricular heart failure
Heart Failure	I322	Hypertensive heart and renal disease with both (congestive) heart failure and renal failure
Heart Failure	I509	Heart failure, unspecified
Hypertension	I10	Essential (primary) hypertension
Hypertension	I11	Hypertensive heart disease
Hypertension	I12	Hypertensive renal disease
Hypertension	I13	Hypertensive heart and renal disease
Hypertension	I15	Secondary hypertension
Inflammatory Bowel Disease	K50	Crohn's disease [regional enteritis]
Inflammatory Bowel Disease	M075	Arthropathy in ulcerative colitis
Inflammatory Bowel Disease	K519	Ulcerative colitis, unspecified
Inflammatory Bowel Disease	K518	Other ulcerative colitis
Inflammatory Bowel Disease	K515	Left sided colitis
Inflammatory Bowel Disease	K513	Ulcerative (chronic) rectosigmoiditis
Inflammatory Bowel Disease	M074	Arthropathy in Crohn's disease [regional enteritis]
Inflammatory Bowel Disease	K512	Ulcerative (chronic) proctitis
Inflammatory Bowel Disease	K510	Ulcerative (chronic) pancolitis
Osteoporosis	M82	Osteoporosis in diseases classified elsewhere
Osteoporosis	M80	Osteoporosis with pathological fracture
Osteoporosis	M81	Osteoporosis without pathological fracture
PVD	I731	Thromboangiitis obliterans [Buerger]
PVD	I745	Embolism and thrombosis of iliac artery
PVD	I744	Embolism and thrombosis of arteries of extremities, unspecified
PVD	I743	Embolism and thrombosis of arteries of lower extremities
PVD	I739	Peripheral vascular disease, unspecified
PVD	I738	Other specified peripheral vascular diseases
Rheumatoid Arthritis	M053	Rheumatoid arthritis with involvement of oth organs and sys
Rheumatoid Arthritis	M062	Rheumatoid bursitis
Rheumatoid Arthritis	M060	Seronegative rheumatoid arthritis
Rheumatoid Arthritis	M068	Other specified rheumatoid arthritis
Rheumatoid Arthritis	M061	Adult-onset Still's disease
Rheumatoid Arthritis	M059	Seropositive rheumatoid arthritis, unspecified
Rheumatoid Arthritis	M063	Rheumatoid nodule
Rheumatoid Arthritis	M069	Rheumatoid arthritis, unspecified
Rheumatoid Arthritis	M083	Juvenile polyarthritis (seronegative)
Rheumatoid Arthritis	M080	Juvenile rheumatoid arthritis
Rheumatoid Arthritis	M058	Other seropositive rheumatoid arthritis
Rheumatoid Arthritis	M052	Rheumatoid vasculitis
Rheumatoid Arthritis	I528	Rheumatoid carditis
Rheumatoid Arthritis	M084	Pauciarticular juvenile arthritis
Rheumatoid Arthritis	J990	Rheumatoid lung disease
Rheumatoid Arthritis	M051	Rheumatoid lung disease
Rheumatoid Arthritis	M050	Felty's syndrome
Rheumatoid Arthritis	M082	Juvenile arthritis with systemic onset
Stroke & TIA	G452	Multiple and bilateral precerebral artery syndromes
Stroke & TIA	G454	Transient global amnesia
Stroke & TIA	G453	Amaurosis fugax
Stroke & TIA	G463	Brain stem stroke syndrome
Stroke & TIA	I631	Cerebral infarction due to embolism of precerebral arteries
Stroke & TIA	G464	Cerebellar stroke syndrome
Stroke & TIA	I660	Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction

Continued

Supplementary Appendix 1: Continued

Condition	ICD-10 code	ICD-10 code description
Stroke & TIA	G460	Middle cerebral artery syndrome
Stroke & TIA	G468	Other vascular syndromes of brain in cerebrovascular diseases
Stroke & TIA	G462	Posterior cerebral artery syndrome
Stroke & TIA	G461	Anterior cerebral artery syndrome
Stroke & TIA	G467	Other lacunar syndromes
Stroke & TIA	I630	Cerebral infarction due to thrombosis of precerebral arteries
Stroke & TIA	I633	Cerebral infarction due to thrombosis of cerebral arteries
Stroke & TIA	G466	Pure sensory lacunar syndrome
Stroke & TIA	G450	Vertebro-basilar artery syndrome
Stroke & TIA	I635	Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries
Stroke & TIA	I638	Other cerebral infarction
Stroke & TIA	I639	Cerebral infarction, unspecified
Stroke & TIA	I632	Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries
Stroke & TIA	I64	Stroke, not specified as haemorrhage or infarction
Stroke & TIA	I650	Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction
Stroke & TIA	G458	Other transient cerebral ischaemic attacks and related syndromes
Stroke & TIA	I65	Occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction
Stroke & TIA	I693	Sequelae of cerebral infarction
Stroke & TIA	I69.4	Sequelae of stroke, not specified as haemorrhage or infarction
Stroke & TIA	I694	Sequelae of stroke, not specified as haemorrhage or infarction
Stroke & TIA	I634	Cerebral infarction due to embolism of cerebral arteries
Stroke & TIA	G465	Pure motor lacunar syndrome
Stroke & TIA	G451	Carotid artery syndrome (hemispheric)
Stroke & TIA	G459	Transient cerebral ischaemic attack, unspecified
Stroke & TIA	I66	Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction
Condition	Read code	Read code description
Anxiety Disorders	Eu41z	[X]Anxiety disorder, unspecified
Anxiety Disorders	Eu41y	[X]Other specified anxiety disorders
Anxiety Disorders	Eu412	[X]Mixed anxiety and depressive disorder
Anxiety Disorders	Eu411	[X]Generalized anxiety disorder
Anxiety Disorders	Eu410	[X]Panic disorder [episodic paroxysmal anxiety]
Anxiety Disorders	E2029	Fear of crowds
Anxiety Disorders	E20y2	Other occupational neurosis
Anxiety Disorders	Eu402	[X]Specific (isolated) phobias
Anxiety Disorders	Eu40y	[X]Other phobic anxiety disorders
Anxiety Disorders	Eu341	[X]Depressive neurosis
Anxiety Disorders	ZV112	[V]Personal history of neurosis
Anxiety Disorders	Z4L1.	Anxiety counselling
Anxiety Disorders	Z481.	Phobia counselling
Anxiety Disorders	Eu41.	[X]Other anxiety disorders
Anxiety Disorders	Eu400	[X]Agoraphobia
Anxiety Disorders	Eu401	[X]Social phobias
Anxiety Disorders	E20y3	Psychasthenic neurosis
Anxiety Disorders	E20y.	Other neurotic disorders
Anxiety Disorders	E20y1	Writer's cramp neurosis
Anxiety Disorders	E20yz	Other neurotic disorder NOS
Anxiety Disorders	E20z.	Neurotic disorder NOS
Anxiety Disorders	Eu403	[X]Needle phobia
Anxiety Disorders	Eu40z	[X]Phobic anxiety disorder, unspecified
Anxiety Disorders	Eu40.	[X]Phobic anxiety disorders

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Anxiety Disorders	E202z	Phobic disorder NOS
Anxiety Disorders	E202E	Fear of pregnancy
Anxiety Disorders	E202D	Fear of death
Anxiety Disorders	E202C	Dental phobia
Anxiety Disorders	E202B	Cancer phobia
Anxiety Disorders	E202A	Fear of flying
Anxiety Disorders	E20..	Neurotic disorders
Anxiety Disorders	Eu413	[X]Other mixed anxiety disorders
Anxiety Disorders	E2027	Animal phobia
Anxiety Disorders	E2026	Acrophobia
Anxiety Disorders	E2025	Social phobia, fear of public washing
Anxiety Disorders	E2024	Social phobia, fear of public speaking
Anxiety Disorders	E2023	Social phobia, fear of eating in public
Anxiety Disorders	E2022	Agoraphobia without mention of panic attacks
Anxiety Disorders	E200z	Anxiety state NOS
Anxiety Disorders	E2020	Phobia unspecified
Anxiety Disorders	E201B	Compensation neurosis
Anxiety Disorders	E200.	Anxiety states
Anxiety Disorders	E2005	Recurrent anxiety
Anxiety Disorders	E2004	Chronic anxiety
Anxiety Disorders	E2002	Generalized anxiety disorder
Anxiety Disorders	E2000	Anxiety state unspecified
Anxiety Disorders	E2028	Claustrophobia
Anxiety Disorders	E2021	Agoraphobia with panic attacks
Anxiety Disorders	1Bb..	Specific fear
Anxiety Disorders	8G94.	Anxiety management training
Anxiety Disorders	8G52.	Antiphobic therapy
Anxiety Disorders	286..	Poor insight into neurotic condition
Anxiety Disorders	285..	Neurotic condition, insight present
Anxiety Disorders	225K.	O/E - fearful mood
Anxiety Disorders	9N54.	Encounter for fear
Anxiety Disorders	225J.	O/E - panic attack
Anxiety Disorders	8HHp.	Referral for guided self-help for anxiety
Anxiety Disorders	1B1H.	Fear
Anxiety Disorders	146G.	H/O: agoraphobia
Anxiety Disorders	1466.	H/O: anxiety state
Anxiety Disorders	E202.	Phobic disorders
Anxiety Disorders	E2003	Anxiety with depression
Anxiety Disorders	E2001	Panic disorder
Anxiety Disorders	1B1V.	C/O - panic attack
Asthma	14B4.	H/O: asthma
Asthma	173A.	Exercise induced asthma
Asthma	173c.	Occupational asthma
Asthma	173d.	Work aggravated asthma
Asthma	1780.	Aspirin induced asthma
Asthma	H332.	Mixed asthma
Asthma	102..	Asthma confirmed
Asthma	21262	Asthma resolved
Asthma	212G.	Asthma resolved
Asthma	H330z	Extrinsic asthma NOS
Asthma	H3310	Intrinsic asthma without status asthmaticus
Asthma	H331z	Intrinsic asthma NOS
Asthma	H333.	Acute exacerbation of asthma
Asthma	H3301	Extrinsic asthma with status asthmaticus
Asthma	H335.	Chronic asthma with fixed airflow obstruction
Asthma	H3120	Chronic asthmatic bronchitis

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Asthma	H33z2	Late-onset asthma
Asthma	H33..	Asthma
Asthma	H330.	Extrinsic (atopic) asthma
Asthma	H331.	Intrinsic asthma
Asthma	H334.	Brittle asthma
Asthma	H3311	Intrinsic asthma with status asthmaticus
Asthma	H33z.	Asthma unspecified
Asthma	H33z0	Status asthmaticus NOS
Asthma	H33z1	Asthma attack
Asthma	H33zz	Asthma NOS
Asthma	H3300	Extrinsic asthma without status asthmaticus
Atrial Fibrillation	G5731	Atrial flutter
Atrial Fibrillation	3273.	ECG: atrial flutter
Atrial Fibrillation	G573z	Atrial fibrillation and flutter NOS
Atrial Fibrillation	G573.	Atrial fibrillation and flutter
Atrial Fibrillation	3272.	ECG: atrial fibrillation
Atrial Fibrillation	G5733	Non-rheumatic atrial fibrillation
Atrial Fibrillation	G5732	Paroxysmal atrial fibrillation
Atrial Fibrillation	G5734	Permanent atrial fibrillation
Atrial Fibrillation	G5730	Atrial fibrillation
Atrial Fibrillation	G5735	Persistent atrial fibrillation
Atrial Fibrillation	9hF1.	Excepted from atrial fibrillation qual indic: Inform dissent
Atrial Fibrillation	662S.	Atrial fibrillation monitoring
Atrial Fibrillation	90s4.	Atrial fibrillation monitoring telephone invite
Atrial Fibrillation	90s3.	Atrial fibrillation monitoring verbal invite
Atrial Fibrillation	90s2.	Atrial fibrillation monitoring third letter
Atrial Fibrillation	90s1.	Atrial fibrillation monitoring second letter
Atrial Fibrillation	90s..	Atrial fibrillation monitoring administration
Atrial Fibrillation	9hF..	Exception reporting: atrial fibrillation quality indicators
Atrial Fibrillation	6A9..	Atrial fibrillation annual review
Atrial Fibrillation	212R.	Atrial fibrillation resolved
Atrial Fibrillation	14AR.	History of atrial flutter
Atrial Fibrillation	14AN.	H/O: atrial fibrillation
Atrial Fibrillation	90s0.	Atrial fibrillation monitoring first letter
CHD	14AL.	H/O: Treatment for ischaemic heart disease
CHD	G344.	Silent myocardial ischaemia
CHD	6A4..	Coronary heart disease review
CHD	8H2V.	Admit ischaemic heart disease emergency
CHD	G31y2	Subendocardial ischaemia
CHD	G31..	Other acute and subacute ischaemic heart disease
CHD	G343.	Ischaemic cardiomyopathy
CHD	G34..	Other chronic ischaemic heart disease
CHD	G31yz	Other acute and subacute ischaemic heart disease NOS
CHD	G31y.	Other acute and subacute ischaemic heart disease
CHD	G31y3	Transient myocardial ischaemia
CHD	6A2..	Coronary heart disease annual review
CHD	8B3k.	Coronary heart disease medication review
CHD	G3y..	Other specified ischaemic heart disease
CHD	G34z0	Asymptomatic coronary heart disease
CHD	G34y1	Chronic myocardial ischaemia
CHD	G34yz	Other specified chronic ischaemic heart disease NOS
CHD	G3z..	Ischaemic heart disease NOS
CHD	Gyu3.	[X]Ischaemic heart diseases
CHD	G34z.	Other chronic ischaemic heart disease NOS
CHD	Gyu32	[X]Other forms of acute ischaemic heart disease
CHD	G34y.	Other specified chronic ischaemic heart disease

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
CHD	G3...	Ischaemic heart disease
CHD	G3110	Myocardial infarction aborted
CHD	G340.	Coronary atherosclerosis
CHD	Gyu33	[X]Other forms of chronic ischaemic heart disease
CKD	Ua1IM	Chronic peritoneal dialysis
CKD	X018T	Angioplasty of arteriovenous fistula
CKD	TA22y	Failure of sterile precautions during other perfusion
CKD	X018U	Thrombolysis of arteriovenous fistula
CKD	X018V	Thrombolysis of arteriovenous graft
CKD	X01AI	Continuous haemodialysis
CKD	X018Y	Embolectomy of arteriovenous fistula
CKD	7L1Cz	Placement other apparatus- compensate for renal failure NOS
CKD	7L1Bz	Placement ambulatory apparatus- compensate renal failure NOS
CKD	7L1C.	Placement other apparatus for compensation for renal failure
CKD	7L1C0	Insertion of temporary peritoneal dialysis catheter
CKD	7L1Cy	Placement other apparatus- compensate for renal failure OS
CKD	TA22.	Failure of sterile precautions during perfusion
CKD	U6122	[X]Failure sterile precautions dur kidney dialys/other perf
CKD	7A614	Ligation of acquired arteriovenous fistula
CKD	7L1B0	Insertion of chronic ambulatory peritoneal dialysis catheter
CKD	14S2.	H/O: kidney recipient
CKD	7A600	Insertion of arteriovenous prosthesis
CKD	7A603	Removal of infected arteriovenous shunt
CKD	TA420	Mech failure of instrument &/or apparatus during kidney dial
CKD	7L1B1	Removal of chronic ambulatory peritoneal dialysis catheter
CKD	7A60z	Arteriovenous shunt NOS
CKD	7A6E2	Declotting of thigh vein loop
CKD	7L1By	Placement ambulatory apparatus- compensate renal failure OS
CKD	Ua1IN	Stab peritoneal dialysis
CKD	TA22z	Failure of sterile precautions during perfusion NOS
CKD	7A60y	Other specified arteriovenous shunt
CKD	8877.	Ultrafiltration
CKD	Xaa6o	Infection of dialysis arteriovenous fistula
CKD	Xaa7F	Infection of dialysis arteriovenous shunt
CKD	Xaa7H	Haemorrhage of dialysis arteriovenous graft
CKD	Xaa7I	Haemorrhage of dialysis arteriovenous fistula
CKD	Xaa7J	Haemorrhage of dialysis arteriovenous shunt
CKD	X018Z	Embolectomy of arteriovenous graft
CKD	Xaa7K	Rupture of dialysis arteriovenous graft
CKD	XaZkw	Aneurysm of vein of transplanted kidney
CKD	XaZcU	Aneurysm of dialysis arteriovenous fistula
CKD	XaZcX	Aneurysm of needle site of dialysis arteriovenous fistula
CKD	XaZcd	Aneurysm of anastomotic site of dialysis AV fistula
CKD	XaZdk	Thrombus in peritoneal dialysis catheter
CKD	Xaa5T	Infection of dialysis vascular access
CKD	Xaa5U	Haemorrhage of dialysis vascular access
CKD	8882.	Intestinal dialysis
CKD	G760.	Acquired arteriovenous fistula
CKD	TA02z	Accid cut,puncture,perf,h'ge - perfusion NOS
CKD	X40bz	Renewal of chronic ambulatory peritoneal dialysis catheter
CKD	Xaa5j	Occlusion of dialysis arteriovenous shunt
CKD	Xaa6n	Infection of dialysis arteriovenous graft
CKD	Xaa5W	Stenosis of dialysis arteriovenous graft
CKD	Xaa5e	Thrombosis of dialysis arteriovenous graft
CKD	Xaa5f	Thrombosis of dialysis arteriovenous fistula

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
CKD	Xaa5g	Thrombosis of dialysis arteriovenous shunt
CKD	Xaa5h	Occlusion of dialysis arteriovenous graft
CKD	Xaa5i	Occlusion of dialysis arteriovenous fistula
CKD	Xaa5X	Stenosis of dialysis arteriovenous shunt
CKD	7A602	Attention to arteriovenous shunt
CKD	X018e	Removal of stent from arteriovenous fistula
CKD	X018g	Adjustment of arteriovenous fistula stent
CKD	X01AG	Intermittent haemodialysis with sequential ultrafiltration
CKD	X018j	Banding of arteriovenous fistula
CKD	X018o	Exploration of arteriovenous graft
CKD	7B00.	Renal transplant
CKD	X01AF	Intermittent haemodialysis
CKD	X30Lw	Long-term disorder of dialysis
CKD	X30Ls	First use syndrome of dialysis
CKD	X30Lt	Anaphylactoid reaction to dialysis
CKD	X30Lu	Hyperchloraemic acidosis associated with dialysis
CKD	X30Lv	Hard water syndrome
CKD	X018a	Procedure on intraluminal device of arteriovenous fistula
CKD	X018d	Removal of intraluminal device from arteriovenous fistula
CKD	X01AJ	Continuous arteriovenous haemodialysis
CKD	X01AK	Continuous venovenous haemodialysis
CKD	X01AL	Haemofiltration
CKD	X01AH	Intermittent haemodialysis with continuous ultrafiltration
CKD	X01AM	Intermittent haemofiltration
CKD	X018c	Insertion of stent into arteriovenous fistula
CKD	X01AN	Continuous haemofiltration
CKD	X01AP	Continuous venovenous haemofiltration
CKD	X01AQ	Haemodiafiltration
CKD	X01AR	Intermittent haemodiafiltration
CKD	X018f	Adjustment of intraluminal device of arteriovenous fistula
CKD	X018b	Insertion of intraluminal device into arteriovenous fistula
CKD	X01AO	Continuous arteriovenous haemofiltration
CKD	X30Lx	Beta-2 microglobulin amyloidosis
CKD	X30M2	Aluminium-related osteomalacia
CKD	7L1A0	(Renal dialysis) or (Thomas intravascular dialysis shunt)
CKD	7B002	Cadaveric renal transplant
CKD	7B00y	Other specified transplantation of kidney
CKD	7B00z	Transplantation of kidney NOS
CKD	X30Lr	Dialysis disequilibrium
CKD	7L1A.	Compensation for renal failure (& dialysis)
CKD	7B001	Live donor renal transplant
CKD	7L1A2	Haemodialysis NEC
CKD	7L1Ay	Other specified compensation for renal failure
CKD	7L1Az	Compensation for renal failure NOS
CKD	7L1B.	Chronic ambulatory peritoneal dialysis catheter procedure ++
CKD	7L1A1	Peritoneal dialysis
CKD	X30Lp	Disorder associated with dialysis
CKD	X30Ly	Beta-2 microglobulin arthropathy
CKD	X30Lz	Matrix stone formation of dialysis
CKD	X30M0	Aluminium intoxication
CKD	X30M1	Aluminium bone disease
CKD	X30Lq	Acute disorder of haemodialysis
CKD	X30J3	End stage renal failure with renal transplant
CKD	X30J0	End stage renal failure
CKD	X01AU	Continuous venovenous haemodiafiltration
CKD	X01AY	Plasma filtration

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
CKD	X30D2	Xenograft renal transplant
CKD	X30J1	End stage renal failure, untreated by RRT
CKD	X01AS	Continuous haemodiafiltration
CKD	X30J2	End stage renal failure on dialysis
CKD	X01AT	Continuous arteriovenous haemodiafiltration
CKD	XaZe2	Rupture of artery of transplanted kidney
CKD	X30MK	Poor drainage of peritoneal dialysis catheter
CKD	X30ML	Extrusion of peritoneal dialysis catheter cuff
CKD	X30MM	Misplacement of acute peritoneal dialysis catheter
CKD	X30MN	Renal transplant disorder
CKD	X30MO	Primary non-function of renal transplant
CKD	XaZe3	Rupture of vein of transplanted kidney
CKD	X30MP	Renal transplant rejection
CKD	XaMKM	Allotransplantation of kidney from cadaver NEC
CKD	XaC2Z	[X] Peritoneal dialysis associated peritonitis
CKD	XaE9T	Donor renal transplantation
CKD	XaLiG	Thrombectomy of arteriovenous fistula
CKD	XaLiH	Creation of graft fistula for dialysis
CKD	X30MX	Chronic rejection of renal transplant
CKD	X40c5	Intermittent peritoneal dialysis
CKD	X40c2	Flushing of chronic ambulatory peritoneal dialysis catheter
CKD	X40c3	Continuous ambulatory peritoneal dialysis
CKD	X40c4	Continuous cycling peritoneal dialysis
CKD	X30MQ	Hyperacute rejection of renal transplant
CKD	X30MF	Loss of solute clearance
CKD	X30MJ	Omental wrapping around peritoneal dialysis catheter
CKD	X30M4	Polyserositis syndrome of dialysis
CKD	X30M6	Adynamic bone disease
CKD	X30M7	Disorders associated with peritoneal dialysis
CKD	X30M8	Pain during inflow of dialysate
CKD	X30M9	Pain during outflow of dialysate
CKD	X30ME	Loss of ultrafiltration
CKD	X30M5	Underdialysis
CKD	XaM1o	Allotransplantation of kidney from cadaver, heart-beating
CKD	Xa0Ex	Peritoneal dialysis-associated peritonitis
CKD	Xa0FB	Percutaneous balloon angioplasty of arteriovenous fistula
CKD	Xa0Gm	Percutaneous embolectomy of arteriovenous fistula
CKD	Xa0H7	Percutaneous thrombolysis of arteriovenous fistula
CKD	Xa0HK	Unexplained episode of renal transplant dysfunction
CKD	XaM1p	Allotransplantation kidney from cadaver, heart non-beating
CKD	Xa0HL	Pre-existing disease in renal transplant
CKD	Xa0x1	Removal of arteriovenous shunt
CKD	Xa1dw	Transplant kidney
CKD	Xa24I	Acquired renal arteriovenous fistula
CKD	Xa3x6	Kidney replacement
CKD	Xa402	Extracorporeal kidney
CKD	Xa0ol	Procedure related to surgical arteriovenous connection
CKD	XE2u6	Chronic ambulatory peritoneal dialysis catheter procedure
CKD	XaM2A	Automated peritoneal dialysis
CKD	XaMMt	Peritoneal dialysis NEC
CKD	XaBrA	Haemodialysis procedure
CKD	X40c6	Tidal peritoneal dialysis
CKD	XaOmL	Ligation of arteriovenous dialysis fistula
CKD	XE0kD	Renal dialysis (& haemodialysis)
CKD	XaOoH	Ligation of arteriovenous dialysis graft
CKD	XaZWa	Urological complication of renal transplant

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
CKD	XaZYx	Vascular complication of renal transplant
CKD	XaMtg	Extracorporeal albumin haemodialysis
CKD	Xa9zl	Dependence on renal dialysis
CKD	X40c7	Night-time intermittent peritoneal dialysis
CKD	XaREO	Continuous ambulatory peritoneal dialysis associated perit
CKD	X40c1	Aspiration chronic ambulatory peritoneal dialysis catheter
CKD	X30Mg	Transplant glomerulopathy
CKD	X30MH	Obstruction of peritoneal dialysis catheter
CKD	X30Mh	Transplant glomerulopathy - early form
CKD	X30MI	Migration of peritoneal dialysis catheter
CKD	Xa8S7	Haemodialysis
CKD	X40c0	Adjustment chronic ambulatory peritoneal dialysis catheter
CKD	X30Mc	Failed renal transplant
CKD	XE0Fj	Repair of acquired arteriovenous fistula
CKD	XE0Jf	Compensation for renal failure
CKD	XE0Jg	Renal dialysis
CKD	XE21r	Mechanical failure of apparatus during kidney dialysis
CKD	ZV560	[V]Aftercare involving extracorporeal dialysis
CKD	XE0Fh	Creation of arteriovenous fistula NEC
CKD	X30MG	Disorder of peritoneal dialysis catheter
CKD	XaZe7	Stenosis of vein of transplanted kidney
CKD	XaZl0	Aneurysm of artery of transplanted kidney
CKD	XaaEx	Stenosis of arterial side of dialysis arteriovenous shunt
CKD	X30M3	Aluminium-related fracturing osteodystrophy
CKD	XaZlv	Thrombosis of dialysis vascular access
CKD	X30Md	Perfusion injury of renal transplant
CKD	XaZmp	Anaphylactoid reaction due to haemodialysis
CKD	Xaa2Q	Thrombosis of vein of transplanted kidney
CKD	Xaa5S	Occlusion of dialysis vascular access
CKD	XaaEy	Stenosis of venous side of dialysis arteriovenous shunt
CKD	X30Mi	Transplant glomerulopathy - late form
CKD	X30MD	Peritoneal dialysis catheter tunnel infection
CKD	Xaa2O	Thrombosis of artery of transplanted kidney
CKD	X30MC	Peritoneal dialysis catheter exit site infection
CKD	XaZlu	Stenosis of dialysis vascular access
CKD	X30MZ	Chronic rejection of renal transplant - grade II
CKD	X30MS	Very mild acute rejection of renal transplant
CKD	X30MT	Acute rejection of renal transplant
CKD	X30MU	Acute rejection of renal transplant - grade I
CKD	TA020	Accid cut,puncture,perf,h'ge - kidney dialysis
CKD	X30MV	Acute rejection of renal transplant - grade II
CKD	XaZc8	Ruptured aneurysm of dialysis vascular access
CKD	X30MY	Chronic rejection of renal transplant - grade 1
CKD	X30Ma	Chronic rejection of renal transplant - grade III
CKD	X30MR	Accelerated rejection of renal transplant
CKD	X30NN	Perirenal and periureteric post-transplant lymphocele
CKD	X30MW	Acute rejection of renal transplant - grade III
CKD	X30Mb	Acute-on-chronic rejection of renal transplant
CKD	ZV420	[V]Kidney transplanted
CKD	ZV451	[V]Renal dialysis status
CKD	ZV56.	[V]Aftercare involving intermittent dialysis
CKD	ZV561	[V]Preparatory care for dialysis
CKD	ZV56y	[V]Other specified aftercare involving intermittent dialysis
CKD	X30MB	Bloodstained peritoneal dialysis effluent
CKD	ZV56z	[V]Unspecified aftercare involving intermittent dialysis

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
CKD	TA220	Failure of sterile precautions during kidney dialysis
CKD	XaZcQ	Aneurysm of superficialised artery of dialysis AV fistula
CKD	TB11.	Kidney dialysis with complication, without blame
CKD	X018M	Creation of Cimino fistula
CKD	X018N	Creation brachiocephalic fistula
CKD	X018n	Exploration of arteriovenous fistula
CKD	ZVu3G	[X]Other dialysis
COPD	H3...	Chronic obstructive pulmonary disease
COPD	H3110	Purulent chronic bronchitis
COPD	H322.	Centrilobular emphysema
COPD	H3120	Chronic asthmatic bronchitis
COPD	H31yz	Other chronic bronchitis NOS
COPD	14B3.	History of chronic obstructive pulmonary disease
COPD	H310.	Simple chronic bronchitis
COPD	H310z	Simple chronic bronchitis NOS
COPD	H3111	Fetid chronic bronchitis
COPD	H3123	Bronchiolitis obliterans
COPD	H3100	Chronic catarrhal bronchitis
COPD	H321.	Panlobular emphysema
COPD	H31y.	Other chronic bronchitis
COPD	H31z.	Chronic bronchitis NOS
COPD	H31y1	Chronic tracheobronchitis
COPD	H313.	Mixed simple and mucopurulent chronic bronchitis
COPD	H320z	Chronic bullous emphysema NOS
COPD	H312z	Obstructive chronic bronchitis NOS
COPD	H3200	Segmental bullous emphysema
COPD	H3201	Zonal bullous emphysema
COPD	H3202	Giant bullous emphysema
COPD	H3203	Bullous emphysema with collapse
COPD	H320.	Chronic bullous emphysema
COPD	H312.	Obstructive chronic bronchitis
COPD	H311.	Mucopurulent chronic bronchitis
COPD	H3y31	[X]Other specified chronic obstructive pulmonary disease
COPD	H3y..	Other specified chronic obstructive airways disease
COPD	H39..	Very severe chronic obstructive pulmonary disease
COPD	H32y0	Acute vesicular emphysema
COPD	H311z	Mucopurulent chronic bronchitis NOS
COPD	H32y2	MacLeod's unilateral emphysema
COPD	H32yz	Other emphysema NOS
COPD	H32z.	Emphysema NOS
COPD	H36..	Mild chronic obstructive pulmonary disease
COPD	H37..	Moderate chronic obstructive pulmonary disease
COPD	H38..	Severe chronic obstructive pulmonary disease
COPD	H32y.	Other emphysema
COPD	H3y30	[X]Other emphysema
COPD	H32y1	Atrophic (senile) emphysema
COPD	H3121	Emphysematous bronchitis
COPD	H3122	Acute exacerbation of chronic obstructive airways disease
COPD	H31..	Chronic bronchitis
COPD	H5832	Eosinophilic bronchitis
COPD	H4640	Chronic emphysema due to chemical fumes
COPD	H3y0.	Chronic obstruct pulmonary dis with acute lower resp infectn
COPD	H3y1.	Chron obstruct pulmonary dis wth acute exacerbation, unspec
COPD	H3z..	Chronic obstructive airways disease NOS
COPD	H4641	Obliterative bronchiolitis due to chemical fumes
COPD	H3A..	End stage chronic obstructive airways disease

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
COPD	H32..	Emphysema
Dementia	Eu01.	[X]Vascular dementia
Dementia	Eu013	[X]Mixed cortical and subcortical vascular dementia
Dementia	Eu011	[X]Multi-infarct dementia
Dementia	E001z	Presenile dementia NOS
Dementia	E041.	Dementia in conditions EC
Dementia	1461.	H/O: dementia
Dementia	9hD0.	Excepted from dementia quality indicators: Patient unsuitabl
Dementia	8CMZ.	Dementia care plan
Dementia	6AB..	Dementia annual review
Dementia	66h..	Dementia monitoring
Dementia	E00y.	Other senile and presenile organic psychoses
Dementia	9hD1.	Excepted from dementia quality indicators: Informed dissent
Dementia	Eu010	[X]Vascular dementia of acute onset
Dementia	Eu000	[X]Dementia in Alzheimer's disease with early onset
Dementia	E00z.	Senile or presenile psychoses NOS
Dementia	E004z	Arteriosclerotic dementia NOS
Dementia	E0042	Arteriosclerotic dementia with paranoia
Dementia	E0041	Arteriosclerotic dementia with delirium
Dementia	Eu00z	[X]Dementia in Alzheimer's disease, unspecified
Dementia	E0040	Uncomplicated arteriosclerotic dementia
Dementia	E002z	Senile dementia with depressive or paranoid features NOS
Dementia	E002.	Senile dementia with depressive or paranoid features
Dementia	Eu001	[X]Dementia in Alzheimer's disease with late onset
Dementia	Eu002	[X]Dementia in Alzheimer's dis, atypical or mixed type
Dementia	Eu00.	[X]Dementia in Alzheimer's disease
Dementia	E003.	Senile dementia with delirium
Dementia	9hD..	Exception reporting: dementia quality indicators
Dementia	9Ou4.	Dementia monitoring verbal invite
Dementia	9Ou3.	Dementia monitoring third letter
Dementia	9Ou2.	Dementia monitoring second letter
Dementia	Eu012	[X]Subcortical vascular dementia
Dementia	Eu01z	[X]Vascular dementia, unspecified
Dementia	E0043	Arteriosclerotic dementia with depression
Dementia	ZS7C5	Language disorder of dementia
Dementia	F110.	Alzheimer's disease
Dementia	F1101	Alzheimer's disease with late onset
Dementia	F1100	Alzheimer's disease with early onset
Dementia	Eu041	[X]Delirium superimposed on dementia
Dementia	Eu02z	[X] Unspecified dementia
Dementia	Fyu30	[X]Other Alzheimer's disease
Dementia	9Ou5.	Dementia monitoring telephone invite
Dementia	E004.	Arteriosclerotic dementia
Dementia	E0021	Senile dementia with depression
Dementia	E0013	Presenile dementia with depression
Dementia	E00..	Senile/presenile dementia
Dementia	9Ou1.	Dementia monitoring first letter
Dementia	E0020	Senile dementia with paranoia
Dementia	E000.	Uncomplicated senile dementia
Dementia	E001.	Presenile dementia
Dementia	E0012	Presenile dementia with paranoia
Dementia	E0011	Presenile dementia with delirium
Dementia	E0010	Uncomplicated presenile dementia
Dementia	9Ou..	Dementia monitoring administration
Dementia	Eu01y	[X]Other vascular dementia
Depression	E1121	Single major depressive episode, mild

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Depression	E1120	Single major depressive episode, unspecified
Depression	E1131	Recurrent major depressive episodes, mild
Depression	E113.	Recurrent major depressive episode
Depression	Eu32.	[X]Depressive episode
Depression	Eu251	[X]Schizoaffective disorder, depressive type
Depression	E2003	Anxiety with depression
Depression	9Ov1.	Depression monitoring second letter
Depression	E130.	Reactive depressive psychosis
Depression	Eu322	[X]Severe depressive episode without psychotic symptoms
Depression	E0043	Arteriosclerotic dementia with depression
Depression	E0021	Senile dementia with depression
Depression	E0013	Presenile dementia with depression
Depression	Eu323	[X]Severe depressive episode with psychotic symptoms
Depression	1465.	H/O: depression
Depression	8HHq.	Referral for guided self-help for depression
Depression	8CAa.	Patient given advice about management of depression
Depression	E112.	Single major depressive episode
Depression	E1122	Single major depressive episode, moderate
Depression	9Ov2.	Depression monitoring third letter
Depression	9Ov0.	Depression monitoring first letter
Depression	9Ov3.	Depression monitoring verbal invite
Depression	9Ov4.	Depression monitoring telephone invite
Depression	9Ov..	Depression monitoring administration
Depression	9kQ..	On full dose long term treatment depression - enh serv admin
Depression	9k4..	Depression - enhanced services administration
Depression	E1123	Single major depressive episode, severe, without psychosis
Depression	9k40.	Depression - enhanced service completed
Depression	9H92.	Depression interim review
Depression	E1125	Single major depressive episode, partial or unspec remission
Depression	E1130	Recurrent major depressive episodes, unspecified
Depression	E112z	Single major depressive episode NOS
Depression	Eu33z	[X]Recurrent depressive disorder, unspecified
Depression	E1126	Single major depressive episode, in full remission
Depression	E1124	Single major depressive episode, severe, with psychosis
Depression	Eu333	[X]Recurrent depress disorder cur epi severe with psyc symp
Depression	9HA0.	On depression register
Depression	8BK0.	Depression management programme
Depression	Eu334	[X]Recurrent depressive disorder, currently in remission
Depression	Eu341	[X]Depressive neurosis
Depression	Eu204	[X]Post-schizophrenic depression
Depression	E1133	Recurrent major depressive episodes, severe, no psychosis
Depression	E1134	Recurrent major depressive episodes, severe, with psychosis
Depression	E1135	Recurrent major depressive episodes, partial/unspec remission
Depression	E1136	Recurrent major depressive episodes, in full remission
Depression	212S.	Depression resolved
Depression	E1137	Recurrent depression
Depression	E118.	Seasonal affective disorder
Depression	E11..	Depressive psychoses
Depression	E11y2	Atypical depressive disorder
Depression	E11z2	Masked depression
Depression	E135.	Agitated depression
Depression	E291.	Prolonged depressive reaction
Depression	E2B1.	Chronic depression
Depression	E2B..	Depressive disorder NEC
Depression	E113z	Recurrent major depressive episode NOS
Depression	Eu33y	[X]Other recurrent depressive disorders

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Depression	Eu332	[X]Recurr depress disorder cur epi severe without psyc sympt
Depression	9H91.	Depression medication review
Depression	Eu33.	[X]Recurrent depressive disorder
Depression	Eu32z	[X]Depressive episode, unspecified
Depression	Eu32y	[X]Other depressive episodes
Depression	9H90.	Depression annual review
Depression	Eu328	[X]Major depression, severe with psychotic symptoms
Depression	Eu320	[X]Mild depressive episode
Depression	Eu412	[X]Mixed anxiety and depressive disorder
Depression	Eu321	[X]Moderate depressive episode
Depression	Eu325	[X]Major depression, mild
Depression	Eu326	[X]Major depression, moderately severe
Depression	Eu327	[X]Major depression, severe without psychotic symptoms
Depression	Eu329	[X]Single major depr ep, severe with psych, psych in remiss
Depression	E1132	Recurrent major depressive episodes, moderate
Depression	Eu32A	[X]Recurr major depr ep, severe with psych, psych in remiss
Depression	Eu330	[X]Recurrent depressive disorder, current episode mild
Depression	Eu331	[X]Recurrent depressive disorder, current episode moderate
Depression	Eu324	[X]Mild depression
Diabetes Mellitus	C1082	Type I diabetes mellitus with neurological complications
Diabetes Mellitus	C1085	Type I diabetes mellitus with ulcer
Diabetes Mellitus	C1084	Unstable type I diabetes mellitus
Diabetes Mellitus	C108H	Type I diabetes mellitus with arthropathy
Diabetes Mellitus	C108F	Type I diabetes mellitus with diabetic cataract
Diabetes Mellitus	C108D	Type I diabetes mellitus with nephropathy
Diabetes Mellitus	C10E0	Type 1 diabetes mellitus with renal complications
Diabetes Mellitus	C108A	Type I diabetes mellitus without complication
Diabetes Mellitus	C10EH	Type 1 diabetes mellitus with arthropathy
Diabetes Mellitus	C1080	Type I diabetes mellitus with renal complications
Diabetes Mellitus	C10E8	Type 1 diabetes mellitus - poor control
Diabetes Mellitus	C108E	Type I diabetes mellitus with hypoglycaemic coma
Diabetes Mellitus	C10E6	Type 1 diabetes mellitus with gangrene
Diabetes Mellitus	C108.	Type 1 diabetes mellitus
Diabetes Mellitus	C1089	Type I diabetes mellitus maturity onset
Diabetes Mellitus	C1087	Type I diabetes mellitus with retinopathy
Diabetes Mellitus	C10E2	Type 1 diabetes mellitus with neurological complications
Diabetes Mellitus	C109B	Type II diabetes mellitus with polyneuropathy
Diabetes Mellitus	C10E1	Type 1 diabetes mellitus with ophthalmic complications
Diabetes Mellitus	C1088	Type I diabetes mellitus - poor control
Diabetes Mellitus	C109.	Type 2 diabetes mellitus
Diabetes Mellitus	C1091	Type II diabetes mellitus with ophthalmic complications
Diabetes Mellitus	C10EL	Type 1 diabetes mellitus with persistent microalbuminuria
Diabetes Mellitus	C10EK	Type 1 diabetes mellitus with persistent proteinuria
Diabetes Mellitus	C10EJ	Type 1 diabetes mellitus with neuropathic arthropathy
Diabetes Mellitus	C10EF	Type 1 diabetes mellitus with diabetic cataract
Diabetes Mellitus	C1092	Type II diabetes mellitus with neurological complications
Diabetes Mellitus	C10EE	Type 1 diabetes mellitus with hypoglycaemic coma
Diabetes Mellitus	C10ED	Type 1 diabetes mellitus with nephropathy
Diabetes Mellitus	C10EQ	Type 1 diabetes mellitus with gastroparesis
Diabetes Mellitus	C1090	Type II diabetes mellitus with renal complications
Diabetes Mellitus	C1095	Type II diabetes mellitus with gangrene
Diabetes Mellitus	C1096	Type II diabetes mellitus with retinopathy
Diabetes Mellitus	C10EB	Type 1 diabetes mellitus with mononeuropathy
Diabetes Mellitus	C1094	Type II diabetes mellitus with ulcer
Diabetes Mellitus	C1097	Type II diabetes mellitus - poor control
Diabetes Mellitus	C109E	Type II diabetes mellitus with diabetic cataract

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Diabetes Mellitus	C109F	Type II diabetes mellitus with peripheral angiopathy
Diabetes Mellitus	C109A	Type II diabetes mellitus with mononeuropathy
Diabetes Mellitus	C109C	Type II diabetes mellitus with nephropathy
Diabetes Mellitus	C109D	Type II diabetes mellitus with hypoglycaemic coma
Diabetes Mellitus	C108J	Type I diabetes mellitus with neuropathic arthropathy
Diabetes Mellitus	C10E9	Type 1 diabetes mellitus maturity onset
Diabetes Mellitus	C10E7	Type 1 diabetes mellitus with retinopathy
Diabetes Mellitus	C109K	Hyperosmolar non-ketotic state in type 2 diabetes mellitus
Diabetes Mellitus	C10E5	Type 1 diabetes mellitus with ulcer
Diabetes Mellitus	C10E3	Type 1 diabetes mellitus with multiple complications
Diabetes Mellitus	C10F1	Type 2 diabetes mellitus with ophthalmic complications
Diabetes Mellitus	C10E.	Type 1 diabetes mellitus
Diabetes Mellitus	C109J	Insulin treated Type 2 diabetes mellitus
Diabetes Mellitus	C109G	Type II diabetes mellitus with arthropathy
Diabetes Mellitus	C109H	Type II diabetes mellitus with neuropathic arthropathy
Diabetes Mellitus	C10F0	Type 2 diabetes mellitus with renal complications
Diabetes Mellitus	C10F.	Type 2 diabetes mellitus
Diabetes Mellitus	C10EP	Type 1 diabetes mellitus with exudative maculopathy
Diabetes Mellitus	C10EA	Type 1 diabetes mellitus without complication
Diabetes Mellitus	C10EN	Type 1 diabetes mellitus with ketoacidotic coma
Diabetes Mellitus	C10F5	Type 2 diabetes mellitus with gangrene
Diabetes Mellitus	C10EG	Type 1 diabetes mellitus with peripheral angiopathy
Diabetes Mellitus	C10EC	Type 1 diabetes mellitus with polyneuropathy
Diabetes Mellitus	C10FM	Type 2 diabetes mellitus with persistent microalbuminuria
Diabetes Mellitus	C10EM	Type 1 diabetes mellitus with ketoacidosis
Diabetes Mellitus	C10E4	Unstable type 1 diabetes mellitus
Diabetes Mellitus	C10FG	Type 2 diabetes mellitus with arthropathy
Diabetes Mellitus	C10FH	Type 2 diabetes mellitus with neuropathic arthropathy
Diabetes Mellitus	C10FQ	Type 2 diabetes mellitus with exudative maculopathy
Diabetes Mellitus	C10FC	Type 2 diabetes mellitus with nephropathy
Diabetes Mellitus	C10F4	Type 2 diabetes mellitus with ulcer
Diabetes Mellitus	C10F7	Type 2 diabetes mellitus - poor control
Diabetes Mellitus	C10FN	Type 2 diabetes mellitus with ketoacidosis
Diabetes Mellitus	C10FP	Type 2 diabetes mellitus with ketoacidotic coma
Diabetes Mellitus	C10FK	Hyperosmolar non-ketotic state in type 2 diabetes mellitus
Diabetes Mellitus	C10F6	Type 2 diabetes mellitus with retinopathy
Diabetes Mellitus	C10F3	Type 2 diabetes mellitus with multiple complications
Diabetes Mellitus	C10FL	Type 2 diabetes mellitus with persistent proteinuria
Diabetes Mellitus	C10FJ	Insulin treated Type 2 diabetes mellitus
Diabetes Mellitus	C10FF	Type 2 diabetes mellitus with peripheral angiopathy
Diabetes Mellitus	C10FR	Type 2 diabetes mellitus with gastroparesis
Diabetes Mellitus	C10FE	Type 2 diabetes mellitus with diabetic cataract
Diabetes Mellitus	C10FB	Type 2 diabetes mellitus with polyneuropathy
Diabetes Mellitus	C10FA	Type 2 diabetes mellitus with mononeuropathy
Diabetes Mellitus	C10F9	Type 2 diabetes mellitus without complication
Diabetes Mellitus	C10F2	Type 2 diabetes mellitus with neurological complications
Diabetes Mellitus	C10FD	Type 2 diabetes mellitus with hypoglycaemic coma
Epilepsy	6674.	Epilepsy associated problems
Epilepsy	F2553	Visceral reflex epilepsy
Epilepsy	F259.	Early infant epileptic encephalopathy with suppression bursts
Epilepsy	1B1W.	Transient epileptic amnesia
Epilepsy	1O30.	Epilepsy confirmed
Epilepsy	9Of3.	Epilepsy monitoring verbal invite
Epilepsy	21260	Epilepsy resolved
Epilepsy	6110.	Contraceptive advice for patients with epilepsy
Epilepsy	F256.	Infantile spasms

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Epilepsy	F250y	Other specified generalised nonconvulsive epilepsy
Epilepsy	Eu052	[X]Schizophrenia-like psychosis in epilepsy
Epilepsy	Eu05y	[X]Epileptic psychosis NOS
Epilepsy	212J.	Epilepsy resolved
Epilepsy	F2550	Jacksonian, focal or motor epilepsy
Epilepsy	667D.	Epilepsy control poor
Epilepsy	667F.	Seizure free >12 months
Epilepsy	667G.	Epilepsy restricts employment
Epilepsy	667H.	Epilepsy prevents employment
Epilepsy	667J.	Epilepsy impairs education
Epilepsy	F253.	Grand mal status
Epilepsy	667K.	Epilepsy limits activities
Epilepsy	667E.	Epilepsy care arrangement
Epilepsy	667..	Epilepsy monitoring
Epilepsy	F1321	Progressive myoclonic epilepsy
Epilepsy	F2500	Petit mal (minor) epilepsy
Epilepsy	F2510	Grand mal (major) epilepsy
Epilepsy	F2511	Neonatal myoclonic epilepsy
Epilepsy	667L.	Epilepsy does not limit activities
Epilepsy	Eu060	[X]Limbic epilepsy personality
Epilepsy	667W.	Emergency epilepsy treatment since last appointment
Epilepsy	671J0	Pre-conception advice for patients with epilepsy
Epilepsy	667V.	Many seizures a day
Epilepsy	667S.	1 to 7 seizures a week
Epilepsy	667R.	2 to 4 seizures a month
Epilepsy	Eu803	[X]Acquired aphasia with epilepsy [Landau - Kleffner]
Epilepsy	667Q.	1 to 12 seizures a year
Epilepsy	667T.	Daily seizures
Epilepsy	90f6.	Epilepsy monitoring call second letter
Epilepsy	90f5.	Epilepsy monitoring call first letter
Epilepsy	90f4.	Epilepsy monitoring telephone invite
Epilepsy	8BIF.	Epilepsy medication review
Epilepsy	667P.	No seizures on treatment
Epilepsy	667X.	No epilepsy drug side effects
Epilepsy	F25G.	Severe myoclonic epilepsy in infancy
Epilepsy	F1322	Myoclonic encephalopathy
Epilepsy	90f7.	Epilepsy monitoring call third letter
Epilepsy	F1422	Dyssynergia cerebellaris myoclonica
Epilepsy	F2501	Pykno-epilepsy
Epilepsy	667Z.	Epilepsy monitoring NOS
Epilepsy	F2502	Epileptic seizures - atonic
Epilepsy	F2504	Juvenile absence epilepsy
Epilepsy	F2505	Lennox-Gastaut syndrome
Epilepsy	F250.	Generalised nonconvulsive epilepsy
Epilepsy	F25z.	Epilepsy NOS
Epilepsy	667N.	Epilepsy severity
Epilepsy	67AF.	Pregnancy advice for patients with epilepsy
Epilepsy	F2503	Epileptic seizures - akinetic
Epilepsy	667M.	Epilepsy management plan given
Epilepsy	F2515	Tonic-clonic epilepsy
Epilepsy	F255z	Partial epilepsy without impairment of consciousness NOS
Epilepsy	F251.	Generalised convulsive epilepsy
Epilepsy	F251z	Generalised convulsive epilepsy NOS
Epilepsy	F252.	Petit mal status
Epilepsy	667C.	Epilepsy control good
Epilepsy	F2540	Temporal lobe epilepsy

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Epilepsy	F2542	Psychosensory epilepsy
Epilepsy	F251y	Other specified generalised convulsive epilepsy
Epilepsy	F2560	Hypsarrhythmia
Epilepsy	F25y1	Gelastie epilepsy
Epilepsy	F25y2	Local-related(focal)(partial) idiopathic epileptic syn seizure local onset
Epilepsy	F2541	Psychomotor epilepsy
Epilepsy	F2514	Epileptic seizures - tonic
Epilepsy	F2545	Complex partial epileptic seizure
Epilepsy	F254.	Partial epilepsy with impairment of consciousness
Epilepsy	F254z	Partial epilepsy with impairment of consciousness NOS
Epilepsy	F2551	Sensory induced epilepsy
Epilepsy	F2552	Somatosensory epilepsy
Epilepsy	F2513	Epileptic seizures - myoclonic
Epilepsy	F2554	Visual reflex epilepsy
Epilepsy	F2556	Simple partial epileptic seizure
Epilepsy	F255.	Partial epilepsy without impairment of consciousness
Epilepsy	F255y	Partial epilepsy without impairment of consciousness OS
Epilepsy	F2544	Epileptic automatism
Epilepsy	F2543	Limbic system epilepsy
Epilepsy	F2512	Epileptic seizures - clonic
Epilepsy	F2555	Unilateral epilepsy
Epilepsy	F25y3	Complex partial status epilepticus
Epilepsy	F25C.	Drug-induced epilepsy
Epilepsy	F25D.	Menstrual epilepsy
Epilepsy	F25E.	Stress-induced epilepsy
Epilepsy	F25..	Epilepsy
Epilepsy	F25F.	Photosensitive epilepsy
Epilepsy	F25y4	Benign Rolandic epilepsy
Epilepsy	F25B.	Alcohol-induced epilepsy
Epilepsy	6677.	Epilepsy drug side effects
Epilepsy	6678.	Epilepsy treatment changed
Epilepsy	6679.	Epilepsy treatment started
Epilepsy	667A.	Epilepsy treatment stopped
Epilepsy	667B.	Nocturnal epilepsy
Epilepsy	1473.	H/O: epilepsy
Epilepsy	F25A.	Juvenile myoclonic epilepsy
Epilepsy	F250z	Generalised nonconvulsive epilepsy NOS
Epilepsy	F25y5	Panayiotopoulos syndrome
Epilepsy	F25yz	Other forms of epilepsy NOS
Epilepsy	Fyu50	[X]Other generalized epilepsy and epileptic syndromes
Epilepsy	Fyu51	[X]Other epilepsy
Epilepsy	F25X.	Status epilepticus, unspecified
Epilepsy	Fyu52	[X]Other status epilepticus
Epilepsy	F25y.	Other forms of epilepsy
Epilepsy	F25y0	Cursive (running) epilepsy
Epilepsy	F2561	Salaam attacks
Epilepsy	F256z	Infantile spasms NOS
Epilepsy	F257.	Kojevnikov's epilepsy
Epilepsy	F258.	Post-ictal state
Epilepsy	Fyu59	[X]Status epilepticus, unspecified
Heart Failure	9Or..	Heart failure monitoring administration
Heart Failure	G1yz1	Rheumatic left ventricular failure
Heart Failure	G400.	Acute cor pulmonale
Heart Failure	9On2.	Left ventricular dysfunction monitoring third letter
Heart Failure	9hH1.	Excepted heart failure quality indicators: Informed dissent
Heart Failure	9h11.	Excepted from LVD quality indicators: Patient unsuitable

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Heart Failure	662h.	New York Heart Association classification - class III
Heart Failure	9h12.	Excepted from LVD quality indicators: Informed dissent
Heart Failure	9hH0.	Excepted heart failure quality indicators: Patient unsuitable
Heart Failure	9hH..	Exception reporting: heart failure quality indicators
Heart Failure	G41z.	Chronic cor pulmonale
Heart Failure	9N2p.	Seen by community heart failure nurse
Heart Failure	9N6T.	Referred by heart failure nurse specialist
Heart Failure	9On0.	Left ventricular dysfunction monitoring first letter
Heart Failure	9On1.	Left ventricular dysfunction monitoring second letter
Heart Failure	9h1..	Exception reporting: LVD quality indicators
Heart Failure	9Or5.	Heart failure monitoring third letter
Heart Failure	662i.	New York Heart Association classification - class IV
Heart Failure	661M5	Heart failure self-management plan agreed
Heart Failure	662p.	Heart failure 6 month review
Heart Failure	662T.	Congestive heart failure monitoring
Heart Failure	388D.	New York Heart Assoc classification heart failure symptoms
Heart Failure	101..	Heart failure confirmed
Heart Failure	14AM.	H/O: Heart failure in last year
Heart Failure	9On3.	Left ventricular dysfunction monitoring verbal invite
Heart Failure	14A6.	H/O: heart failure
Heart Failure	9Or3.	Heart failure monitoring first letter
Heart Failure	9On4.	Left ventricular dysfunction monitoring telephone invite
Heart Failure	9On..	Left ventricular dysfunction monitoring administration
Heart Failure	9Or0.	Heart failure review completed
Heart Failure	9Or1.	Heart failure monitoring telephone invite
Heart Failure	9Or2.	Heart failure monitoring verbal invite
Heart Failure	9Or4.	Heart failure monitoring second letter
Heart Failure	G58z.	Heart failure NOS
Heart Failure	G5800	Acute congestive heart failure
Heart Failure	G584.	Right ventricular failure
Heart Failure	662f.	New York Heart Association classification - class I
Heart Failure	662W.	Heart failure annual review
Heart Failure	G5yyA	Left ventricular diastolic dysfunction
Heart Failure	G5yy9	Left ventricular systolic dysfunction
Heart Failure	8CeC.	Preferred place of care for next exacerbation heart failure
Heart Failure	G234.	Hyperten heart&renal dis+both(congestv)heart and renal fail
Heart Failure	679X.	Heart failure education
Heart Failure	8HBE.	Heart failure follow-up
Heart Failure	8H2S.	Admit heart failure emergency
Heart Failure	8CL3.	Heart failure care plan discussed with patient
Heart Failure	8B29.	Cardiac failure therapy
Heart Failure	8CMK.	Has heart failure management plan
Heart Failure	8HHz.	Referral to heart failure exercise programme
Heart Failure	8CMW8	Heart failure clinical pathway
Heart Failure	679W1	Education about deteriorating heart failure
Heart Failure	8Hk0.	Referred to heart failure education group
Heart Failure	G2101	Malignant hypertensive heart disease with CCF
Heart Failure	G2111	Benign hypertensive heart disease with CCF
Heart Failure	G21z1	Hypertensive heart disease NOS with CCF
Heart Failure	G232.	Hypertensive heart&renal dis wth (congestive) heart failure
Heart Failure	G5540	Congestive cardiomyopathy
Heart Failure	662g.	New York Heart Association classification - class II
Heart Failure	G58..	Heart failure
Heart Failure	G582.	Acute heart failure
Heart Failure	G580.	Congestive heart failure
Heart Failure	G581.	Left ventricular failure

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Heart Failure	ZRad.	New York Heart Assoc classification heart failure symptoms
Heart Failure	G5810	Acute left ventricular failure
Heart Failure	G5801	Chronic congestive heart failure
Heart Failure	G5802	Decompensated cardiac failure
Heart Failure	G5803	Compensated cardiac failure
Heart Failure	G5804	Congestive heart failure due to valvular disease
Heart Failure	G580.	Right ventricular failure
Hypertension	G241z	Secondary benign hypertension NOS
Hypertension	G24z.	Secondary hypertension NOS
Hypertension	G2400	Secondary malignant renovascular hypertension
Hypertension	G24z0	Secondary renovascular hypertension NOS
Hypertension	G24z1	Hypertension secondary to drug
Hypertension	G24zz	Secondary hypertension NOS
Hypertension	Gyu21	[X]Hypertension secondary to other renal disorders
Hypertension	G240.	Secondary malignant hypertension
Hypertension	L1220	Other pre-existing hypertension in preg/childb/puerp unspec
Hypertension	L1282	Pre-exist 2ndry hypertens comp preg childbth and puerperium
Hypertension	L127z	Pre-eclampsia or eclampsia + pre-existing hypertension NOS
Hypertension	L128.	Pre-exist hypertension compl preg childbirth and puerperium
Hypertension	L1280	Pre-exist hyperten heart dis compl preg childbth+puerperium
Hypertension	TJC7.	Adverse reaction to other antihypertensives
Hypertension	L122z	Other pre-existing hypertension in preg/childb/puerp NOS
Hypertension	TJC7z	Adverse reaction to antihypertensives NOS
Hypertension	61462	Hypertension induced by oral contraceptive pill
Hypertension	G24..	Secondary hypertension
Hypertension	L127.	Pre-eclampsia or eclampsia with pre-existing hypertension
Hypertension	G2410	Secondary benign renovascular hypertension
Hypertension	L1221	Other pre-existing hypertension in preg/childb/puerp - deliv
Hypertension	U60C5	[X]Oth antihyperten drug caus advers eff in therap use, NEC
Hypertension	L1223	Other pre-exist hypertension in preg/childb/puerp-not deliv
Hypertension	G672.	Hypertensive encephalopathy
Hypertension	L122.	Other pre-existing hypertension in preg/childbirth/puerp
Hypertension	Gyu2.	[X]Hypertensive diseases
Hypertension	G2z..	Hypertensive disease NOS
Hypertension	G20z.	Essential hypertension NOS
Hypertension	G241.	Secondary benign hypertension
Hypertension	G234.	Hyperten heart&renal dis+both(congestv)heart and renal fail
Hypertension	G240z	Secondary malignant hypertension NOS
Hypertension	G244.	Hypertension secondary to endocrine disorders
Hypertension	G2y..	Other specified hypertensive disease
Hypertension	G232.	Hypertensive heart&renal dis wth (congestive) heart failure
Hypertension	G2...	Hypertensive disease
Hypertension	G2111	Benign hypertensive heart disease with CCF
Hypertension	G21z0	Hypertensive heart disease NOS without CCF
Hypertension	G21z1	Hypertensive heart disease NOS with CCF
Hypertension	G22z.	Hypertensive renal disease NOS
Hypertension	G2101	Malignant hypertensive heart disease with CCF
Hypertension	662F.	Hypertension treatm. started
Hypertension	G233.	Hypertensive heart and renal disease with renal failure
Hypertension	G231.	Benign hypertensive heart and renal disease
Hypertension	G230.	Malignant hypertensive heart and renal disease
Hypertension	G23..	Hypertensive heart and renal disease
Hypertension	G222.	Hypertensive renal disease with renal failure
Hypertension	G221.	Benign hypertensive renal disease
Hypertension	G220.	Malignant hypertensive renal disease
Hypertension	G200.	Malignant essential hypertension

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Hypertension	8B26.	Antihypertensive therapy
Hypertension	G22..	Hypertensive renal disease
Hypertension	G201.	Benign essential hypertension
Hypertension	G202.	Systolic hypertension
Hypertension	G21z.	Hypertensive heart disease NOS
Hypertension	G203.	Diastolic hypertension
Hypertension	G210.	Malignant hypertensive heart disease
Hypertension	G2100	Malignant hypertensive heart disease without CCF
Hypertension	G211.	Benign hypertensive heart disease
Hypertension	G2110	Benign hypertensive heart disease without CCF
Hypertension	G21..	Hypertensive heart disease
Hypertension	G21zz	Hypertensive heart disease NOS
Hypertension	662c.	Hypertension six month review
Hypertension	662d.	Hypertension annual review
Hypertension	662r.	Trial withdrawal of antihypertensive therapy
Hypertension	7Q01.	High cost hypertension drugs
Hypertension	8BL0.	Patient on maximal tolerated antihypertensive therapy
Hypertension	662b.	Moderate hypertension control
Hypertension	8I3N.	Hypertension treatment refused
Hypertension	F4042	Blind hypertensive eye
Hypertension	F4213	Hypertensive retinopathy
Hypertension	G23z.	Hypertensive heart and renal disease NOS
Hypertension	14A2.	H/O: hypertension
Hypertension	21261	Hypertension resolved
Hypertension	212K.	Hypertension resolved
Hypertension	662O.	On treatment for hypertension
Hypertension	9OI9.	Hypertens.monitor deleted
Hypertension	6627.	Good hypertension control
Hypertension	6628.	Poor hypertension control
Hypertension	662G.	Hypertensive treatm.changed
Hypertension	G20..	Essential hypertension
Hypertension	6624.	Borderline hyperten:yearly obs
Inflammatory Bowel Disease	J4...	Inflammatory bowel disease
Inflammatory Bowel Disease	ZR3S.	CDAI - Crohn's disease activity index
Inflammatory Bowel Disease	ZR3S.	Crohn's disease activity index
Inflammatory Bowel Disease	N0453	Juvenile arthritis in Crohn's disease
Inflammatory Bowel Disease	N0311	Arthropathy in Crohn's disease
Inflammatory Bowel Disease	Jyu40	[X]Other Crohn's disease
Inflammatory Bowel Disease	J40z.	Crohn's disease NOS
Inflammatory Bowel Disease	J4005	Exacerbation of Crohn's disease of small intestine
Inflammatory Bowel Disease	J401z	Crohn's colitis
Inflammatory Bowel Disease	J40..	Crohn's disease
Inflammatory Bowel Disease	J4002	Crohn's disease of the terminal ileum
Inflammatory Bowel Disease	J4003	Crohn's disease of the ileum unspecified
Inflammatory Bowel Disease	J401z	Crohn's disease of the large bowel NOS
Inflammatory Bowel Disease	J4012	Exacerbation of Crohn's disease of large intestine
Inflammatory Bowel Disease	J400z	Crohn's disease of the small bowel NOS
Inflammatory Bowel Disease	J4004	Crohn's disease of the ileum NOS
Inflammatory Bowel Disease	J40..	Regional enteritis - Crohn's disease
Inflammatory Bowel Disease	J41..	Ulcerative colitis and/or proctitis
Inflammatory Bowel Disease	N0454	Juvenile arthritis in ulcerative colitis
Inflammatory Bowel Disease	N0310	Arthropathy in ulcerative colitis
Inflammatory Bowel Disease	Jyu41	[X]Other ulcerative colitis
Inflammatory Bowel Disease	J41z.	Idiopathic proctocolitis NOS
Inflammatory Bowel Disease	J41yz	Other idiopathic proctocolitis NOS
Inflammatory Bowel Disease	J41y.	Other idiopathic proctocolitis

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Inflammatory Bowel Disease	J412.	Ulcerative (chronic) ileocolitis
Inflammatory Bowel Disease	J410z	Ulcerative proctocolitis NOS
Inflammatory Bowel Disease	J08z9	Orofacial Crohn's disease
Inflammatory Bowel Disease	J4104	Exacerbation of ulcerative colitis
Inflammatory Bowel Disease	J4103	Ulcerative proctitis
Inflammatory Bowel Disease	J4101	Ulcerative colitis
Inflammatory Bowel Disease	J4100	Ulcerative ileocolitis
Inflammatory Bowel Disease	J410.	Ulcerative proctocolitis
Inflammatory Bowel Disease	J41..	Idiopathic proctocolitis
Inflammatory Bowel Disease	14C4.	H/O: ulcerative colitis
Inflammatory Bowel Disease	J411.	Ulcerative (chronic) enterocolitis
Osteoporosis	N331M	Fragility fracture due to unspecified osteoporosis
Osteoporosis	NyuB8	[X]Unspecified osteoporosis with pathological fracture
Osteoporosis	NyuB2	[X]Osteoporosis in other disorders classified elsewhere
Osteoporosis	NyuB1	[X]Other osteoporosis
Osteoporosis	N3312	Postoophorectomy osteoporosis with pathological fracture
Osteoporosis	NyuB0	[X]Other osteoporosis with pathological fracture
Osteoporosis	N330A	Osteoporosis in endocrine disorders
Osteoporosis	N331K	Collapse of thoracic vertebra due to osteoporosis
Osteoporosis	N331J	Collapse of lumbar vertebra due to osteoporosis
Osteoporosis	N331H	Collapse of cervical vertebra due to osteoporosis
Osteoporosis	N331B	Postmenopausal osteoporosis with pathological fracture
Osteoporosis	N331L	Collapse of vertebra due to osteoporosis NOS
Osteoporosis	N3746	Osteoporotic kyphosis
Osteoporosis	N3318	Osteoporosis + pathological fracture lumbar vertebrae
Osteoporosis	N3316	Idiopathic osteoporosis with pathological fracture
Osteoporosis	N3315	Drug-induced osteoporosis with pathological fracture
Osteoporosis	N3314	Postsurgical malabsorption osteoporosis with path fracture
Osteoporosis	N331A	Osteoporosis + pathological fracture cervical vertebrae
Osteoporosis	N3313	Osteoporosis of disuse with pathological fracture
Osteoporosis	N3319	Osteoporosis + pathological fracture thoracic vertebrae
Osteoporosis	N330.	Osteoporosis
Osteoporosis	N330D	Osteoporosis due to corticosteroids
Osteoporosis	N330C	Osteoporosis localized to spine
Osteoporosis	N330B	Vertebral osteoporosis
Osteoporosis	N330z	Osteoporosis NOS
Osteoporosis	N3307	Postsurgical malabsorption osteoporosis
Osteoporosis	N3306	Postoophorectomy osteoporosis
Osteoporosis	N3305	Drug-induced osteoporosis
Osteoporosis	N3304	Dissuse osteoporosis
Osteoporosis	N3303	Idiopathic osteoporosis
Osteoporosis	9kj0.	Bone sparing drug treatment offered for osteoporosis - ESA
Osteoporosis	N3302	Postmenopausal osteoporosis
Osteoporosis	N3300	Osteoporosis, unspecified
Osteoporosis	9Od..	Osteoporosis monitoring administration
Osteoporosis	9Od9.	Osteoporosis monitoring check done
Osteoporosis	9Od8.	Osteoporosis monitoring deleted
Osteoporosis	9Od7.	Osteoporosis monitoring telephone invitation
Osteoporosis	N3301	Senile osteoporosis
Osteoporosis	N331N	Fragility fracture
Osteoporosis	9Od4.	Osteoporosis monitoring second letter
Osteoporosis	9Od3.	Osteoporosis monitoring first letter
Osteoporosis	9Od2.	Osteoporosis monitoring default
Osteoporosis	9Od0.	Attends osteoporosis monitoring
Osteoporosis	9Od6.	Osteoporosis monitoring verbal invitation
Osteoporosis	9kj..	Osteoporosis - enhanced services administration

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Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Osteoporosis	9Od5.	Osteoporosis monitoring third letter
Osteoporosis	58EV.	Femoral neck DEXA scan result osteoporotic
Osteoporosis	58EM.	Lumbar DXA scan result osteoporotic
Osteoporosis	58EG.	Hip DXA scan result osteoporotic
Osteoporosis	14GB.	History of osteoporosis
Osteoporosis	66a..	Osteoporosis monitoring
PVD	C1070	Diabetes mellitus, juvenile +peripheral circulatory disorder
PVD	C107.	Diabetes mellitus with peripheral circulatory disorder
PVD	A3A0F	Gas gangrene-foot
PVD	7A49.	Reconstruction of femoral artery or popliteal artery
PVD	2G63.	Ischaemic toe
PVD	14F7.	H/O: arterial lower limb ulcer
PVD	7A4A3	Open embolectomy popliteal artery
PVD	G74y3	Embolism and thrombosis of the iliac artery unspecified
PVD	7A4A2	Open embolectomy of femoral artery
PVD	14NB.	H/O: Peripheral vascular disease procedure
PVD	G73zz	Peripheral vascular disease NOS
PVD	7A41C	Bypass leg artery by aorta/deep femoral art anastomosis NEC
PVD	7A41B	Bypass leg artery by aorta/com femoral art anastomosis NEC
PVD	7A419	Bypass common iliac artery by aorta/com iliac art anast NEC
PVD	7A416	Emerg bypass leg artery by aorta/com fem art anastomosis NEC
PVD	G740.	Aortoiliac obstruction
PVD	7A414	Emerg bypass comm iliac art by aorta/com iliac art anast NEC
PVD	7A4A.	Other open operations on femoral artery or popliteal artery
PVD	C1071	Diabetes mellitus, adult, + peripheral circulatory disorder
PVD	G73y6	Acroparaesthesia - unspecified
PVD	G73y2	Acrocyanosis
PVD	G73y1	Peripheral angiopathic disease EC NOS
PVD	G73y0	Diabetic peripheral angiopathy
PVD	G73y.	Other specified peripheral vascular disease
PVD	G73y4	Acroparaesthesia - Schultze's type
PVD	C1074	NIDDM with peripheral circulatory disorder
PVD	7A47.	Other emergency bypass of femoral artery or popliteal artery
PVD	7A48.	Other bypass of femoral artery or popliteal artery
PVD	7A431	Open embolectomy of iliac artery
PVD	7A43.	Other open operations on iliac artery
PVD	C1073	IDDM with peripheral circulatory disorder
PVD	7A421	Endarterectomy of iliac artery NEC
PVD	7A42.	Reconstruction of iliac artery
PVD	7A413	Bypass iliac artery by femoral/femoral art anastomosis NEC
PVD	7A412	Emerg bypass iliac artery by femoral/femoral art anast NEC
PVD	7A123	Bypass bifurcation aorta by anastom aorta to iliac artery
PVD	7A420	Endarterectomy and patch repair of iliac artery
PVD	7A430	Repair of iliac artery NEC
PVD	7A410	Emerg bypass iliac art by iliac/femoral art anastomosis NEC
PVD	7A120	Emerg bypass bifurc aorta by anast aorta to femoral artery
PVD	M2714	Mixed venous and arterial leg ulcer
PVD	M2710	Ischaemic ulcer diabetic foot
PVD	M271.	Ischaemic leg ulcer
PVD	Gyu74	[X]Other specified peripheral vascular diseases
PVD	G742z	Peripheral arterial embolism and thrombosis NOS
PVD	M2713	Arterial leg ulcer
PVD	G7426	Embolism and thrombosis of the anterior tibial artery
PVD	7A41.	Other bypass of iliac artery
PVD	7A12.	Other bypass of bifurcation of aorta
PVD	7A102	Axillo-bifemoral bypass graft

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
PVD	7A101	Bypass aorta by anastomosis axillary to femoral artery NEC
PVD	G7427	Embolism and thrombosis of the dorsalis pedis artery
PVD	7A100	Emerg aortic bypass by anastomosis axillary to femoral art
PVD	G74y2	Embolism and/or thrombosis of the external iliac artery
PVD	G74y1	Embolism and/or thrombosis of the internal iliac artery
PVD	G74y0	Embolism and/or thrombosis of the common iliac artery
PVD	G7429	Embolism and thrombosis of a leg artery NOS
PVD	7A103	Axillo-unifemoral PTFE bypass graft
PVD	R0542	[D]Gangrene of toe in diabetic
PVD	7A192	Open embolectomy of bifurcation of aorta
PVD	7A12z	Other bypass of bifurcation of aorta NOS
PVD	7A411	Bypass iliac artery by iliac/femoral artery anastomosis NEC
PVD	7A41F	Ilio-femoral prosthetic cross over graft
PVD	7A44z	Transluminal operation on iliac artery NOS
PVD	7A44y	Other specified transluminal operation on iliac artery
PVD	7A444	Percutaneous transluminal insertion of iliac artery stent
PVD	7A443	Insertion of iliac artery stent
PVD	R0543	[D]Widespread diabetic foot gangrene
PVD	7A41y	Other specified other bypass of iliac artery
PVD	7A433	Open insertion of iliac artery stent
PVD	7A42z	Reconstruction of iliac artery NOS
PVD	7A42y	Other specified reconstruction of iliac artery
PVD	7A41z	Other bypass of iliac artery NOS
PVD	7A440	Percutaneous transluminal angioplasty of iliac artery
PVD	7A12y	Other specified other bypass of bifurcation of aorta
PVD	G7425	Embolism and thrombosis of the popliteal artery
PVD	G7424	Embolism and thrombosis of the femoral artery
PVD	7A441	Percutaneous transluminal embolectomy of iliac artery
PVD	G733.	Ischaemic foot
PVD	7A47B	Emerg bypass pop art by pop/peron art anast c vein graft NEC
PVD	7A493	Endarterectomy of popliteal artery NEC
PVD	7A47C	Emerg bypass femoral artery by fem/fem art anastomosis NEC
PVD	7A47y	Other emergency bypass of femoral or popliteal artery OS
PVD	7A47z	Other emergency bypass of femoral or popliteal artery NOS
PVD	7A480	Bypass femoral artery by fem/pop art anast c prosthesis NEC
PVD	7A481	Bypass popliteal artery by pop/pop a anast c prosthesis NEC
PVD	G73y7	Erythrocytosis
PVD	7A482	Bypass femoral artery by fem/pop art anast c vein graft NEC
PVD	7A47D	Emerg bypass popliteal artery by pop/fem art anastomosis NEC
PVD	7A4B3	Percutaneous transluminal embolectomy of popliteal artery
PVD	7A4B4	Percutaneous transluminal embolisation of femoral artery
PVD	7A4B5	Percutaneous transluminal embolisation of popliteal artery
PVD	7A4B8	Percut translum thrombolysis femoral graft streptokinase
PVD	7A4B9	Percutaneous transluminal insertion of stent femoral artery
PVD	7A50.	Revision of reconstruction of artery
PVD	7A494	Profundoplasty femoral artery & patch repair deep fem artery
PVD	7A483	Bypass popliteal artery by pop/pop a anast c vein graft NEC
PVD	7A477	Emerg bypass pop art by pop/tib art anast c vein graft NEC
PVD	7A486	Bypass femoral artery by fem/tib art anast c vein graft NEC
PVD	7A487	Bypass popliteal artery by pop/tib a anast c vein graft NEC
PVD	7A488	Bypass femoral artery by fem/peron a anast c prosthesis NEC
PVD	7A48A	Bypass femoral artery by fem/peron a anast c vein graft NEC
PVD	7A48B	Bypass popliteal art by pop/peron art anast c vein graft NEC
PVD	7A48C	Bypass femoral artery by femoral/femoral art anastomosis NEC
PVD	7A48D	Bypass popliteal artery by pop/fem artery anastomosis NEC
PVD	7A48E	Femoro-femoral prosthetic cross over graft

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Supplementary Appendix 1: Continued

Condition	Read code	Read code description
PVD	7A476	Emerg bypass femoral art by fem/tib a anast c vein graft NEC
PVD	7A48y	Other bypass of femoral artery or popliteal artery OS
PVD	7A490	Endarterectomy and patch repair of femoral artery
PVD	7A491	Endarterectomy and patch repair of popliteal artery
PVD	7A492	Endarterectomy of femoral artery NEC
PVD	7A485	Bypass popliteal artery by pop/tib a anast c prosthesis NEC
PVD	7A484	Bypass femoral artery by fem/tib art anast c prosthesis NEC
PVD	7A472	Emerg bypass femoral art by fem/pop a anast c vein graft NEC
PVD	7A473	Emerg bypass pop art by pop/pop art anast c vein graft NEC
PVD	7A474	Emerg bypass femoral art by fem/tib art anast c prosth NEC
PVD	7A48z	Other bypass of femoral artery or popliteal artery NOS
PVD	7A500	Revision of reconstruction involving aorta
PVD	7A4B1	Percutaneous transluminal angioplasty of popliteal artery
PVD	7A4A0	Repair of femoral artery NEC
PVD	7A471	Emerg bypass popliteal art by pop/pop art anast c prosth NEC
PVD	G7320	Gangrene of toe
PVD	G732.	Peripheral gangrene
PVD	G731z	Thromboangiitis obliterans NOS
PVD	G7310	Buerger's disease
PVD	7A470	Emerg bypass femoral art by fem/pop art anast c prosth NEC
PVD	7A502	Revision of reconstruction involving femoral artery
PVD	G731.	Thromboangiitis obliterans
PVD	G700.	Aorto-iliac disease
PVD	C108G	Insulin dependent diab mell with peripheral angiopathy
PVD	C107z	Diabetes mellitus NOS with peripheral circulatory disorder
PVD	G702z	Extremity artery atheroma NOS
PVD	G7321	Gangrene of foot
PVD	G73z.	Peripheral vascular disease NOS
PVD	G73yz	Other specified peripheral vascular disease NOS
PVD	G73y8	Erythromelalgia
PVD	G702.	Extremity artery atheroma
PVD	7A4B0	Percutaneous transluminal angioplasty of femoral artery
PVD	7A503	Revision of reconstruction of popliteal artery
PVD	G73..	Other peripheral vascular disease
PVD	G73y5	Acroparaesthesia - Nothnagel's type
PVD	G73z0	Intermittent claudication
PVD	R0550	[D]Failure of peripheral circulation
PVD	7A501	Revision of reconstruction involving iliac artery
PVD	7A121	Bypass bifurc aorta by anastom aorta to femoral artery NEC
PVD	7A495	Profundoplasty and patch repair of popliteal artery
PVD	7A4Ay	Other open operation on femoral or popliteal artery OS
PVD	7A496	Profundoplasty of femoral artery NEC
PVD	7A498	Reconstruction of femoral artery with vein graft
PVD	7A499	Reconstruction of popliteal artery with vein graft
PVD	7A49y	Reconstruction of femoral or popliteal artery OS
PVD	7A4B2	Percutaneous transluminal embolectomy of femoral artery
PVD	7A49z	Reconstruction of femoral or popliteal artery NOS
PVD	7A4A1	Repair of popliteal artery NEC
PVD	7A4A7	Repair of femoral artery with temporary silastic shunt
PVD	7A4A8	Repair of popliteal artery with temporary silastic shunt
PVD	7A497	Profundoplasty of popliteal artery NEC
Rheumatoid Arthritis	N0422	Rheumatoid nodule
Rheumatoid Arthritis	N042z	Rheumatoid arthropathy + visceral/systemic involvement NOS
Rheumatoid Arthritis	N040F	Rheumatoid arthritis of ankle
Rheumatoid Arthritis	N040R	Rheumatoid nodule
Rheumatoid Arthritis	N0405	Rheumatoid arthritis of elbow

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Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Rheumatoid Arthritis	N005.	Adult Still's Disease
Rheumatoid Arthritis	N040.	Rheumatoid arthritis
Rheumatoid Arthritis	N0400	Rheumatoid arthritis of cervical spine
Rheumatoid Arthritis	N0401	Other rheumatoid arthritis of spine
Rheumatoid Arthritis	H570.	Rheumatoid lung
Rheumatoid Arthritis	N0421	Rheumatoid lung disease
Rheumatoid Arthritis	N040H	Rheumatoid arthritis of talonavicular joint
Rheumatoid Arthritis	N040J	Rheumatoid arthritis of other tarsal joint
Rheumatoid Arthritis	N040K	Rheumatoid arthritis of 1st MTP joint
Rheumatoid Arthritis	N040N	Rheumatoid vasculitis
Rheumatoid Arthritis	N042.	Other rheumatoid arthropathy + visceral/systemic involvement
Rheumatoid Arthritis	N040P	Seronegative rheumatoid arthritis
Rheumatoid Arthritis	N040S	Rheumatoid arthritis - multiple joint
Rheumatoid Arthritis	N040G	Rheumatoid arthritis of subtalar joint
Rheumatoid Arthritis	N040T	Flare of rheumatoid arthritis
Rheumatoid Arthritis	N041.	Felty's syndrome
Rheumatoid Arthritis	N040Q	Rheumatoid bursitis
Rheumatoid Arthritis	N0402	Rheumatoid arthritis of shoulder
Rheumatoid Arthritis	F3964	Myopathy due to rheumatoid arthritis
Rheumatoid Arthritis	G5y8.	Rheumatoid myocarditis
Rheumatoid Arthritis	14G1.	H/O: rheumatoid arthritis
Rheumatoid Arthritis	Nyu1G	[X]Seropositive rheumatoid arthritis, unspecified
Rheumatoid Arthritis	N0406	Rheumatoid arthritis of distal radio-ulnar joint
Rheumatoid Arthritis	Nyu12	[X]Other specified rheumatoid arthritis
Rheumatoid Arthritis	N04y2	Adult-onset Still's disease
Rheumatoid Arthritis	N04y0	Fibrosing alveolitis associated with rheumatoid arthritis
Rheumatoid Arthritis	N04y0	Caplan's syndrome
Rheumatoid Arthritis	N04y0	Rheumatoid lung
Rheumatoid Arthritis	Nyu11	[X]Other seropositive rheumatoid arthritis
Rheumatoid Arthritis	F3712	Polyneuropathy in rheumatoid arthritis
Rheumatoid Arthritis	N047.	Seropositive erosive rheumatoid arthritis
Rheumatoid Arthritis	N0407	Rheumatoid arthritis of wrist
Rheumatoid Arthritis	N0408	Rheumatoid arthritis of MCP joint
Rheumatoid Arthritis	N0409	Rheumatoid arthritis of PIP joint of finger
Rheumatoid Arthritis	66H..	Rheumatoid arthrit. monitoring
Rheumatoid Arthritis	N040A	Rheumatoid arthritis of DIP joint of finger
Rheumatoid Arthritis	N040D	Rheumatoid arthritis of knee
Rheumatoid Arthritis	N04X.	"Seropositive rheumatoid arthritis, unspecified"
Rheumatoid Arthritis	G5yA.	Rheumatoid carditis
Rheumatoid Arthritis	2G27.	O/E-hands-rheumatoid spindling
Rheumatoid Arthritis	N040B	Rheumatoid arthritis of hip
Stroke & TIA	Z7CE7	Transient global amnesia
Stroke & TIA	ZV125	[V]Personal history of stroke
Stroke & TIA	G66..	Stroke unspecified
Stroke & TIA	G66..	Stroke and cerebrovascular accident unspecified
Stroke & TIA	G65..	Transient cerebral ischaemia
Stroke & TIA	G64z1	Wallenberg syndrome
Stroke & TIA	14AB.	H/O: TIA
Stroke & TIA	G641.	Cerebral embolism
Stroke & TIA	G64..	Cerebral arterial occlusion
Stroke & TIA	14A7.	H/O: CVA/stroke
Stroke & TIA	ZV12D	[V]Personal history of transient ischaemic attack
Stroke & TIA	G65zz	Transient cerebral ischaemia NOS
Stroke & TIA	G65z.	Transient cerebral ischaemia NOS
Stroke & TIA	G65z1	Intermittent cerebral ischaemia
Stroke & TIA	G664.	Cerebellar stroke syndrome

Continued

Supplementary Appendix 1: Continued

Condition	Read code	Read code description
Stroke & TIA	G64z.	Cerebral infarction NOS
Stroke & TIA	G656.	Vertebrobasilar insufficiency
Stroke & TIA	G655.	Transient global amnesia
Stroke & TIA	G650.	Insufficiency - basilar artery
Stroke & TIA	Fyu55	[X]Other transnt cerebral ischaemic attacks+related syndroms
Stroke & TIA	F4236	Amaurosis fugax
Stroke & TIA	8CRB.	Transient ischaemic attack clinical management plan
Stroke & TIA	G65y.	Other transient cerebral ischaemia
Stroke & TIA	1B1S.	Transient global amnesia
Stroke & TIA	G657.	Carotid territory transient ischaemic attack
Stroke & TIA	Gyu6C	[X]Sequelae of stroke,not specfd as h'morrhage or infarction
Stroke & TIA	G68X.	Sequelae of stroke,not specfd as h'morrhage or infarction
Stroke & TIA	G668.	Right sided CVA
Stroke & TIA	G667.	Left sided CVA
Stroke & TIA	G666.	Pure sensory lacunar syndrome
Stroke & TIA	G665.	Pure motor lacunar syndrome
Stroke & TIA	14AB0	H/O amaurosis fugax
Stroke & TIA	G663.	Brain stem stroke syndrome
Stroke & TIA	Fyu56	[X]Other lacunar syndromes
Stroke & TIA	9h2..	Exception reporting: stroke quality indicators
Stroke & TIA	9h22.	Excepted from stroke quality indicators: Informed dissent
Stroke & TIA	9h21.	Excepted from stroke quality indicators: Patient unsuitable
Stroke & TIA	8IEC.	Ref multidisciplinary stroke function improvement declined
Stroke & TIA	8HHM.	Ref to multidisciplinary stroke function improvement service
Stroke & TIA	G64z0	Brainstem infarction
Stroke & TIA	7P242	Delivery of rehabilitation for stroke
Stroke & TIA	Gyu6G	[X]Cereb infarct due unsp occlus/stenos precerebr arteries
Stroke & TIA	662M1	Stroke 6 month review
Stroke & TIA	661N7	Stroke self-management plan review
Stroke & TIA	661M7	Stroke self-management plan agreed
Stroke & TIA	1M4..	Central post-stroke pain
Stroke & TIA	14AK.	H/O: Stroke in last year
Stroke & TIA	662M2	Stroke initial post discharge review
Stroke & TIA	662M.	Stroke monitoring
Stroke & TIA	Gyu63	[X]Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artr
Stroke & TIA	G6X..	Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artr
Stroke & TIA	G6W..	Cereb infarct due unsp occlus/stenos precerebr arteries
Stroke & TIA	G683.	Sequelae of cerebral infarction
Stroke & TIA	G64z4	Infarction of basal ganglia
Stroke & TIA	G64z3	Right sided cerebral infarction
Stroke & TIA	Gyu64	[X]Other cerebral infarction
Stroke & TIA	G64z2	Left sided cerebral infarction
Stroke & TIA	L440.	CVA - cerebrovascular accident in the puerperium
Stroke & TIA	G640.	Cerebral thrombosis
Stroke & TIA	G6400	Cerebral infarction due to thrombosis of cerebral arteries
Stroke & TIA	G63y1	Cerebral infarction due to embolism of precerebral arteries
Stroke & TIA	G63y0	Cerebral infarct due to thrombosis of precerebral arteries
Stroke & TIA	G63..	Infarction - precerebral
Stroke & TIA	662e.	Stroke/CVA annual review
Stroke & TIA	G6410	Cerebral infarction due to embolism of cerebral arteries

Supplementary Appendix 2: welsh_standard_populations.docx – population of Wales grouped by age groups and gender (used as standard population)

Age group	Gender	Population estimate (2018)
0-19	Female	342523
0-19	Male	361517
20-29	Female	198754
20-29	Male	212900
30-39	Female	186826
30-39	Male	185025
40-49	Female	191784
40-49	Male	183742
50-59	Female	222449
50-59	Male	211466
60-69	Female	191600
60-69	Male	182235
70-79	Female	155561
70-79	Male	141790
80+	Female	101825
80+	Male	68634
Age group	Gender	Population estimate (2020)
0-19	Female	341354
0-19	Male	360423
20-29	Female	199339
20-29	Male	215332
30-39	Female	192237
30-39	Male	190308
40-49	Female	186136
40-49	Male	179259
50-59	Female	225673
50-59	Male	213519
60-69	Female	194142
60-69	Male	183229
70-79	Female	163436
70-79	Male	149473
80+	Female	103745
80+	Male	71981

