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General practitioners' wellbeing during the COVID-19 pandemic: Novel methods with social media data

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Abstract

Background: It is difficult to engage busy healthcare professionals in research. Yet during the COVID-19 pandemic, gaining their perspectives has never been more important.

Objective: To explore social media data for insights into the wellbeing of UK General Practitioners (GPs) during the Covid-19 pandemic.

Methods: We used a combination of search approaches to identify 381 practising UK NHS GPs on Twitter. Using a two stage social media analysis, we firstly searched for key themes from 91,034 retrieved tweets (before and during the pandemic). Following this we used qualitative content analysis to provide in-depth insights from 7145 tweets related to wellbeing.

Results: Social media proved a useful tool to identify a cohort of UK GPs; following their tweets longitudinally to explore key themes and trends in issues related to GP wellbeing during the pandemic. These predominately related to support, resources and public perceptions and fluctuations were identified at key time-points during the pandemic, all achieved without burdening busy GPs.

Conclusion: Social media data can be searched to identify a cohort of GPs to explore their wellbeing and changes over time.

KEYWORDS
general practitioners (GPs); National Health Service (NHS); pandemic; primary health care; research, qualitative; social media

INTRODUCTION

Before the COVID-19 pandemic, rising demands on UK NHS general practitioners (GPs), including increasing complexity and intensity of work and difficulties in recruitment and retention, led to reports of a service in 'crisis' (The King's Fund, 2016; The King's Fund, 2019). While expanding public commentary and campaigns

from UK doctor groups highlight the difficulties being faced in general practice, insufficient research evidence explores the key sources of stress and impact on NHS GP wellbeing.

Healthcare professionals are notoriously difficult to recruit to interviews and unlikely to complete surveys (Cottrell et al., 2015; Patel et al., 2017). The COVID-19 pandemic not only exacerbates the time pressures, but survey fatigue among this professional group during this time also reduced research participation. As a result, social media analysis provided a valuable tool to enable explore GPs views and experiences first-hand. The method also provides information in real-time, without interviewer bias.

Healthcare professionals currently use a broad range of social media platforms, with Twitter being one of the most common (Antheunis et al., 2013; Chan & Leung, 2018; George et al., 2013; Rolls et al., 2016; von Muhlen & Ohno-Machado, 2012). Over half of medical doctors on Twitter are general practitioners (Antheunis et al., 2013). Twitter allows any healthcare professional to share their experiences, thoughts or perceptions via their account. Previous research has demonstrated that doctors are quick to use Twitter as a platform to discuss informally current issues pertinent to their work and to communicate with colleagues (Antheunis et al., 2013; George et al., 2013; von Muhlen & Ohno-Machado, 2012). More recently, research has explored discussion of work practices during COVID-19 (Sullivan et al., 2021).

While Twitter data have been used to identify experiences and opinions on COVID-19 from the public (Ainley et al., 2021; Alomari et al., 2021; Babvey et al., 2021; Dyer & Kolic, 2020; Gao et al., 2021; Guntuku et al., 2020; Huang et al., 2020; Karami & Anderson, 2020; Koh & Liew, 2022; Lee et al., 2020; Lwin et al., 2020; Osakwe et al., 2021; Rao et al., 2020; Skalski et al., 2017; Su et al., 2020; Valdez et al., 2020) and USA medical professionals (Sullivan et al., 2021; Wahbeh et al., 2020), it has not been used to study the impact of the pandemic on the wellbeing of NHS GPs practising in the United Kingdom (Jefferson, Golder, et al., 2022). In a systematic review published in 2022, we identified 31 studies exploring the impact of COVID-19 on primary care doctors' mental health and wellbeing; all of which relied upon traditional methods of data collection; namely surveys or interviews (Jefferson, Golder, et al., 2022). Only two of these 31 studies were limited to UK GPs (Taylor et al., 2021; Trivedi et al., 2021).

The present article provides a case study example of how two forms of social media analysis can be used to assess healthcare professionals′ perceptions and experiences, using the topic of UK GP wellbeing during the pandemic. This group was chosen as the work formed part of a larger project exploring the impact of the

Key Messages

- Social media can provide real-world data reflecting the experiences, attitudes, perceptions and wellbeing of busy health professionals, without the need for surveys or traditional qualitative methods.
- Social media views are posted contemporaneously to the situation so can be used to gain insights into rapidly changing pressures on health professionals in real-time.
- Information professionals should be aware of the potential value and increasing volume of studies using social media data.
- Information professionals may be best placed to devise and conduct searches of social media data for future research.

pandemic on UK GPs; highlighted as increasingly important due to wider debate around a potential workforce 'crisis' in UK general practice, even before the pandemic (The King's Fund, 2016; The King's Fund, 2019).

METHODS

We used a mixed-methods approach to analyse the social media data. First, we used a quantitative approach to analyse the longitudinal trends in 91,034 tweets pre- and post-COVID (January 2019 to February 2021). We then conducted a qualitative analysis to provide more in-depth insights into the themes related to GP wellbeing during the pandemic (February 2020 to February 2021). This analysis was inductive in nature, and as such we did not seek to confirm or refute an existing hypothesis, but rather to explore emerging themes. This paper conforms to the Standards for Reporting Qualitative Research (SRQR) (O'Brien et al., 2014).

Sampling and data

Twitter profiles of users who tweeted on COVID-19 from 10 March 2020 to October 2020 were shared by Professor Mike Thelwall (see Acknowledgements). We limited profiles to those with a self-reported UK location and 'Dr' or 'Doctor' in their username (5512 users and 223 users, respectively) or biographical description (850 users and 3885 users). We then selected GPs manually, excluding private practice GPs, retired GPs and Twitter accounts for

GP surgeries, rather than an individual's account. This identified 293 practising UK NHS GPs. We supplemented these by searching for 'NHS GP' as a phrase in 'people' in the Twitter Advanced Search facility, identifying a further 88 Twitter users after removing duplicates. The final sample included 381 UK NHS GPs. To explore the representativeness of our sample, we collated available demographic data, such as gender and race (categorised as black, white or Asian), geographical location within the United Kingdom, and type of GP (such as GP Partner or GP Trainee).

The longitudinal analysis included 185 GP user accounts from the total 381 sample for whom we could obtain continual tweets from 1st January 2019 to February 2021. GP accounts were excluded if their Twitter usage exceeded the maximum download limit of 3200 tweets, if they joined Twitter after 2019, if they had an extended break from Twitter, or changed their account to private.

For the qualitative analysis one author (SG) randomly selected 200 GPs from the total 381 who posted tweets from February 2020. This generated variation in demographics and posts, while enabling data saturation with no new themes emerging. Of these 200 GPs, 196 had timelines containing data relevant to GP wellbeing and were included in our analysis.

Analysis

For both analyses we collected tweets from the GPs sampled using Mozdeh software (http://mozdeh.wlv.ac.uk/). We excluded non-English tweets, retweets, and duplicate tweets and imported them into an Excel Spreadsheet. The longitudinal analysis analysed trends over time in #hashtags, @handles (usernames), words used and key themes.

The qualitative analysis, led by an experienced qualitative health researcher, pursued a more in-depth approach that utilised thematic analysis to identify themes emerging relating to GP wellbeing during the pandemic. Following a period of data familiarisation, this process involved coding the tweets into multiple relevant categories, with a coding framework developed through multiple iterations and in consultation with a team of researchers with topic and methodological expertise. This approach is one of the most common methods for studying information obtained from social media (Wang et al., 2019) and is appropriate for identifying prevalence (Skalski et al., 2017). Tweets were hand-coded (Kim et al., 2013) and coding was recorded in Excel software. To avoid over-interpretation of these short tweets, we coded only what was explicitly stated.

We tested for consistency in coding and increased the dependability of the findings by independently double coding 10% of tweets. Level of agreement was high, with 1.2% (11/915) codes changed and three additional codes added following discussion by coders. All codes were checked by the second coder during the coding categorisation process, rather than independently assigned. Although repeated themes were identified at an early stage, indicating potential 'data saturation,' we coded all 196 timelines.

RESULTS

Sample demographics

Our sample is broadly representative of the UK GP population in terms of race; however, we had a higher proportion of men in our sample (Table 1). GPs were located throughout the United Kingdom, with a slight over-representation from London. The majority (81%) did not indicate what GP role they held. Of those that did, most were GP Partners or GP Trainees/Registrars. Age was reported by less than 5% of GPs.

Analysis 1: Longitudinal trends January 2019 to February 2021

Volume of tweets (91,034 tweets from 185 GPs)

The number of tweets increased dramatically just prior to the first UK lockdown (20th March 2020) and remained high until the end of April 2020 (Figure 1). The next largest peaks were around the time of the Royal College of General Practitioners (RCGP) Annual Conference (24th–25th October 2019) and the USA presidential election results (November 2020). Other smaller peaks reflected polling day (12th December 2019), a GP conference 'DGPLondon20' (29th February 2020), announcement of the second lockdown (31st October 2020), the first vaccine efficacy results (12th November 2020), and the COVID-19 vaccine roll-out (January 2021).

Hashtags (11,950 unique hashtags mentioned 34,372 times)

In addition to hashtags related to the NHS and primary care, which dominate GPs' tweets throughout the time period, those related to Brexit dominated in 2019, COVID-19 dominated in 2020 and COVID-19 vaccines in 2021 (Table A1). Many new COVID-19 hashtags emerged in 2020, such as, #covid19, #coronavirus, #stayhomesavelives, #lockdown, #socialdistancing, #covidvaccine, #ppe and #nhsheroes.

TABLE 1 GP demographics (gender, race and country)

	Male	Female	Unknown	White	Asian	Black	Unknown	England	Scotland	Wales	NI	Unknown UK
Longitudinal study (n = 185)	58% (107/185)	42% (77/185)	0.5% (1/185)	64%, (118/185)	30% (55/185)	4% (7/185)	3% (5/185)	75% (138/185) (35 from London)	6% (11/185)	4% (8/185)	2% (3/185)	14% (25/185)
Qualitative study (n = 196)	56% (109/196)	43% (85/196)	1% (2/196)	61% (119/196)	32% (63/196)	6% (11/196)	2% (3/196)	77% (150/196) (36 from London)	7% (13/196)	5% (9/196)	1% (2/196)	11% (22/196)
GP population (headcount)[a]	43%	56%	1%	51%	23%	4%	19%	82%	9%	6%	3%	–

Note: Data are from—England https://digital.nhs.uk/data-and-information/publications/statistical/general-practice-workforce-archive/31-march-2021, Wales https://gov.wales/general-practice-workforce-30-september-2020, NI http://www.hscboard.hscni.net/our-work/integrated-care/gps/gps-current-facts-and-figures/, and Scotland https://publichealthscotland.scot/publications/general-practice-gp-workforce-and-practice-list-sizes/general-practice-gp-workforce-and-practice-list-sizes-2010-2020/.

[a]Gender and ethnicity is for England.

Handles (34,931 unique handles used 177,766 times)

The most common Twitter handles cited by GPs were organisations (such as @rcgp, @nhsengland, @thebma), politicians (such as @matthancock, @borisjohnson) and fellow GPs. Handles in 2020/2021 were similar to 2019 with an increase in mentions of GPs labelled as 'renowned COVID-19 health experts' by Twitter (Table A1).

Words (86,671 different words used 1,731,115 times)

Similar language was used in each year (Table A1). Many of the words used were to thank the hard work of colleagues (thank, time, great, work, staff, team, practice). Terms in 2021 also reflected the COVID-19 vaccine roll-out.

Specified themes (using words and hashtags)

During the first wave in March 2020, tweets peaked relating to COVID-19, in particular issues around safety, frontline staff, mortality and interventions to reduce transmission (such as lockdown, social distancing and personal protective equipment [PPE]) (Figure 2A and Table A2). These issues remained relatively common throughout the rest of the year. Tweets about lack of testing for COVID-19 peaked in both the first wave (March 2020) and in September 2020, when UK shortages were apparent even for healthcare professionals (Table A2).

Commentary around remote working increased during the pandemic. References to workload, the perception of GP surgeries being 'closed', flu, GP 'bashing' and low morale peaked around September to October 2020 (Figure 2B). This coincided with the timing of a letter from NHS England to all GP practices requesting them to 'reopen' (Iacobucci, 2021) (Table A2).

Issues related to coping, wellbeing, appreciation, sadness and enjoyment appeared at low levels throughout the time period (Figure 2C). January 2021 saw an increase in vaccine-related tweets (Figure 2A) at the time of the COVID-19 vaccination programme.

Analysis 2: Qualitative exploration

Table 2 summarises the themes which emerged during the pandemic. The 12 most commonly identified themes in descending order of frequency are described below, many of which were interconnected.
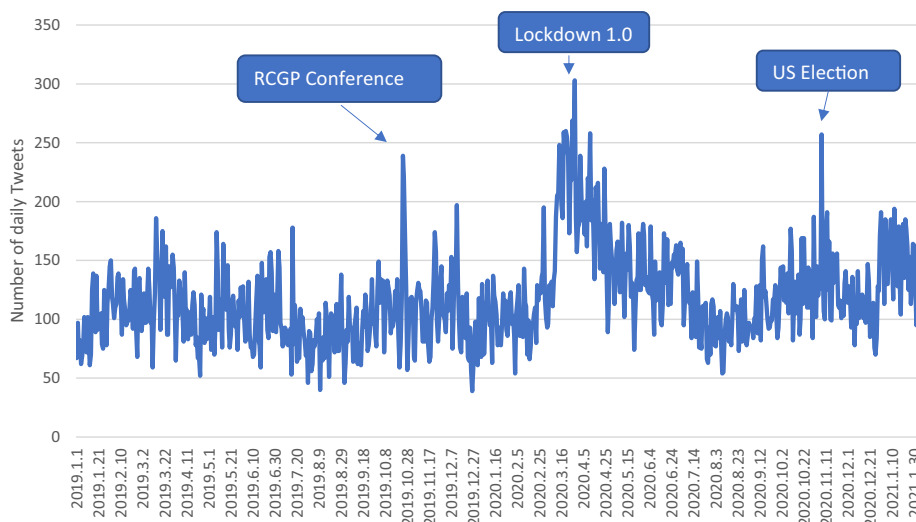
FIGURE 1 Total number of daily tweets from 185 GPs [Colour figure can be viewed at wileyonlinelibrary.com]

Changes to GP working practice ($n = 1746$)

The most common theme was related to changes in working practices, in particular remote working. While 800 posts where either positive or neutral, 946 posts were negative with GPs expressing concern around missed diagnoses, widening health inequalities, patient satisfaction, job satisfaction, and increased time and fatigue. Problems contacting patients were common and additional challenges in working from home were present, particularly for those with children. GPs emphasised the need to remain accessible to patients through face-to-face consultations, but were concerned about safety. Non-COVID care was also a concern, as was the increasing number of patients with mental health problems. Most posts in the positive or neutral category were factual statements describing the changes. However, a small number highlighted the efficiencies of home working, improved patient care and a greater work/life balance. Although there was concern about the logistics of GPs delivering the COVID vaccination programme, GPs appeared buoyed by the vaccine roll-out.

NHS resources ($n = 1277$)

Posts concerning NHS resources were mostly negative (1238) with only 39 mentioning adequate resources (mainly referring to having PPE or testing available). Some tweets about adequate resources stated that '*at last we have plenty of PPE*', thus referring to a time when supplies were inadequate. Conversely, negative posts regarding the scarcity of resources often referred to PPE ($n = 521$), COVID-19 testing ($n = 289$), staff ($n = 169$), funding/pay ($n = 141$) or a general lack of resources ($n = 118$). With respect to the lack of PPE, GPs felt they were lower priority compared to secondary care staff and '*even supermarket employees*'. The quality of PPE was

described as '*substandard*' or even '*hopeless*' with flimsy paper masks, thin plastic aprons and masks several years out of date. Pleas were made for World Health Organisation guidance on PPE to be followed, including FFP3 masks (those offering maximum protection). GPs questioned how many lives were lost because of inadequate PPE supplies.

GPs expressed anger about the lack of COVID-19 testing in the first phase of the pandemic. There was frustration that GPs were perceived to be lower priority than high-profile public figures, and hospital staff. Again, GPs were confused and angry as to why they were not a priority group, given they had more contact with patients than secondary care staff.

GPs reported that the testing system again caused problems in September 2020 with long waiting times for results, or long distances to travel to testing centres.

Many posts referenced a decline in GP numbers over recent years, expressing the view that primary care staffing levels were critical before the pandemic and COVID-19 exacerbated these problems. GPs reported attrition, due to factors such as workload, underfunding, low morale and lack of appreciation.

Many GPs posted about NHS funding cuts over the past 10 years. The frustration surrounding perceived underfunding of primary care grew over time as increasing amounts were spent on privately provided interventions, including 'NHS Test and Trace', which many GPs felt would have been better managed by the NHS.

Direction, management or leadership ($n = 1161$)

Approximately a 10th of posts relating to direction and management were positive ($n = 115$), and these were mostly directed at organisations such as the RCGP, The
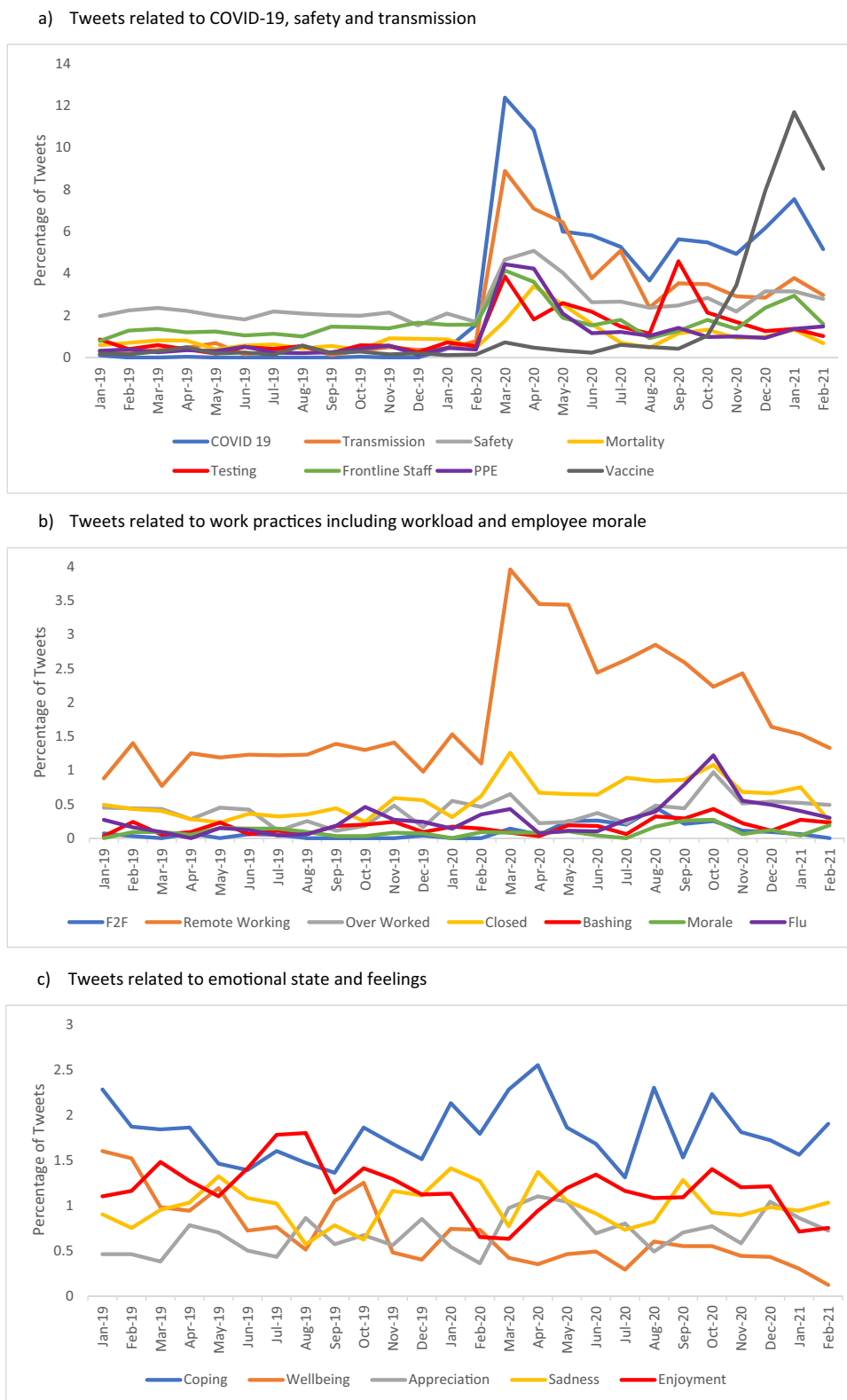
a) Tweets related to COVID-19, safety and transmission

b) Tweets related to work practices including workload and employee morale

c) Tweets related to emotional state and feelings

FIGURE 2 Daily percentages of GP tweets mentioning specific related-terms [Colour figure can be viewed at wileyonlinelibrary.com]

King's Fund, or Public Health England, with very few directed at UK government actions.

Most negative posts regarding leadership were critical of underfunding, declining numbers of GPs, lack of PPE and testing, incorrect information for risk assessing patients, limited resources to carry out the vaccination programme, inconsistent or poor guidance for GPs and scapegoating GPs. Poor management of care homes

TABLE 2 Main themes and sub-themes of qualitative content analysis

Main themes	Sub-themes	No of tweets (n = 7145[a])	No of GPs (n = 196)	% of tweets made by female, male GPs (n = 86, 110)[b]	% of tweets posted by White, Asian, black GPs (n = 119, 63, 11)[c]
Changes to GP practice (n = 1746, 24%)	Changes to practice (negative)	946 (13%)	142 (72%)	64%, 78%	71%, 75%, 64%
	Changes to practice (positive or neutral)	800 (11%)	132 (67%)	64%, 78%	67%, 68%, 55%
NHS resources (n = 1277, 18%)	Resources, lack of (general)	118 (2%)	42 (21%)	12%, 28%	18%, 22%, 27%
	Resources, lack of (PPE)	521 (7%)	107 (55%)	43%, 61%	52%, 64%, 54%
	Resources, lack of (testing)	289 (4%)	70 (36%)	34%, 35%	28%, 46%, 36%
	Resources, lack of (staff)	169 (2%)	64 (33%)	23%, 39%	29%, 40%, 18%
	Resources, lack of (funding, pay)	141 (2%)	47 (24%)	20%, 26%	20%, 30%, 27%
	Resources, adequate	39 (1%)	26 (13%)	6%, 19%	9%, 17%, 27%
Direction/management/ leadership from UK government or leading organisations such as RCGPs and BMA (n = 1161, 16%)	Direction, management (positive)	115 (2%)	53 (27%)	19%, 34%	61%, 62%, 45%
	Direction, management (negative)	1046 (15%)	119 (61%)	56%, 63%	26%, 30%, 18%
Information (n = 1037, 15%)	Misinformation (about or received by GPs)	564 (8%)	109 (56%)	57%, 54%	54%, 57%, 64%
	Information use and sharing (among GPs)	343 (5%)	89 (45%)	44%, 45%	39%, 52%, 64%
	Information to support GP wellbeing	130 (2%)	53 (27%)	30%, 24%	23%, 33%, 27%
Appreciation of or by GPs (n = 1015, 14%)	Appreciation of GPs (negative)	277 (4%)	84 (43%)	41%, 44%	39%, 52%, 27%
	Appreciation of GPs (positive)	188 (3%)	84 (43%)	43%, 43%	42%, 44%, 45%
	Appreciation of others	550 (8%)	111 (57%)	63%, 52%	55%, 59%, 73%
NHS work colleagues (n = 686, 10%)	NHS work, colleagues (positive)	620 (9%)	119 (61%)	55%, 54%	56%, 68%, 64%
	NHS work, colleagues (negative)	66 (1%)	30 (15%)	10%, 18%	12%, 17%, 36%
Personal GP experiences or emotions (n = 613, 9%)	Experience C19 positive test/self-isolation	151 (2%)	58 (30%)	29%, 30%	22%, 46%, 27%
	Experience stress/burnout	98 (1%)	43 (22%)	22%, 22%	21%, 24%, 18%
	Emotions	364 (5%)	103 (53%)	64%, 43%	53%, 49%, 55%
GP workload (n = 552, 8%)	Workload increase	537 (8%)	105 (54%)	45%, 59%	52%, 57%, 45%
	Workload decrease	15 (0.2%)	13 (7%)	8%, 5%	7%, 8%, 0%
Colleagues health or wellbeing (n = 533, 7%)	Concern about colleague health, wellbeing (depression, burnout, etc.)	533 (7%)	120 (61%)	59%, 62%	51%, 75%, 91%
Risks to GPS (n = 481, 7%)	Risks to GPs themselves	367 (5%)	89 (45%)	43%, 46%	39%, 56%, 37%
	Risks to GPs families	45 (1%)	24 (12%)	13%, 12%	9%, 17%, 9%
		69 (1%)	25 (13%)	12%, 13%	5%, 36%, 22%

TABLE 2 (Continued)

Main themes	Sub-themes	No of tweets (n = 7145[a])	No of GPs (n = 196)	% of tweets made by female, male GPs (n = 86, 110)[b]	% of tweets posted by White, Asian, black GPs (n = 119, 63, 11)[c]
	Risks to Black, Asian and minority ethnic GPs				
Communication/ integration/ collaboration (n = 294, 4%)	Communication (positive)	208 (3%)	69 (35%)	29%, 40%	34%, 37%, 27%
	Communication (negative)	86 (1%)	44 (22%)	16%, 27%	21%, 25%, 18%
Self-care of GPs in reference to their wellbeing (n = 201, 3%)	Self-care (positive)	189 (3%)	65 (33%)	37%, 30%	30%, 37%, 36%
	Self-care (negative)	12 (0.2%)	9 (5%)	3%, 5%	5%, 3%, 9%

[a]Some tweets discussed more than one topic and were coded in more than one category.

[b]Using test of proportions, comparing the % of male tweeting the topic and the % of female—topics of 'negative changes to practice' ($p = 0.028$), 'lack of resources' ($p = 0.005$), 'lack of staff' ($p = 0.019$), 'PPE' ($p = 0.013$), 'adequate resources' ($p < 0.001$) and 'positive direction/management' ($p = 0.019$) were posted more heavily by males than females, whereas experience of 'emotions' ($p = 0.003$) were more by females than males.

[c]Using Fisher's exact test significant differences were found in four categories about 'Risks to BAME GPs' ($p < 0.001$), 'Resources lack of (testing)' ($p = 0.048$), 'Experience C19' ($p = 0.003$) and 'Colleague Health/Wellbeing' ($p = 0.001$) with a higher proportion of Black and Asian GPs tweeting.

during the pandemic and risks to staff and patients were also discussed and there were calls for the government to be held accountable.

There was a general sentiment that the focus of government and media was on hospital patients and staff. Anger was expressed about the behaviour of political figures who 'broke' COVID-19 rules.

Misinformation and information sharing (n = 1037)

Misinformation about or received by GPs (n = 564) was common; with complaints over confusing or contradictory guidance. For example, at the start of the pandemic confusion existed around PPE guidance, isolation rules for GPs, suspension of routine work, shielding lists and the movement to remote consultations.

The government was seen as perpetuating misinformation about GP surgeries being 'closed'—a theme that persisted throughout the pandemic. GPs declared that they were not 'tucked away safe' or 'twiddling our thumbs' but 'working harder than ever'. Pleas to the public and reassurances that practices were open continued throughout our analysis.

GPs also used Twitter as a platform to share general information related to working during the pandemic (n = 343). Some GPs shared advice on working practices, while others asked questions of their colleagues. Sharing petitions on issues such as testing or PPE and work surveys was commonplace, as was sharing factual information on issues such as GP deaths, risks for minority ethnic GPs, and doctors experiencing symptoms of 'long COVID'.

Information was shared to support GP wellbeing (n = 130), with posts giving links to webinars, events or resources. Other posts simply suggested ways to help such as 'being kind to yourself', 'taking breaks', 'taking down time' and 'keeping active'.

Appreciation of or by GPs (n = 1015)

Many GPs expressed feelings of being unappreciated by media, government and the public (n = 277). In March 2020 there were reports of stealing toilet rolls and hand sanitizer from GP practices as well as vandalism, graffiti and abuse from patients. Public perceptions were viewed as being exacerbated by GPs being accused of being 'closed', 'lazy', 'selfish' and not doing the job they 'signed up to'. There were references to 'GP bashing' and GPs being blamed for the 'failures of government'. GPs complained of feeling like 'public enemy number one', particularly from September 2020.

There were fewer posts relating to positive appreciation received by GPs (n = 188) and these tended to reference gifts from businesses or the local community, allocated shopping times, and donations of PPE. The 'clap for carers' was met with a positive emotional response by some GPs. Some said that 'it bought a lump to my throat' or 'a tear to my eye'. As time went on, however, views became less positive and by January 2021, a return of 'clap for carers' was met with calls for the public to observe the rules to protect the NHS instead. GPs recognised patient gratitude, particularly during the vaccination programme.

GPs expressed gratitude to other professions and the public supporting them in the pandemic, including organisations, volunteers, the public, neighbours, local businesses ($n = 550$) and scientists and teachers.

NHS work colleagues ($n = 686$)

There were expressions of gratitude to all NHS staff ($n = 620$) with comments about altruism, dedication, staff 'going above and beyond the call of duty', 'showing courage' and being 'heroes'. There were also views expressed about how 'fantastic' the NHS itself is by providing free care, rapid adaptations to change and an incredible response to the crisis.

There was, however, some criticism of other parts of the NHS treating GPs 'like commodities instead of human beings', 'bullying', 'too much bureaucracy', and a management team 'devoid of reality' ($n = 66$).

Personal GP experiences or emotions/stress ($n = 613$)

Personal experience of COVID-19 was reported in 151 posts. In the earlier posts, before testing commenced, many felt confident that they had COVID-19, some had confirmation later in the year via an antibody test.

GPs reported anxiety about their own safety, the safety of their families, the 'tsunami' in workload, and lack of resources. Many stated that they were 'fearful' about the level of care for patients, and 'heartbroken' by patients suffering or dying alone.

GPs also referred to work pressures as unbearable, stating that they felt 'completely overwhelmed', and 'never felt so exhausted'. Some perceived an impact on their mental health, with comments that they felt 'mentally drained', 'broken', 'wiped out', 'worn down', 'teary' and 'burnt out'.

Low morale was exacerbated by 'false rumours' and a 'constant attack on GPs' by media, government and the public. GPs were frustrated by public behaviour such as non-compliance with lockdowns or isolation, not wearing masks, and vaccine uptake.

From late November there were more positive posts with GPs reporting that they were at last 'feeling hopeful'. Those reporting on their involvement with the vaccine roll-out described feeling 'emotional' and 'proud'.

GP workload ($n = 552$)

GPs reported working long shifts, frequently working over 50-h weeks, working on days off, and not taking annual leave or bank holidays. Before COVID-19, primary care was described as at 'breaking point'. During the pandemic, workload was described as having 'gone through the roof' creating 'immense pressure' with GPs 'pushed to the limit;' a situation described as unsustainable.

Additional pressures reported included the increase in remote consultations (described as taking longer), NHS 111 referrals, hospitals reducing non-COVID-19 services, keeping up to date with COVID-19 evidence and safe working practice guidelines, dealing with patient risk assessments, donning and doffing PPE, sanitising between patients, requests for mask exemption letters, shielding notes, isolation notes, sick notes, and early ordering of prescriptions. In addition, patient demand was perceived to have increased due to a rise in mental health issues, an expanded flu vaccination programme and the COVID-19 vaccination roll-out.

Colleagues health and wellbeing ($n = 533$)

Issues were raised regarding burnout, stress, anxiety and even suicide resulting from the 'extreme pressure' and 'overwhelming workload'. There were concerns about GPs leaving the profession at 'an alarming rate', and calls for support for GP wellbeing. There was some resistance to 'resilience training', seen by some as 'blaming colleagues'.

GPs expressed worries for their colleagues' safety, likening GPs to 'soldiers fighting without armour', and 'putting their lives on the line', particularly returning retired GPs and minority ethnic GPs. In response to the risks, GPs reported that colleagues were 'writing their wills', looking into death in service benefits or seeking guardianship of their children in preparation for the worst. Other posts announced colleagues hospitalised with or dying from COVID-19, and numbers of GPs dying.

Risk to GPs ($n = 481$)

Some GPs resigned themselves to 'inevitably' catching COVID-19. Some GPs talked about 'living in fear of unknowingly passing it on to my family and loved ones', particularly more vulnerable family members.

Concerns around risk to minority ethnic GPs centred around the disproportionately higher death rate in minority ethnic GPs and calls for 'appropriate measures' to be put in place. These views were more commonplace among minority ethnic GPs.

Communication ($n = 294$)

There was praise for primary care teams 'pulling together' and a clear sense of 'solidarity', alongside

comments about how well community teams and volunteer/good neighbour schemes worked with GPs. There was concern that primary and secondary care could work better together. A 'Berlin Wall' and a 'them and us mentality' was described between primary and secondary care. While there were calls for better IT systems others praised technology that enabled improved communication and made the situation more 'bearable'.

Pleas were made for better communication between the NHS and government, particularly as GPs had no warning of policy announcements such as shielding changes, and flu and COVID-19 vaccine roll-outs.

Self-care of GPs ($n = 201$)

GPs were very aware of the potential impact of the pandemic on their mental health; some reported looking after themselves, mostly through exercise and eating well, as well as some 'self-care' activities. The importance of taking annual leave and having days off 'even in the middle of a pandemic' was also emphasised. Others, though, disliked the 'self-care mantra' and felt resilience planning was insufficient to 'reverse the unprecedented levels of stress faced by primary care doctors today'.

Themes by gender and race

Gender differences were apparent in the nature of tweets by men and women, with men posting more heavily about 'negative changes to practice' ($p = 0.028$), 'lack of resources' ($p = 0.005$), 'lack of staff' ($p = 0.019$), 'PPE' ($p = 0.013$), 'adequate resources' ($p < 0.001$) and 'positive direction/management' ($p = 0.019$). Meanwhile, women GPs described their emotional experiences more than men ($p = 0.003$) (Table 2).

A statistically significant higher proportion of Black and Asian GPs tweets on the themes 'Risks to Minority Ethnic GPs' ($p < 0.001$), 'Resources lack of testing' ($p = 0.048$), 'Experience C19' ($p = 0.003$) and 'Colleague Health/Wellbeing' ($p = 0.001$) (Table 2).

DISCUSSION

The engagement of UK GPs with Twitter made it possible to conduct a mixed-methods social media analysis to explore large volumes of tweets relating to their perspectives and wellbeing during the pandemic and pre-pandemic. The analysis reveals trends in the social commentaries made by GPs during this time, including issues pertinent to GPs that may have affected their

wellbeing. These methods enabled us to explore sensitive issues at a time when the healthcare workforce was under incredible pressure, without burdening them with research time. We were able to identify time trends and causes of GP work-related stress in a large sample of GPs, combining a longitudinal quantitative analysis with an in-depth qualitative analysis in a way that may have been more difficult through traditional research methods.

Key issues were identified relating to perceived lack of resources and support, which had implications for GPs' safety, workload and wellbeing. We highlight the perceived sources of increased workload and stress during the pandemic, including rapid moves to remote working (with remote consultations described as taking longer), GP self-isolation or shielding increasing pressures on colleagues, poor or confusing dissemination of policy guidance, increased patients with mental health problems, time taken cleaning and donning/doffing PPE and poor communication with secondary care. Perceived lack of support from government, media and the public exacerbated the situation and affected GP morale.

Our systematic review (Jefferson, Golder, et al., 2022) on this topic identified only two studies focussed on UK general practice (Taylor et al., 2021; Trivedi et al., 2021). Nevertheless, the international literature highlighted similar trends in GP wellbeing during the pandemic related to rapidly altered working practices, uncertainty and fear of infection risk (Jefferson, Golder, et al., 2022). The recently published GP Worklife Survey reports similar difficulties in their large longitudinal cohort, with GPs experiencing increased stress associated with negative media publicity and demands from patients (Odebiyi et al., 2022). Worryingly, in the under 50 group, this most recent survey also identified the greatest intentions to leave direct patient care within 5 years since the survey began (Odebiyi et al., 2022). A qualitative interview study of 40 UK GPs identified similar themes such as personal risk, workload, practice changes, public perceptions and leadership all increasing stress and anxiety among GPs (Jefferson, Heathcote, & Bloor, 2022).

One other study has explored healthcare professionals' wellbeing during COVID-19 using social media, finding issues of lack of PPE and testing and changes in practice due to telemedicine predominate among USA doctors (Sullivan et al., 2021). Top phrases by physicians were 'help us' and 'need PPE'. This concern was also voiced by UK GPs in our study. The USA study also found discourse regarding unemployment (including furlough and pay cuts) was high among USA physicians (Sullivan et al., 2021), which we did not identify. This may reflect differences between USA and UK healthcare systems.

It is already known that health professionals use social media to create virtual communities (Rolls

410 | WILEY— Health Information and Libraries Journal CILIP The Library and Information association HLG Health Libraries Group

GOLDER ET AL.

et al., 2016). This is also evident in our sample, with many GPs following and sending messages (often of support) to other GPs, demonstrating the degree of connectivity between GPs on Twitter. This research demonstrates the potential value of social media; identifying and listening to these online communities and going beyond searching for a specific topic on social media (the most commonly used method for social media analysis). This approach could prove valuable to health information professionals and librarians to gain insight into the demands and information needs of their users.

Searching social media data is challenging and information professionals may be best placed to undertake such searches given their skills and experience in information retrieval. Analysis of social media datasets may be another study design to add to information professionals' catalogue of skills in light of increasing use of social media. Indeed, social media data have been used not only in surveillance (such as flu epidemics [Samaras et al., 2020]) and to ascertain opinions (such as vaccine hesitancy [Raghupathi et al., 2020]), but also to create observational study designs by creating cohorts or cases and control groups (Golder et al., 2019).

Strengths and limitations

The use of social media to explore the wellbeing of healthcare professionals is novel and this paper is the first focusing on UK GPs. As with all social media research, we are limited by its content and the sample. Online and offline 'personas' may be different and GPs may be strategic in how and what they post. GPs have in the past been sued for discussing patients in such forums. Carville et al. (2020) suggests they may also be cautious in discussing workplace issues for fear of disciplinary action (Carville et al., 2020; Carville & Larson, 2020). GPs in our sample appeared to share their general views and opinions openly, but there was a tendency for them to refer to experiences and concerns around the wellbeing of colleagues, public access to GP services or public mental health rather than discussing their own personal experiences.

Twitter may not fully represent the demographics of the GP population. In general, social media users tend to be younger (Sloan et al., 2015) and have a higher level of education (Sloan et al., 2013; Sloan et al., 2015; Wojcik, 2019). In other respects, such as gender, race and ethnicity they tend to reflect the population (Sloan et al., 2013; Wojcik, 2019). Although we identified GPs from different racial groups and regions, our sample was somewhat over-representative of GPs who are white, male, and living in London.

Social media has the advantage of collecting a huge amount of data in real time; automation using software such as Mozdeh improves efficiency. Here, our reliance on human annotation reduced efficiency when dealing with large quantities of posts, though may have improved validity.

CONCLUSIONS

Our analysis of the Twitter timelines of UK GPs indicates clear trends in the social commentary of GPs during the COVID-19 pandemic, some of which have implications for GP wellbeing. Discussion of perceived workload pressures, unsafe working practices, lack of support and abuse reflect wider media commentaries during this time. These factors detrimentally impact on GPs, leading to issues with GP retention and capacity issues; the effects of which are now being felt in terms of patient care and unmet needs. Further research evaluating interventions that seek to support GPs is needed, to alleviate some of the pressing issues around workforce capacity and encourage GP retention.

We have also demonstrated the value of collecting online data through informal social media posts, which are uniquely representative of lived experience across large samples. Social media data could be useful to contemporaneously explore other real world issues.

CONFLICT OF INTEREST
The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are publicly available on Twitter. We cannot provide copies of the tweets themselves as this would breach Twitter Terms of Service and would prevent anonymity of the GPS in our sample. Twitter IDs are available on request from the authors for those wishing to hydrate them (this cannot be applied to those Tweets deleted or made private since the time of this study). All example tweets provided in the manuscript are paraphrased or were phrases used in multiple tweets.

ETHICS STATEMENT

This study was approved by the Health Sciences Research Governance Committee, University of York in December 2020. No HRA approval was required for this study.

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412 | WILEY—Health Information and Libraries Journal | CILIP The Library and Information Association | HLG Health Libraries Group

GOLDER ET AL.

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APPENDIX

TABLE A1 Top 10 hashtags, handles and words[a] in 2019, 2020 and 2021 [Color table can be viewed at wileyonlinelibrary.com]

Top 2019 Hashtags	Top 2020 Hashtags	Top 2021 Hashtags (Jan to 12th Feb only)
#nhs	#covid19	#covid19
#rcgpac	#nhs	#nhs
#teamgp	#coronavirus	#covidvaccine
#babylosshour	#teamgp	#teamgp
#gp	#covid_19	#geribookclub
#brexit	#covid	#covidvaccination
#menshealth	#primarycare	#covid
#primarycarenetworks	#covid19uk	#oneteam
#sepsis	#gp	#medTwitter
#primarycare	#generalpractice	#primarycare
Top 2019 Handles	**Top 2020 Handles**	**Top 2021 Handles**
@rcgp	@rcgp	@nikkikf
@lowcarbgp	@nikkikf	@nhsengland
@nikkikf	@drsdeg	@rcgp
@nhsengland	@nhsengland	@parthaskar
@helenrcgp	@matthancock	@drsimonhodes
@drsdeg	@fhussain73	@trisha_the_doc
@matthancock	@thebma	@yvettedoc50
@sonalikinra	@trishgreenhalgh	@rbkingston
@thebma	@lowcarbgp	@drjamesgill
@fhussain73	@movemoresheff	@nhskingston_
Top words used in 2019	**Top words used in 2020**	**Top words used in 2021**
Thank	Thank	Thank
Great	Time	Vaccine
GP	Great	patient
Patient	Patient	Time
Time	People	People
Good	Good	Great
Work	Work	Covid
People	GP	GP
care	Care	Good
Health	Health	Work

Note: Red = current affairs or politician; Blue = health or health service or health organisation; Orange = COVID-19; Green = primary care, GPs or heads of organisations; Grey = miscellaneous.

[a]Excludes stop words such as 'the', 'and', 'is'

TABLE A2 Trends in terms used for selected topics 2019 to February 2021

Topic	Terms searched	Highest percentage of daily tweets	Notes
Vaccine	Vaccination OR vaccinations OR vaccine OR vaccines OR vaccinated OR vaccinating OR #covidvaccine OR #vaccines OR #covidvaccination OR#vaccineswork OR #covid-19 OR#covid2019 OR #vaccine OR #vaccination OR #covidvaccines OR #covid19vaccine OR #vaccinessavelives OR #pfizervaccine OR #pfizer OR #astrazeneca OR #covidvacccine #vaccinate OR #getvaccinated	23.4%	Prevalent from the 9th November 2020 onwards, with high volume from beginning of December. 9th November 2020 Pfizer announced results of their phase 3 clinical trial efficacy test results. Vaccination roll out began on 8th December 2020.
COVID-19	corona OR coronavirus OR covid OR covid19 OR pandemic OR virus#covid19 OR #coronavirus OR #covid2019 OR #covid_19 OR #covid OR #covid_19 OR #covid19uk OR #coronavirusuk OR #covid-19 OR #fightcovid19 OR#pandemic OR #covid__19 OR #corona OR #covid_19uk OR #coronavirusoutbreak OR #coronavirusupdate OR#covid2019uk OR #covid19pandemic OR #longcovid OR #covidassessmentcentre OR #coronacrisis OR #coronaviruspandemic OR #coviduk OR #coronacrisisuk OR #zerocovid OR #coronauk OR #coronavirusupdates OR#coronaoutbreak OR #coronaupdate OR #coronvirusuk OR #covidiots	18.1%	Prevalent from Feb and March 2020 onwards. COVID became notifiable disease in UK on 5th March 2020.
Transmission	distancing OR isolate OR isolated OR isolating OR isolation OR lockdown OR mask OR socially OR transmission OR transmitted OR transmit OR vulnerable OR wave OR shielding OR #uklockdown OR #stayathomeandstaysafe OR #stayhomesavelives OR #lockdown OR #lockdown2 OR #lockdownuk OR #lockdownnow OR #socialdistancing OR #socialdistancinguk OR #stayhome OR #stayathome OR #staysafe OR #wearamask OR #flattenthecurve OR #stayinworkout OR #covidiots OR #washyourhands OR #wearamask OR #physicaldistancing OR #savelives OR #stayathomesavelives OR #stayhomestaysafe OR #mask OR #facemask OR #shielding OR #mymaskprotectsyou OR #staysafestayhome OR #selfisolation OR #flattenthecuve OR #stayathomeprotectthenhssavelives OR #protectthenhs OR #facemasks OR #saveournhs OR #coronaviruslockdownuk OR #selfisolating OR #socialdistancinguk OR #covidiot OR #mask OR #selfisolate OR #trackandtrace OR #coronaviruslockdown OR #socialdistanacing OR #shielding OR #coronalockdown OR #coronaviruslockdown OR #coronalockdown OR #social_distancing	21.8%	Prevalent from March 2020 onwards. Peaks on topics of lockdowns, Dominic Cummings, and mask campaigning. 23 March 2020, the UK went into lockdown. 22 May News breaks of Mr Cummings trip to Durham, 24 July Compulsory face coverings in indoor public spaces, 31 October 2020 announcement of second lockdown.

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TABLE A2   (Continued)

Topic	Terms searched	Highest percentage of daily tweets	Notes
	OR #socialdistance OR #stayalert OR #keepyourdistance OR #isolation		
Remote Working	Telephone OR phone OR video OR OR virtual OR remote OR remotely OR teleconsultation OR accurx OR footfall OR econsult OR skype OR zoom OR #remoteworking OR #accurx OR #remoteconsultations OR #doctorlink OR #onlineconsultations #econsultations OR #teleconsultations OR #virtualgroupconsultations OR #newmodelsofconsultation OR #newconsultationmodels OR #videoconsultation OR #virtualconsulting OR #virtualmedicalmeetings OR #virtualmeetings OR #zoom OR #saturdayzooming OR #zoomlife OR #workingfromhome	14.2%	Prevalent throughout 2019 to 2021. More consistently discussed from February 2020 onwards. Slight upward peak in March 2020 and larger peak 30 July 2020. NHS Long Term Plan committed practices to offer e-consultations from April 2020. 30 July 2020 Matt Hancock state GPs 'should do all consultations remotely going forward'.
Testing	test OR tested OR testing OR #covidtesting OR #testhealthcareworkersnow OR #testnhsstaff OR #testtesttest OR #testingforcovid19 OR #testthenhs OR #coronavirustesting OR #testing	12.9%	Prevalent from March 2020 onwards. Peak in first wave and September 2020. Testing was not widely available during the first wave even for HCPs. Shortages in testing was reported in September with people unable to get a test or travelling for miles to get one.
Safety	at-risk OR danger OR dangerous OR dangerously OR safe OR safely OR safer OR safety OR scary OR scare OR scaremongering OR risk OR risking OR risky OR unsafe	11.1%	Prevalent from March 2020 onwards. Peak in March–April 2020. First COVID death initially reported on 5 March 2020 (later earlier death on 30 January 2020 identified as first death). 25 March 2020—first GP death. PPE shortages were widely reported during the first wave.
Coping	burnout OR cope OR coping OR difficult OR distress OR distressed OR distressing OR resilience OR stress OR stressed OR stressful OR struggle OR struggled OR struggling OR tough OR #burnout OR #resilience OR #physicianburnout OR #tackleburnout OR #coping OR #nhsresilience OR #betterworkloadnotmoreresilience OR #lessworknotmoreresilience OR #stress OR #workstress OR #doctorsindistress OR #stressed	9.6%	Fluctuates throughout 2019 to 2021. Peaks reflect increase in posts on work related stress.
PPE	ppe OR protect OR protected OR protecting OR protective OR apron OR aprons OR glove OR gloves OR gown OR gowns OR doff OR doffing OR don OR visor OR visors OR goggles OR n95 OR ffp2 OR ffp3 OR #PPE OR #ppefornhs OR #ppeshortage OR #ppenow OR #properppe OR #weneedppe OR #ffp3	9.6%	Prevalent from March 2020 onwards. Peak on the 22nd April 2019. PPE shortages were widely reported during the first wave.
Frontline Staff	frontline OR staff OR frontliner OR #nhsheroes OR #frontlineheroes OR #frontliners OR #nhscovidheroes	9.1%	Peaked in March to April 2020 with discussion of PPE and testing of staff and December 2020 to January 2021 with vaccinating staff.

(Continues)

TABLE A2 (Continued)

Topic	Terms searched	Highest percentage of daily tweets	Notes
Mortality	death OR die OR died OR mortality OR #death OR #mortality	8.0%	Peak in first wave. First COVID death initially reported on 5 March 2020 (later earlier death on 30 January 2020 identified as first death). 25 March 2020—first GP death.
Sadness	sad OR sadly OR sadness OR #sadly	6.3%	Fluctuates throughout 2019–2021.
Enjoyment	enjoy OR enjoyable OR enjoyed OR enjoying OR enjoyment OR joy OR #joy	6.3%	Dipped after the end of January 2020. Often referred to enjoying work, a course or learning. Before start of the pandemic more about enjoying an event such as cinema, xmas and after pandemic began walks, runs, cycling or countryside.
Appreciation	appreciate OR appreciated OR grateful OR #clapforourcarers OR #gratitude OR #clapforcarers OR #clapforthenhs OR #grateful	6.3%	Fluctuates throughout 2019–2021.
Wellbeing	wellbeing OR well-being OR #wellbeing OR #mindfulness OR #wellness OR #nhswellbeing OR #wellbeingatwork OR #healthandwellbeing OR #worklifebalance OR #mindfullness OR #wellbeingmatters OR #worklife OR #healthandwellness OR #doctorwellbeing OR #nhsmentalwellbeing OR #waystowellbeing OR #bmawellbeing OR #staffwellbeing OR #juniordoctorwellbeing OR #workplacewellbeing OR #clinicianwellbeing OR #worklifebalance	5.6%	More peaks before COVID-19 in March 2020. Often refers to support available, particularly for GPS after start of pandemic and for patients and staff before.
Over worked	overstretched OR over-stretched OR overwhelmed OR overwhelming OR overworked OR relentless OR relentlessly OR stretched OR unrelenting OR work-life OR workload OR work-load OR #gpworkload OR #workload OR #workloadpressures	4.6%	Peaks on 23 January 2019 discussion on GP pharmacist role in reducing GP workload. 5th September 2020 discussion on workload and F2F. 18th October 2020 discussion on abuse of primary care. 7th January 2021 talk of workload prioritisation and vaccines 18th.
Closed	closing OR closed OR close OR #gpsareopen OR #gpisopen #weareopen OR #generalpracticeisopen	4.3%	More frequently used in September 2020. Early September 2020 NHS England wrote to all GP practices to 'reopen'.
Flu	Flu OR #flu OR #flujab OR #fluvaccine OR #influenza OR #fluclinic OR #flujabs OR #flu2020 OR #getyourflujab OR #flu2019	4.2%	More prevalent from September to November 2020 and in January 2019. 1 September 2020 start of largest UK flu vaccination programme.
F2F	F2F	3.2%	More frequently used after March 2020. NHS Long Term Plan committed practices to offer e-consultations from April 2020.
Morale	demoralised OR demoralising OR demoralise OR morale OR #morale	2.5%	More frequently used in September 2020. September 2020: Media coverage suggesting GP surgeries have been closed.
Bashing	bashing OR bashed OR bash OR abuse OR abused	1.3%	More frequently used in September 2020. GP abuse or bashing common thread in September 2020. September 2020: Media coverage suggesting GP surgeries have been closed.