

# Primary care coding activity related to online consultations

## Exploratory analysis using OpenSAFELY

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## Background

### OpenSAFELY

[OpenSAFELY](#) is a new secure analytics platform for electronic health records (EHR) in the NHS, created to deliver urgent results during the global COVID-19 emergency. The platform uses a novel approach for enhanced security and timely data access that avoids the need to migrate large volumes of disclosive pseudonymised patient data outside of the secure environments managed by the EHR software companies (e.g. TPP); instead, it relies on trusted analysts to run computations and analysis on near real-time pseudonymised patient records still held inside the data centres and secure cloud environments of EHR companies.

In this particular report we look into understanding online consultations coding (OC) activity in general practices, via OpenSAFELY-TPP. We would welcome your feedback. This is being seen as a necessary pre-requirement step before scoping how OpenSAFELY and primary care code data could be used in the future to answer further analytical or research questions around online consultations. This work has used elements and learnings from the [Service Restoration Observatory](#) (SRO), to inform and develop the analysis.

### NHSE/I Online consultations project

This particular analysis is being carried out in the context of the NHSE/I Digital First Primary Care programme, which has led the work on enabling and stimulating the use of online consultation systems as a means to improve access to primary care and make best use of clinicians' time. The (pre-covid) commitment was to ensure online consultation would be procured, installed and available in all practices by 30 April 2020. Based on a rapid national collection [7] stood up in April 2020, as of 1st of April 2021 collection-reported OC capability stands at circa 84% of England practices and utilisation stands at close to 10 weekly online consultation submissions per 1,000 GP practice population (some of this may be understated due to collection coverage).<sup>1</sup>

A wider Evaluation of the digital first approach in response to Covid-19 has been commissioned by DFPC and is ongoing.

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<sup>1</sup> Implementation supplier activity data on OC/VC collected under the Control of Patient Information notice under COVID. Figures retrieved 01/04/2021 from the *GP Online & Video Consultations Dashboard* on the FutureNHS Digital IPC Workspace [7]. The dashboard is available for NHS Organisations to use for the purposes of supporting implementation across Primary Care. Access requires authentication and authorisation.

## Online consultations project and OpenSAFELY

OpenSAFELY was identified last year as a means of providing further rich intelligence (ranging from demographics to pathways and service use).

Given the recent and diverse nature of online consultations as a modality, the low maturity and guidelines around online consultation coding and the limited insight of the practice coding to date, it was agreed that the exploration should primarily focus on:

- a) understanding **coding use and prevalence in the primary care record** by codes of interest, over time and in terms of national variation.

*This loosely draws on the OpenSAFELY Service Restoration Observatory framework, though 'Online consultations' is formally a standalone approved project.*

- b) understanding **broad demographics** of those associated with online consultation-relevant codes.

*This draws on point 4 of the initial DFPC request brief and was also judged to be an area where OpenSAFELY could be more readily leveraged while avoiding some complications around defining 'OC consultation' as a physical unit.*

These two areas are the focus of the present report and analysis. They may help inform further research questions and their feasibility.

It should also be noted that not only OpenSAFELY itself, but also the framework and procedures by which non- OpenSAFELY / DataLab researchers access and use the platform are still in active development and being trialled (Phase 2 in the OpenSAFELY project plan). As such, the present analysis project is part of a wider case study and pilot into OpenSAFELY 'Ways of working' for external researchers (including NHSE/IX analysts). Functionality and means for raising requests may evolve in the future to improve insight and facilitate project commissioning, scope and turnaround. Coverage, which up to now has mainly covered TPP (OpenSAFELY-TPP) has been extended to the EMIS EHR system (OpenSAFELY-EMIS) [8]. The OpenSAFELY team is currently running a [pilot to onboard](#) any new approved users or researchers [9].

## Methods

Using OpenSAFELY-TPP, covering 40% of England's population, we have assessed coding activity in general practice from January 2019 until December 2020. This gives us data pre- and post the first wave. It also covers the period during which online consultation systems were widespread implemented across GP practices.

### Methods - read codes relevant to online consultations

#### Coding systems

In general practice, staff record information about patients using clinical coding systems such as SNOMED-CT and dm+d.

System TPP is now fully compliant with SNOMED, with GPs using it in their front-end interactions with EHR systems having previously used CTV3. OpenSAFELY can query the records using either CTV3 or SNOMED which allows flexibility on querying some past activity that cannot be easily

mapped to SNOMED-CT. A SNOMED-CT codelist has been created on OpenCodelists [here](#) and is available for inspection and re-use by anyone.

### Approach to deciding read codes for interrogation

We could not ascertain the existence of a nationally recognised codelist for online consultations. The codelist was developed as follows:

- browse the [SNOMED CT Term Browser](#) for relevant keywords \* and children . Find its CTV3 equivalent (refset), if listed;
- browse the ["Read CTV3 to SNOMED CT Mapping Lookup \(April 2020\)"](#) for relevant keywords \* and children. Find its SNOMED equivalent, if listed;
- Browse [local TPP codes](#);
- Pragmatically browse the literature, online resources and white publications for further code indications [1-5];
- obtain clinical/programme input via the Digital First Primary Care programme (DFPC) on initially found codes of interest (long list from a-d), as well as further codes, to arrive at a refined list;

#### Keywords:

consultation (procedure); econsultation; indirect encounter; online; remote triage; telemedicine; telepractice

### SNOMED shortlist

The short-listed read codes in SNOMED were (codelist builder draft [here](#)):

Code	name	note	ctv3/local TPP equiv.
1068881000000101	eConsultation via online application (procedure)	snomed ct browser ("online"); Twitter	Y1f3b
978871000000104	Consultation via multimedia (procedure)	snomed ct browser (child of consultation (procedure))	
448337001	Telemedicine consultation with patient (procedure)	snomed ct browser (child of consultation (procedure))	XaXcK
868184008	Telemedicine consultation with provider (procedure)	snomed ct browser (child of consultation (procedure))	
719407002	Remote non-verbal consultation (procedure)	snomed ct browser (child of consultation (procedure))	
763184009	Telepractice consultation (procedure)	snomed ct browser (child of "indirect encounter")	
185320006	Encounter by computer link (procedure)	snomed ct browser (child of "indirect encounter")	9N34. .9N34
1090371000000106	Referral to remote triage and advice service (procedure)	snomed ct browser ("remote triage")	
325951000000102	Remote assessment encounter type (record artifact)	snomed ct browser ("remote")	
325871000000103	Remote consultation encounter type (record artifact)	snomed ct browser ("remote")	Y22b4
384131000000101	Remote encounter type (record artifact)	snomed ct browser ("remote")	
325911000000101	Consultation via multimedia encounter type	Feedback / SNOMED CT browser	
699249000	Alert received from telehealth monitoring system	Feedback / SNOMED CT browser	XUman XaX2B 9G6..
401271004	E-mail sent to patient	Codelist builder add-on	Xalvi
325901000000103	Remote non-verbal consultation encounter type	Codelist builder add-on	

325981000000108	Remote non-verbal assessment encounter type	Codelist builder add-on	
325991000000105	Assessment via multimedia encounter type	Codelist builder add-on	
854891000000104	Telehealth encounter type	Codelist builder add-on	

SNOMED read code 1068881000000101 (Y1f3b in local TPP) has been explicitly linked to online consultations/triages by [eConsult](#) and [NECS CSU in their SystemOne guidance](#).

Codes in bold (with rows highlighted blue) are those where *any* recorded activity was eventually found in 2019-2020 in TPP practices / systems. Of the 18 codes, 6 had coded activity. The others did not.

For the majority of the report the analysis will query from the “lens” of SNOMED codes. The (legacy) CTV3 system shortlist can be found in Appendix 1. It is important to note that despite the different coding systems, OpenSAFELY has inbuilt mapping functionality that means that, if two codes in different coding systems have an agreed CTV3-SNOMED equivalence mapping to each other, this will be fully reflected in the activity count (*e.g. for eConsultation via online application, local CTV3 code Y1f3b has a mapping to SNOMED code 1068881000000101. Regardless of if one decides to query via the CTV3 or SNOMED one, all eConsultation coding instances will be accounted for*).

### Cautions when interrogating codes and coding activity

When interpreting output charts and tables please bear in mind:

- All occurrences of codes are included and they do not necessarily indicate unique or new events (e.g. one patient encounter could generate several similar codes, one patient might have similar diagnoses recorded multiple times over time, or practices might bulk-import information).
- There might be other similar codes occurring in the data that are not included in the charts.
- Not all codes represent activity occurring in general practice and may have been passed into the patient record from other services, including third party systems.
- Some apparent changes may represent changes in coding behaviour or displaced activities.

### To note further on online consultations:

Coding of online consultations and interpretation of recorded activity is not straightforward. This is due to a series of reasons:

- The use of online consultations and its national roll-out across practices are fairly recent;
- There isn't yet a standardised agreed approach to coding events. Coding (and clinical coding system) will namely depend on the specific supplier technology and its template implementation;
- The implementation of online consultations can differ among practices design-wise, both in terms of the patient journey and the underlying technology. Within a practice, more than one type of patient journey (pathway, disposition) is also likely to be available. Therefore, the nature of the (series of) codes generated will differ;
- Contrary to typical SRO studies to date, we may not be departing from an existing, pre-covid baseline, where “restoration” is the lens, but rather tracking implementation and uptake that happened concurrently to the pandemic. Confounding may be exacerbated.

- Where new codes have been created recently that are relevant to online consultations, these are typically SNOMED and will tend to not have a CTV3 equivalent unless a local code is defined. Nevertheless, TPP is still quite reliant on CTV3 so the richness of recording will largely be in the legacy system (if using SNOMED, it may only do so via mapping to CTV3).
- Some codes, though potentially used in the scope of online consultations, may not be unique to it, i.e. they may be used as well in the context of video consultations or other remote or computer-based interventions.
- In some cases, guidance is given for new forms of consultations to be recorded in annotated free-text fields of higher-level codes. Free text is not available in OpenSAFELY

## Methods - Coding activity prevalence

We show the number of times each code was recorded over the period from January 2019 to December 2020, at monthly intervals. Values are given per 1,000 registered population. For context, the GP consultation activity over that same period is also recorded - the latter uses a [purpose-built function](#) on OpenSAFELY rather than relying solely on counting code instances<sup>2</sup> [10]. Practice coverage (number of practices with at least one instance of the code over the two year period) is also calculated, at both national and regional level.

Broadly in line with the Service Restoration Observatory work, we also calculated the rate at which certain codes were recorded per 1,000 registered patients at a general practice level (among practices with any instance over the two year period) and we present this as decile charts. We display the median and interdecile range for February, April and December 2020, and, in order to aid interpretation, classify changes to the median using the following:

- **no change:** where activity has remained within 15% of the baseline level.
- **increase:** an increase by 15% from baseline;
- **decrease:**
  - **small drop:** a reduction of between 15% and 60% from baseline;
  - **large drop:** a reduction of >60% from baseline;
  - **sustained drop:** where there has been a reduction of 15% or more from baseline which has not returned to within 15% of baseline by December 2020;
  - **recovery:** where there has been a reduction of 15% from baseline, which returned to within 15% of baseline by December 2020

Cohort: For each month of study, the population of interest was defined as those aged 1+, alive and registered at the start of that month. Patients are assigned to the practice they are registered with that month. In turn, any activity (OC codes, GP consultations) a patient has in that month is assigned to their practice of registration.

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<sup>2</sup> The purpose-built function [10] captures GP-patient interactions, whether in person or by phone/video call. The concept of a “consultation” as captured in EHR clinical coding systems is generally broader than that captured in the GP Appointment Data (GPAD) from GP Appointment Systems. GPAD data is published by NHS Digital as experimental statistics - various caveats remain in place [11].

Contextualisation: though results cannot be directly compared, we also present the trend in online consultation submissions from the dedicated national OC/VC supplier collection, narrowed down to only tally submissions from practices that have TPP as main GP system supplier (according to [POMI](#)). Comparison of trends and of the broad order of magnitude may help inform on whether these two sources are capturing similar OC activity behaviour. OC/VC consultations information has been taken from tab 'OC supplier practice view' from the [FutureNHS dashboard](#) [7]. This contains daily information from August 2020, derived from the daily collection files. This can be extended as a weekly trend back to April 2020 if the earlier weekly-only collection data is used. To note also that approximately 10% of practices are using an OC supplier system that currently does not contribute to the national collection. 5 of 20 suppliers are currently not submitting.

## Methods - cohort sociodemographics

In a separate analysis strand to the coding prevalence information, sociodemographic characteristics were also characterised for those with any online consultation instance.

The population cohort was defined as all those registered with a single GP practice between January 2019 and December 2020. The following characteristics were recorded, typically based on January 2019 status:

- Ethnicity (based on [ethnicity](#) codelists)
- Sex
- Age
- Care home status
- Household size
- Practice registered with and associated region
- Rurality of place of residence
- Disability status ([learning disabilities](#) and [intellectual disabilities](#) codelists created from the QOF register)
- Deprivation quintile

The study population in this cohort was further divided into two sub-cohorts, based on whether the patients had had any recorded online consultation instance or not (at least one match for any of the shortlisted OC codes in the July 2019-December 2020 period). As a broad contextual, a population sub-cohort based on patients that had had any GP consultation in that same period was also defined (in general rather than specific to online consultations). The constitution of these sub-cohorts is presented in summary tables.

For a given sociodemographic or geographic dimension at a time, we also computed for the two year period the:

- OC instance rate (nr of code instances, standardised per 1,000 registered population)
- OC coverage rate (portion of population with at least one code instance)
- GP consultation instance rate (nr of GP consultation instances, standardised per 1,000 registered population)
- GP consultation coverage rate (portion of population with at least one GP consultation instance).

To note that OC instances and their rates should not be equated to online consultation rates or compared directly to GP consultation figures or GPAD figures, for many of the reasons flagged

further above. It may however be useful to look at relative values across levels of a given characteristic (e.g. among ethnic groups). Some sub-cohorts are small so figures and differential patterns require caution given underlying uncertainty. Tests of proportions could be conducted. All instance rates given per 1,000 population. Coverage given as percentage of population.

## Results and observations

Results and commentary are given below.

### Coding activity prevalence

#### Weekly coding activity and contextualisation with OC/VC Supplier collection

The top graph depicts the absolute instances of code eConsultation, as well as of all the SNOMED codes together. It will reflect coding activity through all TPP practices in the 6th January 2020-22nd March 2021 period. Different practices may approach online consultation coding differently though, especially based on the OC supplier system in place, chosen OC pathways and implementation maturity [4].

The bottom graph depicts the total online consultation submissions in the period of w/c 27th April 2020-22nd March 2021 according to the OC/VC supplier collection [7], for TPP practices (as captured by POMI data).<sup>3</sup>

Though both data sources cannot be compared directly, a few takeaways are:

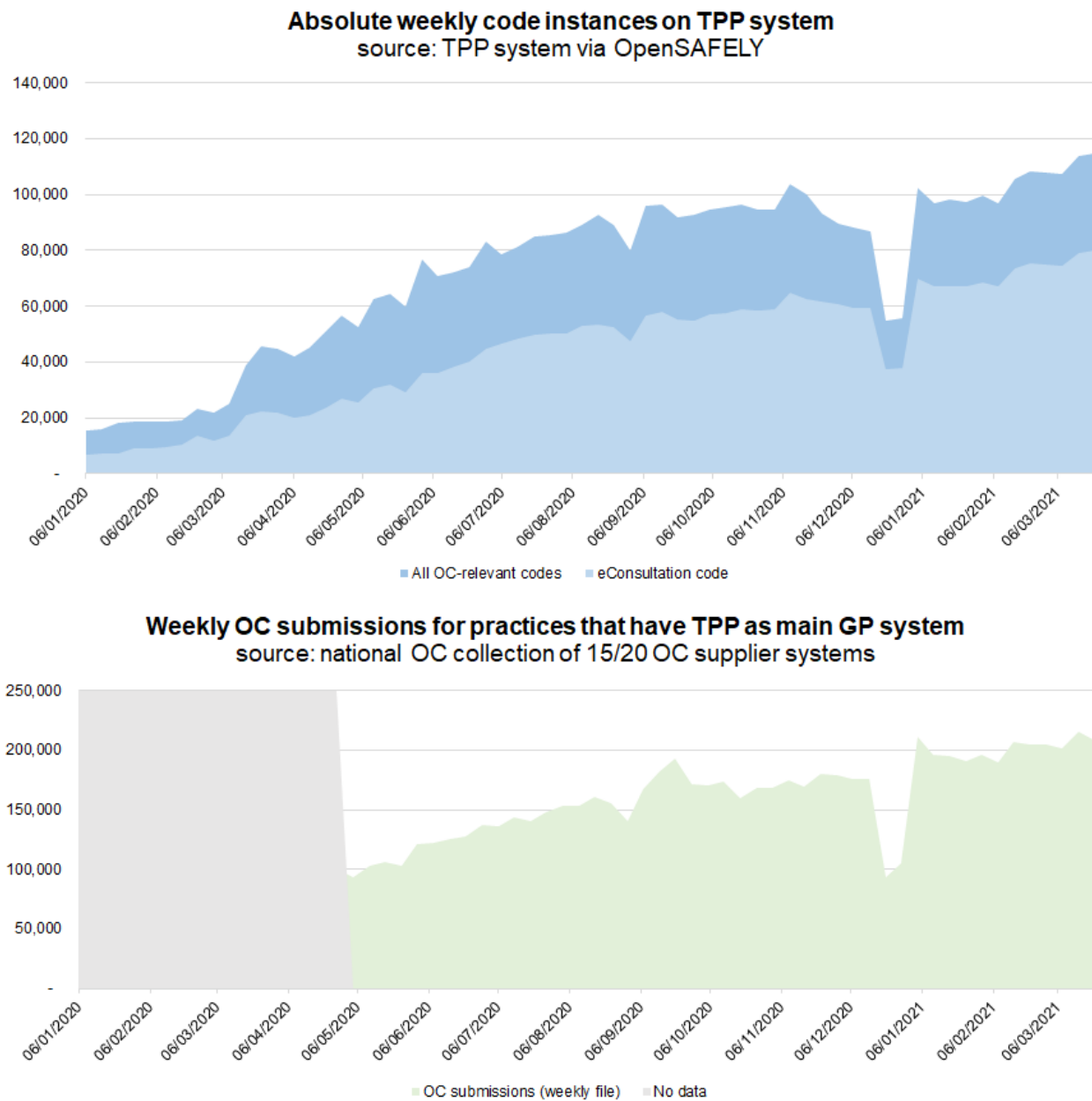
- Broadly, the trends in coding activity and OC submissions look similar, at least in terms of peaks-and-throughs.
- If one were to assume as hypothesis that each OC submission should generate at least one read code in primary care systems, then it'd look like the current coding activity captured is not fully tracking all activity. This may however relate to a range of reasons including: codes such as eConsultation only being triggered downstream from what is considered a submission in an OC consultation journey; certain practices or OC systems not yet using dedicated codes; certain practices or OC systems using codes that are different or broader than those studied here; how an OC submission is defined within the supplier collection.

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<sup>3</sup> In financial year 2020/21 the number of TPP practices has stayed in the 2500±16 range according to POMI. Submissions are shown for these, though for ~130 there was null recorded activity over the full period (supplier data either not collected, or no OC system in that practice). Also note that between 66-132 OC practices (depending on week) had no clear GP system when matching by practice ID to POMI. These were not included.



**Figure 1. Top: absolute weekly online consultation code instances in TPP System (source: OpenSAFELY-TPP). Bottom: weekly OC submissions for practices that have TPP as main GP system (source: national rapid collection)**

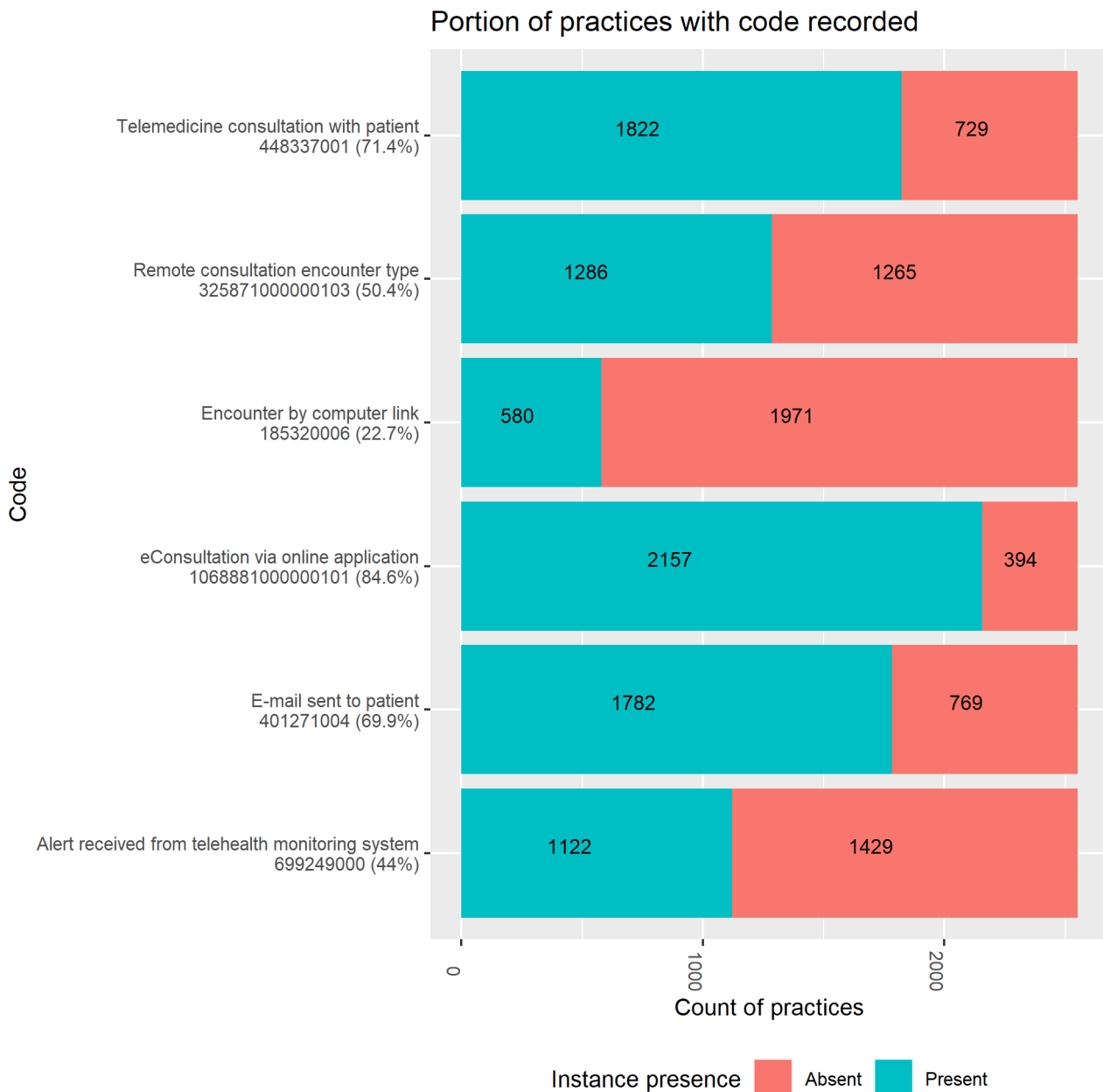


#### Codes with records and Practice coverage

The graph below shows the portion of practices that had at least one instance of the respective SNOMED code, over the two year period.



**Figure 2. Portion of TPP practices with *any* recorded activity for online consultation relevant codes in general practice (January 2019 - December 2020).** Codes with no activity at all omitted.

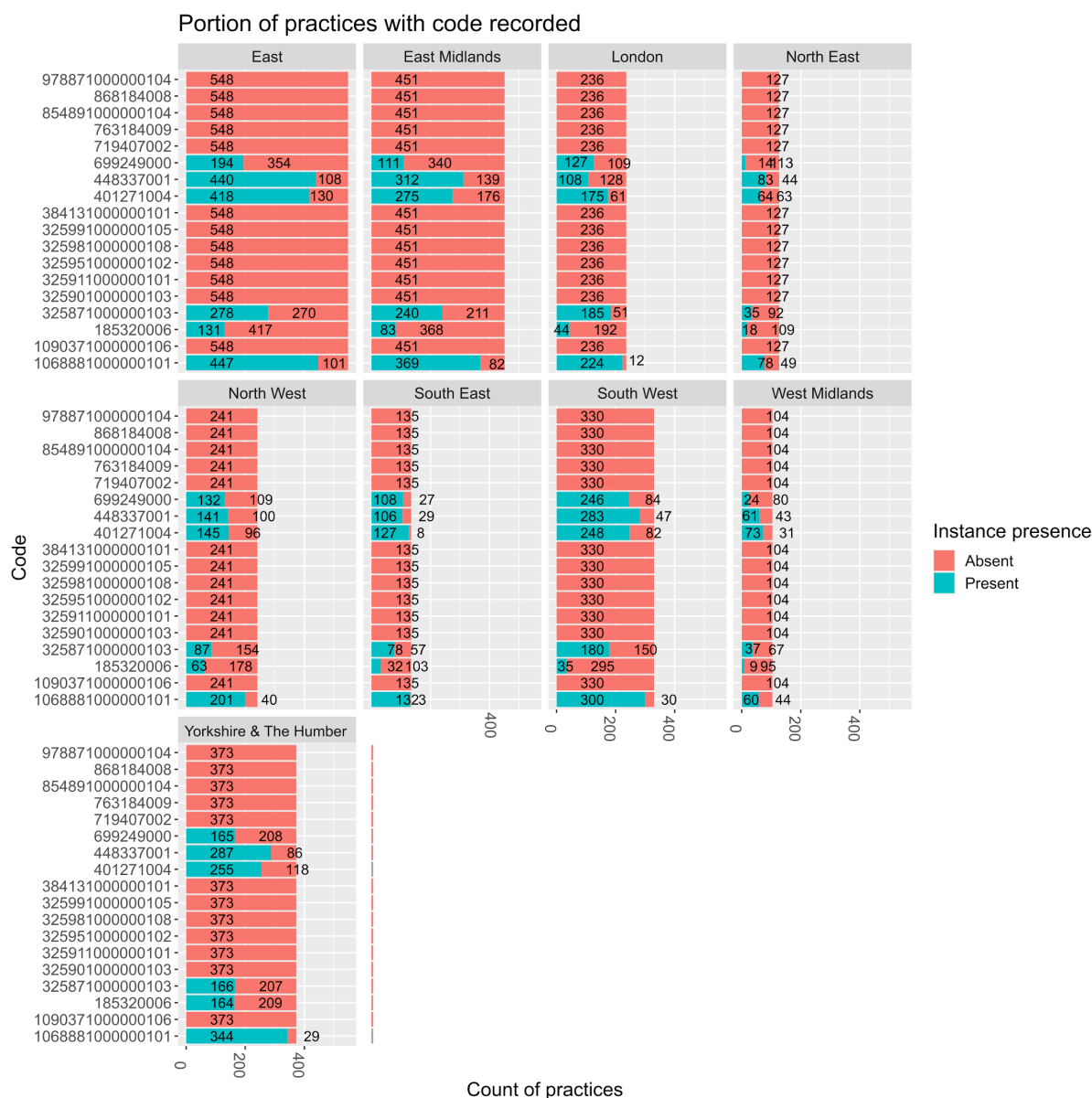


As discussed previously, 12 of 18 codes actually returned no results in TPP. The SNOMED codes for which instances *were* found also correspond to those where both: a) a CTV3 mapping was available when specifying the codelists; b) CTV3-querying had activity recorded (not shown). The practice coverage was, in decreasing order:

- eConsultation via online application (1068881000000101) - 85% of practices
- Telemedicine consultation with patient (448337001) - 71% of practices
- E-mail sent to patient (401271004) - 70% of practices
- Remote consultation encounter type (325871000000103) - 50% of practices
- Alert received from telehealth monitoring system (699249000) - 44% of practices
- Encounter by computer link (185320006) - 23% of practices

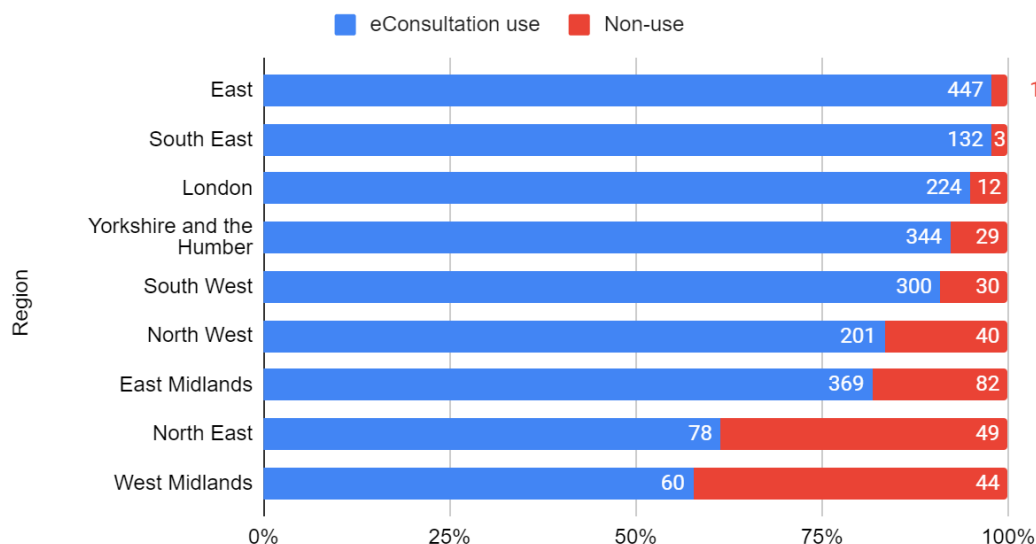
The graph below provides information on coverage (code ever used over two year period) broken down by region. Focussing on the eConsultation code, TPP practice coverage-wise, its coverage of use has been higher in the East and South East and lowest in the North East and Midlands. There may be considerations around practices with changed or multiple systems.

**Figure 3. Portion of TPP practices with *any* recorded activity for online consultation relevant codes *in general practice* (January 2019 - December 2020). Broken down by region.**



**Figure 4. Portion of TPP practices by region with *any* recorded activity for eConsultation code in general practice (January 2019 - December 2020). Numbers in white show absolute count of practices.**

#### eConsultation code use - practice coverage



#### Coding activity - monthly trends

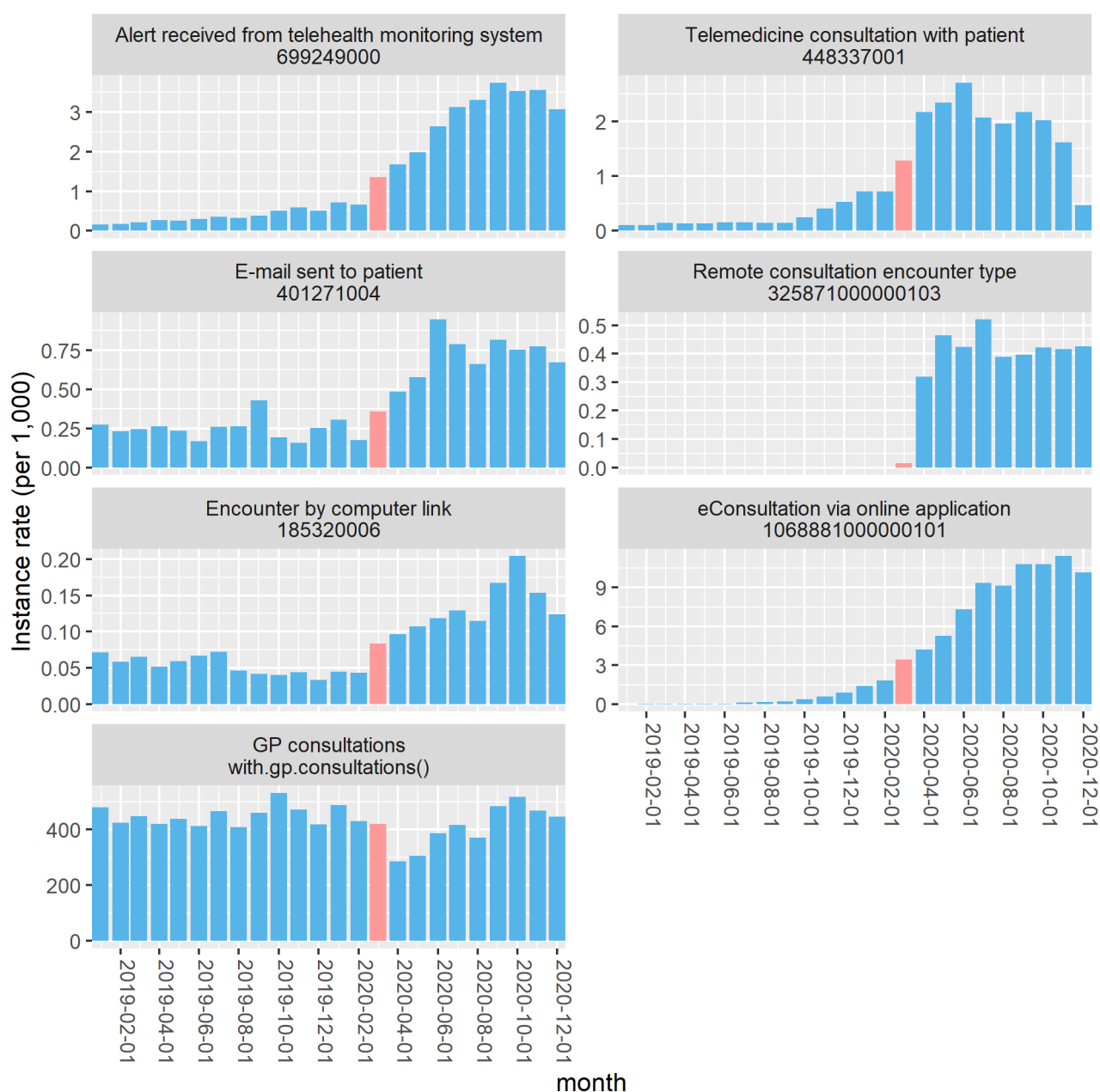
While the previous plots focussed on coverage, the graph below shows the monthly prevalence of the various codes (coding activity) over the period from January 2019 to December 2020. Values are given as a rate (per 1,000 cohort population). The entire cohort population is considered, rather than just those in practices where each code has been recorded. The rate of GP consultation events is also given, for context (its practice coverage is near complete at over 99%, as expected).

The codes with highest activity were, in order of highest monthly peak:

- eConsultation via online application (1068881000000101) - a peak of over 10 monthly coding events per 1,000 registered population in November 2020. This has increased rapidly from virtually none in early 2019.
- Alert received from telehealth monitoring system (699249000) - a peak of over 3.5 events per 1,000 registered population in September 2020. This has increased rapidly compared to 2019. A first step-change is seen around the start of the pandemic (from February to March 2019).
- Telemedicine consultation with patient (448337001) - a peak of over 2.5 events per 1,000 registered population in June 2020. Step changes from February to March and March to April 2020 are noticeable.
- E-mail sent to patient (401271004) - a peak of close to 1 event per 1,000 registered population in June 2020. Step changes from February to March and March to April 2020 are noticeable.
- Remote consultation encounter type (325871000000103) - a peak of over 0.5 events per 1,000 registered population in July 2020. This is likely a new code - its use appears to be first recorded in March 2020. This may relate to TPP introducing a [local-TPP](#) dedicated code that maps to this SNOMED code (Y22b4).

- Encounter by computer link (185320006) - a peak of over 0.2 events per 1,000 in October 2020. Its use seemed to be in slight decline in 2019 and then got a step increase from March 2020.
- We have also plotted the monthly rate of (overall) GP consultations in the TPP practices. This stood broadly above 400 consultations per 1,000 patients in 2019. The dip is seen around April 2020. Recovery occurred, with October 2020 registering the second highest monthly rate, after October 2019.

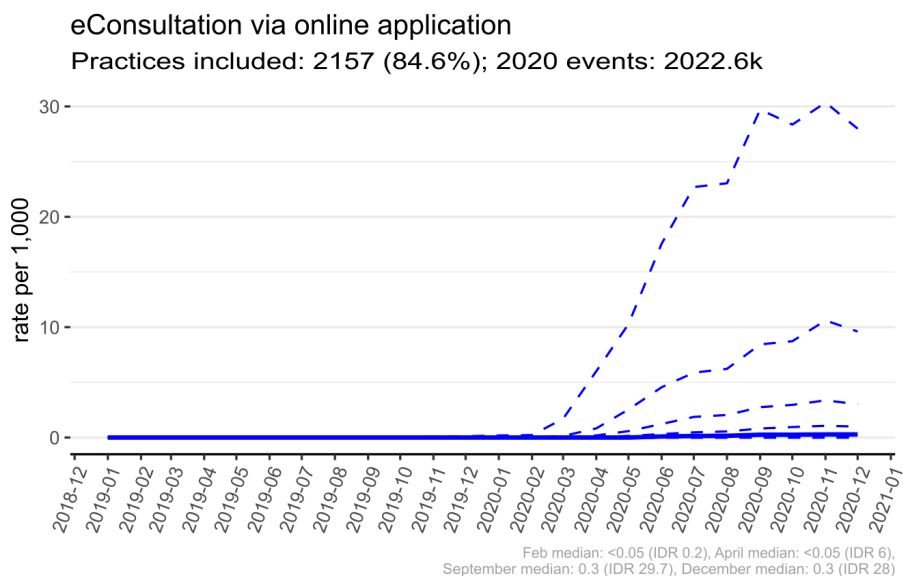
**Figure 5. Monthly code instance rates per 1,000 registered population of SNOMED codes in TPP general practice (January 2019 - December 2020).** March 2020 indicated in pink. Figure with absolute counts given in Appendix 1.



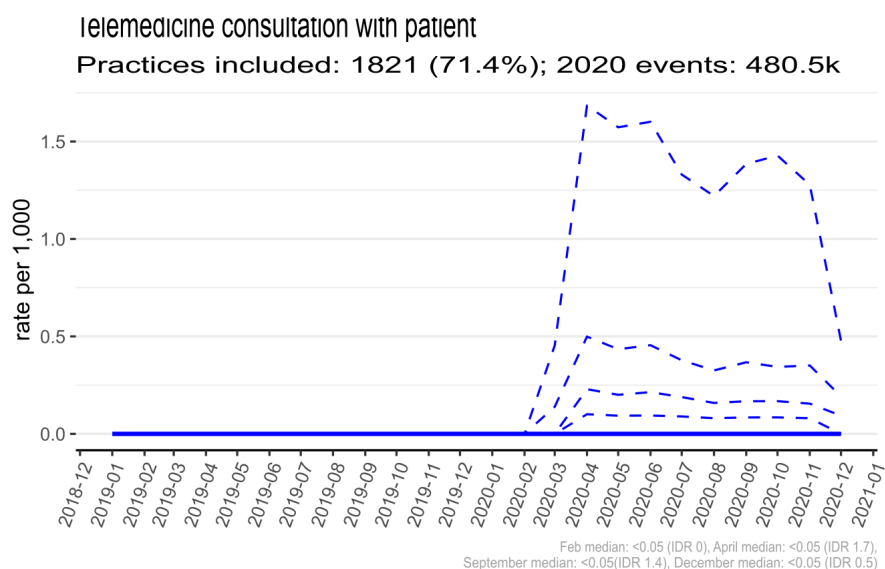
## Coding activity - monthly trends by deciles of practices

To better convey the prevalence of activity over time and in terms of inter-practice variation, decile graphs were created for a couple of the relevant codes.

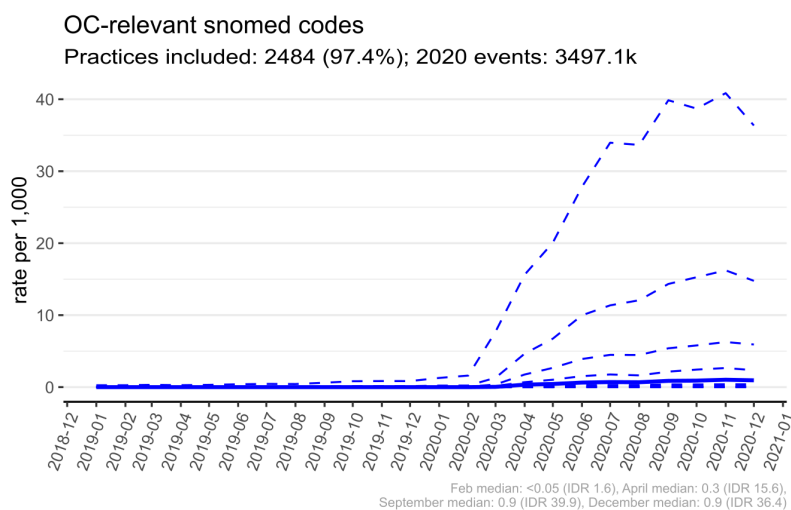
**Figure 6. Recording of results from eConsultation via Online Application (“1068881000000101” ~ “Y1f3b”) in general practice (January 2019 - December 2020)**



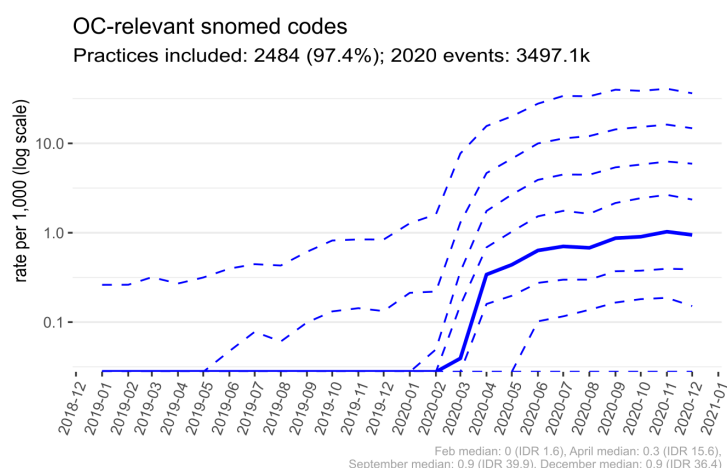
**Figure 7. Recording of results from Telemedicine consultation with patient (“448337001” ~ “XaXcK”) in general practice (January 2019 - December 2020)**



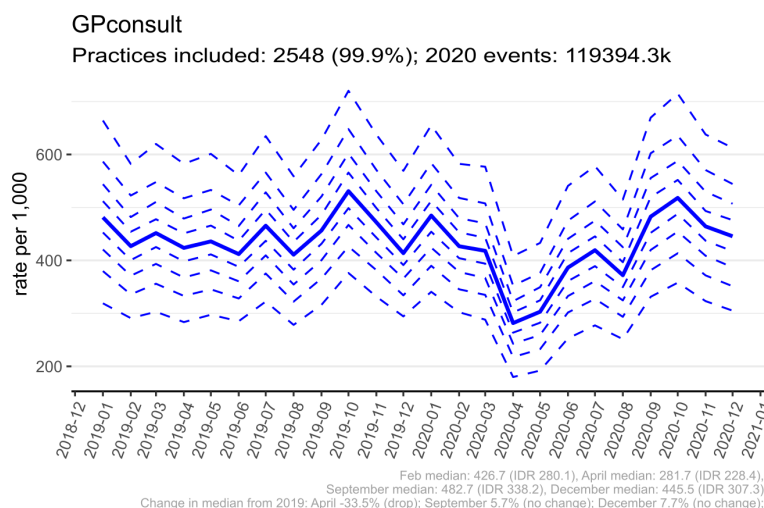
**Figure 8. Recording of results from any of the shortlisted SNOMED online consultations codes (six of eighteen in practice) in general practice (January 2019 - December 2020)**



**Figure 9. Recording of results from any of the shortlisted SNOMED online consultations codes in general practice (January 2019 - December 2020). Previous figure, Log Scale.**



**Figure 10. Contextual - Recording of results from GP Consultations (any modality) in general practice (January 2019 - December 2020)**



## Patterns in demographics

**Table 2. Characteristics of the studied cohort, both overall and by a) patients without a recorded online consultation related code instance; b) patients with such an instance.**

Characteristic	Overall, N = 20,651,036 <sup>1</sup>	Had any OC-relevant coding instance		p-value <sup>2</sup>
		NO, N = 19,563,117 <sup>1</sup>	YES, N = 1,087,919 <sup>1</sup>	
<b>sex</b>				<0.001
Female	10,260,731 (50%)	9,599,496 (49%)	661,235 (61%)	
Male	10,389,976 (50%)	9,963,322 (51%)	426,654 (39%)	
Other/Unknown	329 (<0.1%)	299 (<0.1%)	30 (<0.1%)	
<b>age</b>	41 (22, 59)	41 (21, 59)	43 (27, 58)	<0.001
<b>Age group</b>				<0.001
(0,18]	4,298,691 (21%)	4,151,378 (21%)	147,313 (14%)	
(18,40]	5,738,142 (28%)	5,388,980 (28%)	349,162 (32%)	
(40,50]	2,842,130 (14%)	2,665,869 (14%)	176,261 (16%)	
(50,60]	2,913,528 (14%)	2,735,067 (14%)	178,461 (17%)	
(60,70]	2,269,212 (11%)	2,144,742 (11%)	124,470 (12%)	
(70,80]	1,673,588 (8.2%)	1,598,702 (8.2%)	74,886 (6.9%)	
(80,Inf]	746,742 (3.6%)	716,706 (3.7%)	30,036 (2.8%)	
Unknown	169,003	161,673	7,330	
<b>ethnicity</b>				<0.001
Asian	1,252,414 (6.1%)	1,209,218 (6.2%)	43,196 (4.0%)	
Black	412,399 (2.0%)	398,242 (2.0%)	14,157 (1.3%)	
Mixed	249,470 (1.2%)	238,762 (1.2%)	10,708 (1.0%)	
Other	6,026,577 (29%)	5,737,108 (29%)	289,469 (27%)	
White	12,710,176 (62%)	11,979,787 (61%)	730,389 (67%)	
<b>living alone</b>	5,783,003 (28%)	5,466,461 (28%)	316,542 (29%)	<0.001
<b>region</b>				<0.001
East	4,823,404 (23%)	4,623,066 (24%)	200,338 (18%)	
East Midlands	3,618,902 (18%)	3,458,477 (18%)	160,425 (15%)	
London	1,340,024 (6.5%)	1,277,438 (6.5%)	62,586 (5.8%)	
North East	963,807 (4.7%)	960,313 (4.9%)	3,494 (0.3%)	
North West	1,843,088 (8.9%)	1,722,626 (8.8%)	120,462 (11%)	
South East	1,357,871 (6.6%)	1,236,531 (6.3%)	121,340 (11%)	
South West	2,838,383 (14%)	2,586,842 (13%)	251,541 (23%)	
West Midlands	861,670 (4.2%)	840,558 (4.3%)	21,112 (1.9%)	
Yorkshire & The Humber	2,997,813 (15%)	2,851,255 (15%)	146,558 (13%)	
Unknown	6,074	6,011	63	
<b>deprivation quintile</b>				<0.001
Q1 (most)	4,157,772 (20%)	3,989,883 (21%)	167,889 (16%)	
Q2	4,032,329 (20%)	3,822,954 (20%)	209,375 (20%)	
Q3	4,259,619 (21%)	4,023,228 (21%)	236,391 (22%)	
Q4	4,052,737 (20%)	3,817,032 (20%)	235,705 (22%)	
Q5 (least)	3,796,821 (19%)	3,577,294 (19%)	219,527 (21%)	
Unknown	351,758	332,726	19,032	



<b>rural urban</b>		<0.001	
Other	328,860 (1.6%)	310,706 (1.6%)	18,154 (1.7%)
Rural	4,113,110 (20%)	3,896,532 (20%)	216,578 (20%)
Urban	16,209,066 (78%)	15,355,879 (78%)	853,187 (78%)
<b>care home</b>		<0.001	
Yes	37,137 (0.2%)	34,545 (0.2%)	2,592 (0.2%)
Non	20,613,899 (100%)	19,528,572 (100%)	1,085,327 (100%)

<sup>1</sup> n (%); Median (IQR)

<sup>2</sup> Pearson's Chi-squared test; Wilcoxon rank sum test

Broadly, it can be seen that the cohort with at least one online consultation coding instance:

- Has a higher preponderance of female patients;
- Has a higher relative preponderance of those aged 18-40, followed by those aged 40-50 and 50-60;
- Skews more towards white patients
- Skews more towards those least deprived

To contextualise these with the population with any sort of GP consultation (as opposed to not), results for this are given in Appendix 2.

## Ethnicity

OC coding activity is lower for non-white patients, both in terms of coverage and instance rates. Asian and Black patients register the lowest rates and coverage. Though these differential patterns are also present in GP consultation rates and coverage, they are not as pronounced.

It should be noted that about 6M patients had no ethnicity recorded, or an explicit 'Other' ethnicity, based on GP clinical coding.

**Table 3. Ethnicity breakdown. Online consultation *coding* instance rates (per 1,000 registered population) and population coverage, considering the period of 2019-2020 and patients registered with a single practice. Figures for GP consultations are also given for context.**

ethnicity	Cohort *	GP consultation rate		GP consultation coverage		OC instance rate		OC instance coverage	
Asian	1,252,400	11.15	0.91	79.5%	0.93	0.09	0.53	3.4%	0.60
Black	412,400	10.06	0.82	77.3%	0.90	0.09	0.53	3.4%	0.60
Mixed	249,500	8.92	0.73	75.9%	0.89	0.12	0.71	4.3%	0.75
Other	6,026,600	8.72	0.71	79.2%	0.92	0.14	0.82	4.8%	0.84
White	12,710,200	12.2	1.00	85.7%	1.00	0.17	1.00	5.7%	1.00

\* rounded to nearest 100

Gray figures are ratio vs White

## Deprivation

OC coding activity is lower for the most deprived patients, both in terms of coverage and 2019-2020 instance rates. This deprivation pattern (direction-wise) is also seen in terms of GP

consultation coverage, but not for GP consultation rates. Overall GP consultation rates are higher among the most deprived.

**Table 4. Deprivation breakdown. Online consultation coding instance rates (per 1,000 registered population) and population coverage, considering the period of 2019-2020 and patients registered with a single practice. Figures for GP consultations are also given for context.**

deprivation	Cohort *	GP consultation rate	GP consultation coverage	OC instance rate	OC instance coverage
1 (most)	4,157,800	11.32	81.2%	0.12	4.0%
2	4,032,300	11.05	81.8%	0.15	5.2%
3	4,259,600	11.13	83.2%	0.15	5.5%
4	4,052,700	10.94	84.1%	0.17	5.8%
5 (least)	3,796,800	10.64	85.3%	0.16	5.8%

\* rounded to nearest 100

Gray figures are ratio vs least deprived

## Age-Sex

OC coding activity and coverage has been higher for female patients. Coverage and coding activity has been highest for females aged 18-40 (8.6% with an instance, at 0.29 coding events per 1,000 over 2 years), followed by females aged 40-50, 50-60 and 60-70, in this order.

**Table 5. Age and sex breakdown. Online consultation coding instance rates (per 1,000 registered population) and population coverage, considering the period of 2019-2020 and patients registered with a single practice. Figures for GP consultations are also given for context.**

Age group	Sex	Cohort *	GP consultation rate	GP consultation coverage	OC instance rate	OC instance coverage
(0,18]	Female	2,079,900	5.64	78.9%	0.10	3.9%
(0,18]	Male	2,218,700	4.21	73.8%	0.07	3.0%
(18,40]	Female	2,774,900	13.82	87.5%	0.29	8.6%
(18,40]	Male	2,963,100	5.08	63.0%	0.10	3.8%
(40,50]	Female	1,388,200	13.50	91.8%	0.26	8.1%
(40,50]	Male	1,453,900	7.55	74.3%	0.12	4.4%
(50,60]	Female	1,440,400	14.09	92.9%	0.22	7.3%
(50,60]	Male	1,473,200	10.20	84.1%	0.13	5.0%
(60,70]	Female	1,157,800	16.23	95.4%	0.16	5.7%
(60,70]	Male	1,111,400	14.71	92.9%	0.14	5.3%
(70,80]	Female	889,400	20.47	97.5%	0.12	4.3%
(70,80]	Male	784,200	19.61	97.0%	0.12	4.7%
80+	Female	447,700	23.71	97.9%	0.11	4.0%
80+	Male	299,100	24.49	97.4%	0.11	4.1%

\* rounded to nearest 100

## Learning and intellectual disabilities

OC coding activity coverage is similar for those with and without disability, at about 5% (though slightly higher for those without disability). This contrasts with GP consultation coverage, which

was higher for those with disability than those without (87.7% vs 83.0%). Patterns may not be statistically significant.

For this work, the presence of a disability was defined by identifying patients with codes from codelists related to QOF register [learning disabilities](#) and [intellectual disabilities](#). Physical disabilities were not covered.

**Table 6. Disability flag breakdown. Online consultation coding instance rates (per 1,000 registered population) and population coverage, considering the period of 2019-2020 and patients registered with a single practice. Figures for GP consultations are also given for context.**

Disability	Cohort *	GP consultation rate	GP consultation coverage	OC instance rate	OC instance coverage
No	20,281,600	11.0	83.0%	0.15	5.3%
Yes	369,500	12.4	87.7%	0.15	5.1%

\* rounded to nearest 100

## Region and Rurality

A breakdown by Region and rurality is given below (areas classed as 'Other' rurality-wise were excluded).

**Table 7. Region and rurality breakdown. Online consultation coding instance rates (per 1,000 registered population) and population coverage, considering the period of 2019-2020 and patients registered with a single practice. Figures for GP consultations are also given for context.**

Region	Rurality #	Cohort *	GP consultation rate	GP consultation coverage	OC instance rate	OC instance coverage
East	Rural	1,202,300	11.76	86.3%	0.10	4.1%
	Urban	3,560,900	10.56	82.2%	0.10	4.2%
East Midlands	Rural	799,700	12.26	87.9%	0.24	5.1%
	Urban	2,779,200	11.21	82.8%	0.17	4.2%
London	Rural	1,400	10.05	64.4%	0.09	5.0%
	Urban	1,323,800	9.15	70.2%	0.11	4.7%
North East	Rural	97,400	12.59	87.5%	<0.01	0.4%
	Urban	858,300	11.35	83.9%	<0.01	0.4%
North West	Rural	417,600	12.71	88.7%	0.16	6.1%
	Urban	1,395,000	10.79	85.3%	0.19	6.7%
South East	Rural	265,000	10.94	85.8%	0.18	7.8%
	Urban	1,070,200	10.12	81.6%	0.26	9.2%
South West	Rural	887,400	11.94	86.5%	0.17	6.9%
	Urban	1,913,200	10.98	84.2%	0.31	9.7%
West Midlands	Rural	21,100	9.47	81.5%	<0.01	0.2%
	Urban	834,800	9.43	81.2%	0.06	2.5%

\* rounded to nearest 100

# excludes 'Other'

## Care home status

As with GP consultation rates and coverage, OC coding activity coverage and instance rates are higher for care home residents than the remaining population. About 8,700 OC coding instances have been identified for care home residents. Subsequent analysis could potentially explore these patterns focussing only on the elderly population.

Care home status was assessed using TPP's functionality and the full detail on this methodology, its strengths and limitations can be read in the OpenSAFELY short data report published on [Wellcome Open Research](#) [12].

**Table 8. Breakdown for care home residency. Online consultation coding instance rates (per 1,000 registered population) and population coverage, considering the period of 2019-2020 and patients registered with a single practice. Figures for GP consultations are also given for context.**

Care home	Cohort *	GP consultations *	GP consultation rate	GP consultation coverage	OC instances *	OC instance rate	OC instance coverage
Yes	37,100	827,500	22.28	94.5%	8,700	0.23	0.07
Non	20,613,900	227,134,200	11.02	83.1%	3,137,100	0.15	0.05

\* rounded to nearest 100

## Recommendations and Next Steps

The report above aimed to perform an initial exploratory analysis into the primary care coding activity relating to online consultations. It also provided initial insights around online consultation activity trends over time and by cohort characteristics. Useful feedback and review includes:

- Review the coding prevalence information in context with further data sources and evidence, to better assess its coverage and consistency;
- Relay results to OC systems suppliers. In turn, try and understand a) how a submission is defined for purposes of OC collection submission; b) how online triages/consultations are coded into primary care systems (which codes are used, with which frequency, under which conditions or pathways; based on which primary care system); c) how coding guidelines can be created and mandated to maximise value for operational, research and evaluation purposes.
- DFPC to consider sharing report for review with contacts to understand whether patterns are as expected based on coding practice de-facto online consultation implementation trends and other analysis and evidence strands (e.g. Health Foundation CPRD-based work);
- Based on programme/Policy experience, relay to OpenSAFELY team further strategic OpenSAFELY [querying functionality](#) that could be added to the development pipeline. Examples of opportunities identified include: a) facilitate pathway analysis, e.g. 'has an A&E attendance occurred within a certain number of days after an online consultation coding event' or 'had a GP consultation of any type occurring within two weeks after an online consultation coding event'; b) simplified ability for external collaborators to input a list of

‘pilot’ practices to define treatment and control sub-cohort within OpenSAFELY, while complying with information governance and data protection<sup>4</sup>.

- Review the initial scope document and establish which quick-gain analysis strands could be potentially explored in future commissions to answer key priority research questions, e.g.:
  - Chronic and long-term condition history of users with eConsultation code (e.g. cancer, diabetes, cardiovascular disease, hypertension);
  - Medication history of online consultation users with eConsultation code;
  - A&E admissions or GP appointment flags in a period X after eConsultation coding activity;
  - Same analysis, extended to EMIS [8].

In Appendix 3, we have included some questions that have been used as part of the Service Restoration Observatory feedback and review process. These may inform discussion.

## References

- [1] NECS CSU, [SystmOne - Receiving & Processing eConsult Guide](#), page 5, published 11 June 2020
- [2] @econsult\_thinks, [eConsult tweet on new eConsultation code](#), published 18 May 2020
- [3] NHS England, [Advice on how to establish a remote ‘total triage’ model in general practice using online consultations](#), published 15 September 2020
- [4] NHS England, [Using online consultations in primary care: implementation toolkit](#), published 26 September 2019
- [5] Biobank, [TPP Local Codes \(Data-Coding 8708\)](#)
- [6] The OpenSAFELY Collaborative, OpenSAFELY NHS Service Restoration Observatory 1: describing trends and variation in primary care clinical activity for 23.3 million patients in England during the first wave of COVID-19, medRxiv 2021.01.06.21249352; doi: <https://doi.org/10.1101/2021.01.06.21249352>
- [7] NHS England, [OC/VC National Supplier Collection FutureNHS dashboard](#) [requires authentication and authorisation to NHSEI Digital IPC workspace]
- [8] The OpenSAFELY Collaborative, Trends and clinical characteristics of COVID-19 vaccine recipients: a federated analysis of 57.9 million patients’ primary care records in situ using OpenSAFELY, medRxiv 2021.01.25.21250356; doi: <https://doi.org/10.1101/2021.01.25.21250356>.
- [9] OpenSAFELY, *Onboarding new users to OpenSAFELY*, accessed 6 May 2021

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<sup>4</sup> Outputs with disclosive practice ID’s cannot be extracted and querying on practice ID is not straightforward given pseudonymisation. There is though an ongoing cluster RCT project where such matching is being done in the background by TPP, so this functionality - with appropriate processes, controls and safeguards in place - could in future be extended to external collaborators.

[10] OpenSAFELY documentation, [Variable reference: with\\_gp\\_consultations\(\)](#), accessed 6 May 2021

[11] NHS Digital, [Appointments in General Practice - Experimental statistics publication](#), accessed 6 May 2021

[12] Schultze A, Bates C, Cockburn J et al. Identifying Care Home Residents in Electronic Health Records - An OpenSAFELY Short Data Report [version 1; peer review: awaiting peer review], Wellcome Open Res 2021, 6:90, [doi: https://doi.org/10.12688/wellcomeopenres.16737.1](https://doi.org/10.12688/wellcomeopenres.16737.1)

## Project documents

- [Draft codelist for online consultations \(ctv3\)](#)
- [Draft codelist for online consultations \(SNOMED\)](#)
- [OpenSAFELY Online Consultations GitHub repository](#) *[to be made public]*
- [Project Information Document- DFPC Online Consultations](#) *[to be made public]*
- [Digital First Primary Care: Evaluation of a digital first approach in response to Covid-19 | OpenSAFELY initial request brief](#) (commented) *[limited access]*

## Appendix 1. CTV3 shortlist

A CTV3 shortlist was also defined, for a few reasons:

- At the time of the ask, TPP servers had to be interrogated with CTV3 codes - any SNOMED codes needed mapping into CTV3 (if existent). This has since been updated though.
- Initial method for finding codes relied on a two-pronged CTV3 and SNOMED approach, with subsequent cross-mapping - as such, for completion the relevant codes are logged.

The short-listed codes in CTV3 were as given in the table below (codelist builder draft [here](#)). Those filled yellow are those for which activity was found within the TPP records, in 2019-2020.

**Table A1.1**

Code	names	notes	type
Y1f3b	eConsultation via online application (procedure)	Local TPP code	local-tpp
XUkjp	Telemedicine consultation with patient (procedure)	SnomedCTbrowser refset	ctv3
XaXcK	Telemedicine consultation with patient	CTV3 snomed lkp	ctv3
XVCTw	Telemedicine consultation with provider (procedure)	SnomedCTbrowser refset	ctv3
XUuWQ	Remote non-verbal consultation (procedure)	SnomedCTbrowser refset	ctv3
XV1pT	Telepractice consultation (procedure)	SnomedCTbrowser refset	ctv3
9N34. .9N34	Encounter by computer link	CTV3 snomed lkp CTV3 snomed lkp	ctv3
XUman XaX2B 9G6..	Alert received from telehealth monitoring system	SnomedCTbrowser refset CTV3 snomed lkp CTV3 snomed lkp	ctv3
Y22b4	Remote consultation	Local TPP code	local-tpp



## Appendix 2. TPP cohort characteristics, with sub-cohorts based on presence of any GP consultation in 2019-2020.

**Table A2.1 Characteristics of the studied cohort, both overall and by a) patients without a GP consultation in 2019-2020; b) patients with a consultation.**

Characteristic	Overall, N = 20,651,036 <sup>1</sup>	Had any GP consultation		p-value <sup>2</sup>
		NO, N = 3,484,271 <sup>1</sup>	YES, N = 17,166,765 <sup>1</sup>	
<b>sex</b>				<0.001
Female	10,260,731 (50%)	1,087,898 (31%)	9,172,833 (53%)	
Male	10,389,976 (50%)	2,396,331 (69%)	7,993,645 (47%)	
Other/Unknown	329 (<0.1%)	42 (<0.1%)	287 (<0.1%)	
<b>age</b>	41 (22, 59)	30 (15, 43)	44 (24, 61)	<0.001
<b>age group</b>				<0.001
(0,18]	4,298,691 (21%)	1,019,206 (29%)	3,279,485 (19%)	
(18,40]	5,738,142 (28%)	1,442,431 (41%)	4,295,711 (25%)	
(40,50]	2,842,130 (14%)	488,196 (14%)	2,353,934 (14%)	
(50,60]	2,913,528 (14%)	336,154 (9.7%)	2,577,374 (15%)	
(60,70]	2,269,212 (11%)	131,588 (3.8%)	2,137,624 (13%)	
(70,80]	1,673,588 (8.2%)	46,058 (1.3%)	1,627,530 (9.6%)	
(80,Inf]	746,742 (3.6%)	17,458 (0.5%)	729,284 (4.3%)	
Unknown	169,003	3,180	165,823	
<b>ethnicity</b>				<0.001
Asian	1,252,414 (6.1%)	256,846 (7.4%)	995,568 (5.8%)	
Black	412,399 (2.0%)	93,541 (2.7%)	318,858 (1.9%)	
Mixed	249,470 (1.2%)	60,171 (1.7%)	189,299 (1.1%)	
Other	6,026,577 (29%)	1,251,395 (36%)	4,775,182 (28%)	
White	12,710,176 (62%)	1,822,318 (52%)	10,887,858 (63%)	
<b>living alone</b>	5,783,003 (28%)	1,049,450 (30%)	4,733,553 (28%)	<0.001
<b>region</b>				<0.001
East	4,823,404 (23%)	809,148 (23%)	4,014,256 (23%)	
East Midlands	3,618,902 (18%)	581,969 (17%)	3,036,933 (18%)	
London	1,340,024 (6.5%)	399,214 (11%)	940,810 (5.5%)	
North East	963,807 (4.7%)	151,347 (4.3%)	812,460 (4.7%)	
North West	1,843,088 (8.9%)	255,636 (7.3%)	1,587,452 (9.2%)	
South East	1,357,871 (6.6%)	238,663 (6.9%)	1,119,208 (6.5%)	
South West	2,838,383 (14%)	427,567 (12%)	2,410,816 (14%)	
West Midlands	861,670 (4.2%)	161,955 (4.6%)	699,715 (4.1%)	
Yorkshire & The Humber	2,997,813 (15%)	457,756 (13%)	2,540,057 (15%)	
Unknown	6,074	1,016	5,058	

deprivation quintile				<0.001
Q1 (least)	4,157,772 (20%)	781,369 (23%)	3,376,403 (20%)	
Q2	4,032,329 (20%)	735,329 (21%)	3,297,000 (20%)	
Q3	4,259,619 (21%)	714,307 (21%)	3,545,312 (21%)	
Q4	4,052,737 (20%)	642,990 (19%)	3,409,747 (20%)	
Q5 (most)	3,796,821 (19%)	558,209 (16%)	3,238,612 (19%)	
Unknown	351,758	52,067	299,691	
rural urban				<0.001
Other	328,860 (1.6%)	47,257 (1.4%)	281,603 (1.6%)	
Rural	4,113,110 (20%)	535,061 (15%)	3,578,049 (21%)	
Urban	16,209,066 (78%)	2,901,953 (83%)	13,307,113 (78%)	
care home				<0.001
Yes	37,137 (0.2%)	2,057 (<0.1%)	35,080 (0.2%)	
Non	20,613,899 (100%)	3,482,214 (100%)	17,131,685 (100%)	

<sup>1</sup> n (%); Median (IQR)

<sup>2</sup> Pearson's Chi-squared test; Wilcoxon rank sum test

## Appendix 3.

Excerpts from Service Restoration Observatory online survey (not all may apply to the present report):

Q2. Please can you give us your general observations about the report if you have not already made comments on the google document.

Q3. If you have specific observations about any of the charts or observations please share them here. Please feel free to write as much or as little as you want. Types of things you may want to think about:

- Are there any changes in activity here that are worrying, from a safety or quality perspective? Please indicate the specific graph using the title or clinical code.
- Are there any national or regional groups we should tell, for each key change you are worried by?
- Does anything you see here make you think some of the data might be wrong? If so what, and why?
- Is there any more investigation or analysis needed on specific graphs? For example is there more data, or more context on a change needed? If so, what and where?
- Are there other datasets that could support your recommended investigations and analysis? Please provide a link to the source or description of the dataset.
- Should any of the observations here be described and investigated further in an academic research paper? If so, what is the research question.
- Are any of these changes worth notifying individual practices about? If so, which and can you explain what change a practice should make based on the information?
- For example, we could send alerts to practices every week about the things they are most unusual on, or where they are most at risk.

## Appendix 4. Further plots

**Figure A4.1 Monthly absolute counts of SNOMED codes in TPP general practice (January 2019 - December 2020).** March 2020 indicated in pink. Note the different y axes (each plot scaled individually)

