Covid-19 in the news: the first 12 months

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Abstract

The year 2020 was the year of Covid-19. While we have largely learnt to live with it now, this was the year when the pandemic created huge disruption and a multiplicity of medical, political, economic and social impacts. In this paper we seek to identify the changing concerns of the international press to unfolding events of the Covid pandemic throughout 2020. Based on a 12.3-million-word subset of *The Coronavirus Corpus* (Davis, 2021), we explore keyword nouns and verbs and frequent noun phrases to understand the central concerns of the public reflected in its news media. Results show that news in the early months was dominated by the symptoms of the virus, with items relating to controlling the disease such as *guidelines*, *protocols* and, eventually, *vaccine*, becoming increasingly prominent. Dominant keyword verbs *base*, *infect* and *announce* concerned different activities associated with reporting the pandemic. This corpus-assisted linguistic description of the evolving story of the Covid-19 helps guide our reading of the changing public interest in the pandemic.

1. Introduction

At the end of December 2020, cases of Covid-19 passed 84 million and 1.8 million deaths. With unemployment rising, companies failing, medical facilities overwhelmed, and a more virulent strain emerging, it is not surprising that the worst pandemic in living memory had rarely been out of the news. The pandemic has also brought changes to the language, with words and phrases like *shelter-in-place, bio-bubble, lockdown and R-number* entering our everyday vocabulary. The influence of newspapers in reporting events has been considerable, with 64% in a survey of 10,000 people in 10 countries stating that established news media was their main source of information about the virus (Edelman's Trust Barometer, 2020)[1]. The scale of the printed news has been particularly striking, with *Time* recording 41,000 English-language articles with the term "coronavirus" in the first month (Ducharme, 2020). By March the Oxford corpus reported the term was now one of the most frequently used nouns in English (Oxford Languages, 2020) and by April the editors of the Oxford Dictionary broke with their traditional quarterly reports to announce new words in bi-monthly updates (Kruez, 2020).

The general topic, however, is not the only story. Within this focus on the virus there is a multiplicity, and ever changing, series of themes concerning the social, medical, cultural, political, psychological and economic impact of the virus. While several studies have explored the presentation of Covid in academic (Hyland & Jiang, 2021a) or social media (Chen, Lerman & Ferrara, 2020) texts, journalistic reporting of the virus has been relatively unexplored. This is surprising as reports in print media help structure the public's understanding of the pandemic, creating an evolving narrative of coverage. In this paper we track these shifting perceptions and seek to identify the changing concerns of the international press to unfolding events of the pandemic through the first 12 months of the pandemic. We do so by exploring different discursive framings of common topics over the year, focusing on things and activities expressed through high frequency nouns and verbs which reveal particular aspects of the coronavirus each month. The study is

based on an analysis of 120,000 news articles totalling 12.3 million words published from January to December 2020 in 20 English-speaking countries.

2. The infodemic and the news

It is hard to think of another time when science has not just been front page news but has completely dominated the attention of the world's media and public. The Covid-19 outbreak has impacted almost every aspect of the lives of people across the world, making a health and science story into something more far-reaching. Stock market falls, business closures and unemployment make it a financial story; travel restrictions bring in tourism journalists; lockdowns, working from home and school closures require copy from social and educational journalists.

Covid-19 rapidly became a highly politicised pandemic increasingly reflecting a growing polarisation (Cakanlar, Trudel, & White, 2020). The anxiety and disruption caused by the virus created a huge market for information, leading the World Health Organization to speak of 'a massive infodemic – an overabundance of information, some accurate and some not'[2] several months into the year. Public news is an important platform for people to stay abreast of the situation (Bento et al., 2020; Fletcher, Kalogeropoulos, & Nielsen, 2020).

In terms of readership, Ofcom (2020)[3], the UK regulator for the communications services, has been conducting a regular survey of 2,000 people to gather information about access, consumption and critical engagement with news about the pandemic. In late-December, 90% were still accessing news about Covid-19 at least once a day compared with 99% in March, largely via traditional media of newspapers and radio (85%). One reason for this dependence is a growing distrust of social media with use declining from 49% to 36% as a source of information about the pandemic. So, despite Facebook placing warning labels on 167 million Covid-19 posts up to November (Wagner, 2020), the majority of people are extremely distrustful of social media when searching for Covid information (Anders, 2020).

While the Covid pandemic may be self-evidently 'newsworthy', events are retold and elaborated through the focus of editors and journalists who have particular interests and objectives. They not only seek to sell copy, but to promote particular agendas and encourage certain perspectives, creating sympathy, interest or outrage. Editorial choices, therefore, do not simply reflect the preoccupations of readers, but actively construct what we attend to and how we understand it (Bednarek & Caple, 2012; Bell, 1991). We find these in what news media give salience to: the repeated reference to certain things and the way they are presented in published articles.

3. Analytical approach

In this paper we seek to identify these topics in Year 1 of the Covid story using a corpus approach (e.g. Bednarek & Caple, 2014; Potts, Bednarek, & Caple, 2015) to focus on linguistic items which distinguissh each monthly sub-corpus from the coronavirus corpus as a whole. To do this we use three main methods.

First, we identified the words which occur with exceptional frequency. In addition to raw frequency counts we calculate the *keywords*: "a word form or cluster of words that are statistically more frequent in a corpus than expected" (Hyland & Jiang, 2020, p.8). These 'keywords' give a good sense of what a set of texts are concerned with and reflect the topics which most preoccupied journalists and news editors around the world during each month of the crisis. This is also a method which has been used to analyse news stories in a number of studies, such as racism (Baker et al., 2008) and the Ebola virus (Moodley & Lesage, 2020). A keyword analysis was also used by Nor and Zulcafli (2020) to study Covid-19 in a Malaysian newspaper.

In addition, we are interested not only in what is talked about but in how these topics are presented in news reporting, we therefore examined both keyword nouns and verbs, which typically name things and actions (Biber et al., 1999; Hyland & Jiang, 2021b). Nouns are overwhelmingly the most frequent word class in English, occurring about

every fourth word. The high informational load of newspapers, moreover, means that they are significantly more common in that register than, fiction, conversation and academic prose (Biber et al, 1999). In contrast, while often ignored in the literature, verbs are important in news writing as they convey action and can give a story a sense of movement and momentum (Handford, 2013). Equally, they are important markers for conveying reliability when attributing stories, especially when providing the bases of information, as hearsay or knowledge (Bednarek & Caple, 2012). They also tend to occur in the present tense slightly more often than in the past and in active voice, to emphasise the immediacy and relevance of an event thus construing newsworthiness.

Third, we compiled a list of recurrent noun phrases. Noun phrases help journalists to meet the tight space constraints of news reporting by allowing them to organise information in compact ways and so create a dense, informational style. Being concerned with *things*, definite noun phrases, in particular, dominate newspaper discourse and make it possible to include additional information in heavily nominalised sentences (Bednarek & Caple, 2012; Biber et al.,1999). The 'textual compression' produced by noun phrases not only helps pack information into news stories, but also meets the needs of the modern world for more efficient and specialized information transfer (Biber, 2003; Hyland & Jiang, 2021b). This, of course, is a particular advantage in the 'infodemic' overload of news about the virus (Larson, 2020; Solomon et al., 2020).

At the same time, noun phrases help identify the informational preoccupations of the news at times of viral outbreak. Chiang and Duann (2007), for example, looked at noun phrases in news reports of the SARS epidemic, concluding that they contribute to the political agendas and underlying ideologies of newspapers. This use of noun phrases to accomplish social alignment is also seen in Wallis and Nerlich's (2005) analysis of their use in framing UK press reports of the SARS epidemic in 2003, presenting the disease in bureaucratic, managerial terms rather than more usual metaphor systems of war and plague. Noun phrases are also implicated in the social and ideological repercussions of naming the disease, its nature and its handling by health authorities, news media and

politicians. Prieto-Ramos et al.'s (2020) study of the headlines of eight newspapers in four countries early in the Covid outbreak, for example, shows how tensions can emerge between political and technical considerations in a pandemic where information flows in real time and at unprecedented levels of interconnection worldwide.

Focusing, then, on high frequency noun phrases together with most salient keyword nouns and keyword verbs, we explore what newspapers have presented as the major Covid news items over the first year of the crisis: what they focused on, how they presented them and how they have changed.

4. Corpus and analysis

To address these issues, we drew on *The Coronavirus Corpus* (Davies, 2021)[4], the definitive record of the social, cultural and economic impact of Covid-19. The corpus comprises a subset of the *NOW Corpus (News on The Web)* which every day pulls texts from more than 1,000 online newspapers and magazines (e.g. *Wall Street Journal*, *The Times, Waikato Times, etc.*) in 20 English-speaking countries. The texts in the Coronavirus corpus have at least two occurrences of the words coronavirus, Covid, or Covid-19 and certain strings in the title (see Davies, 2021 for details). At the end of December 2020, it comprised 775 million words and was growing at between 3 and 4 million words a day. From this corpus we randomly selected 1000 texts published from each month via what Davies calls a 'virtual corpus' (Davies, 2021). Therefore, 120,000 news texts were collected from January to December 2020, totalling 12.3 million words. We refer to this as the C2020 corpus and the profile is shown in Table 1.

Table 1 Composition of the C2020 corpus (texts and total words)

January	February	March	April	May	June
1000	1000	1000	1000	1000	1000
948,904	876,253	934,512	927,146	1,071,029	1,148,604
July	**August**	**September**	**October**	**November**	**December**
1000	1000	1000	1000	1000	1000
1,027,926	1,191,734	1,149,716	1,059,705	1,171,643	836,176

Using *AntConc* (Anthony, 2019), we identified the keywords, or those words and clusters which appear statistically more frequently each month in our C2020 corpus compared with the 775-million-word Coronavirus corpus as a whole. We made this comparison to help us track the changing focus of *covid specific items* over the month-by-month reporting of the pandemic, thus highlighting which terms were most salient to news journalists at the time. This minimises the likelihood of routinely occurring high frequency items in a general corpus such as the British National Corpus or even other news items in a general newspaper corpus such as the *NOW* corpus. We set a threshold requirement for a keyword to occur 90 times across 100 different texts to qualify and, because we were interested in the *topics* of the news, we filtered out all high frequency grammar words.

We then manually checked and selected nouns and verbs among the keywords, distinguishing items referring to objects/issues and actions. To explore these items in greater detail we examined the collocational patterns, or most frequently occurring words adjacent to the keywords. In addition, we delved into the most common noun phrases more closely by searching for noun-noun (e.g. *Covid case*) and noun-preposition-noun (e.g. *spread of coronavirus*) combinations. These patterns comprise the vast majority of noun phrases in news texts (Biber, 2003). To locate these, we Part of Speech (POS) tagged the corpus using *TreeTagger*, which has a reliable 96.36%

accuracy (Schmid, 1994). We then used regular expression queries to search these noun phrases.

Finally, we manually checked every instance of these noun phrases to ensure each phrase was meaningful. Both authors worked independently on a 10% sample of each of the resulting items to ensure that the features we included were directly relevant to discussion of the medical, social, political or economic aspects of the coronavirus. We achieved a high inter-rater agreement ($\kappa > .08$) before resolving disagreements. We then normalised the results to 10,000 words to allow comparisons across the monthly corpora, and conducted *log likelihood* tests with effect size (*%DIFF*) also considered (Gabrielatos, 2018) to determine statistical significances. In the following sections we present our results.

5. Most common words overall: *symptom*, *guideline* and *restriction*

To gain an initial impression of changing trends in the evolving Covid story, we first identified which items were most frequent overall in our 12 month corpus. We then looked at these items month by month to determine if the focus had changed over the year. Comparing our C2020 corpus with the whole 775 million words of the Coronavirus corpus, we found *symptom*, *guideline* and *restriction* to be the three most frequent keywords overall. Examining these items in the context of the words they most commonly co-occurred with, their immediate left collocates, we were able to identify more specific uses through recurring lexical associations (Lai, 2019; Potts et al., 2015).

Table 2 Changes of the first left collocates of *symptom* (frequency/MI score)[5]

January	February	March	April	May	June
flu-like (18/7.74)	new (20/9.18)	every (21/9.73)	new (20/10.02)	only (17/8.26)	tell-tale (19/8.07)
diagnostic (10/6.18)	clinical (15/7.17)	key (17/8.82)	lesser-known (16/8.90)	tell-tale (11/9.07)	regular (15/8.12)
new (7/6.36)	early (9/6.20)	common (13/7.40)	coronavirus-like (12/7.58)	inaugural (8/7.17)	superficial (10/6.73)
prominent (5/3.43)	potential (5/4.22)	another (9/8.35)	primary (8/7.74)	coronavirus (5/7.19)	known (7/7.15)
		new (6/5.08)	common (5/5.11)		
July	**August**	**September**	**October**	**November**	**December**
known (16/9.34)	automated (15/8.92)	Covid-19 (13/9.01)	reported (12/9.92)	depressive (12/9.78)	different (18/9.91)
online (12/9.80)	perform (10/7.43)	known (10/8.67)	Covid-19 (10/9.33)	characteristic (9/8.64)	mild (15/9.77)
daily (9/9.26)	daily (8/7.15)	lingering (7/8.73)	specific (8/8.61)	known (8/8.32)	common (12/9.14)
check (7/8.11)	other (5/6.58)				recurrent (9/8.29)
					persistent (6/6.78)

An understanding of the coronavirus is closely linked to the various *symptoms* it exhibits (Saire & Navarro, 2020) and at the outset the novelty of the virus meant that these were unclear. Table 2 shows Covid symptoms were positioned as something emergent and uncertain early in the outbreak, co-occurring with *flu-like* (1) and *common* (2), all of which express less than medical certainty about the effects of the virus:

> (1) The disease is characterized by a *flu-like* **symptom** of level and cough which Is often associated with shortness of breath.   (Jan)
>
> (2) The most *common* **symptom** was fever, with shortness of breath and lung infections appearing in a "small number" of cases, the commission said. (March)

As the year progressed, and people became more aware of the symptoms, collocates such as *telltale* and *known* indicate a more informed understanding (3 & 4), while in

October uncertainty returns with the possibility of confusing Covid with winter illnesses (5 & 6):

> (3) .. check for the fever that is a *telltale* **symptom** of Covid-19 infection. (May)
>
> (4) Doctors in Spain have recently found out that skin rashes were a commonly *known* **symptom** of Covid-19. (June)
>
> (5) *Potential* **symptoms**: Is it a cold, flu or coronavirus? (Nov)
>
> (6) seasonal allergies, crying, even teething and playground exertion can prompt a *Covid-19-like* **symptom**. (Dec)

The word *guidelines* was a similarly prevalent term through the year as governments and officialdom generally were reluctant to express constricting policies in terms of laws or regulations. Collocations show a gradual change in meaning of the term, however, beginning with the specification of general principles (7 & 8):

> (7) The *WHO* **guideline** has been used by many countries to justify 14-day quarantines. (Feb)
>
> (8) The restriction is in compliance to the Davao City *Government* **guideline** No. 7 on the coronavirus disease for all city government offices. (April)

During the year collocates for *guidelines* became more specific as Covid progressed (9 & 10) and increasingly subject to change (11). The revisions respond to the progressive accumulation of clinical evidence and official decisions (O'Reilly, 2020).

> (9) the shortened 10-day *quarantine* **guideline** carries a 1% risk, while the 7 day guideline carries a 5% residual risk. (Dec)
>
> (10) The WHO updated *social distancing* **guideline**: Stay 3 feet away (Aug)
>
> (11) This *amending* **guideline** implements the collateral easing measures decided by the Governing Council in response to the coronavirus pandemic. (Sept)

In contrast to the collocates for *guidelines*, those associated with *restriction* moved from stating specific to broad constraints. During the early months of the pandemic, the press reported new and unfamiliar restrictions which were unfamiliar to the public, often

relating to movement and travel (12 & 13). The usage became more general as the year word on and people knew what they could expect (14 & 15):

(12) It added that the *travel* **restriction** on Chinese citizens from Wuhan and Hubei is also one measure to manage the outbreak. (Feb)

(13) ADA was able to re-strategise and execute a new plan for ELCA within weeks of the nationwide *movement* **restriction** order. (April)

(14) …particularly if parties are simply banned and a *general* **restriction** on numbers is established. (Oct)

(15) Johnson immediately put those regions into a strict new *Tier 4* **restriction** level, upending Christmas plans for millions. (Dec)

6. Changing topics: keyword nouns

Keyness shows that the item is statistically more frequent than expected by chance and so helps to reveal what a group of texts is 'about' or what it boils down to. Having discussed the different framing of the most common three nouns in our corpus in section 5, Table 3 presents the keyword nouns for each month of 2020.

Table 3 Top keyword nouns in the corpus by month 2020

January	February	March	April	May	June
symptom	national	symptom	guideline	guideline	guideline
sneeze	symptom	official	symptom	restriction	restriction
human	restriction	restriction	restriction	worker	mask
official	passenger	precaution	resource	customer	reopening
animal	official	worker	measure	resource	protocol
celebration	citizen	case	rule	student	individual
passenger	flight	measure	mask	rule	rule
authority	mainland	expert	patient	employee	gathering
expert	student	individual	benefit	measure	measure
case	expert	employee	condition	restaurant	employee

July	August	September	October	November	December
guideline	guideline	guideline	restriction	symptom	symptom
child	restriction	restriction	outcome	restriction	guideline
player	requirement	rule	symptom	official	restriction
restriction	rule	recommendation	worker	expert	vaccine
parent	cost	measure	factor	student	official
protocol	vaccine	case	benefit	guideline	worker
customer	resource	issue	procedure	measure	holiday
kid	protocol	challenge	vaccine	vaccine	resident
student	measure	result	case	rule	gathering
requirement	solution	vaccine	resource	worker	student

As we suggested, news in the first four months was dominated by the *symptoms* of the virus, with items relating to controlling the disease such as *guidelines*, *protocols* and, eventually, *vaccine*, becoming increasingly prominent. Early in the year we see an emphasis on the impacts of the virus on passengers, students, citizens, etc., with various symptoms being identified measures to control and reduce the spread.

As we have noted, *restriction and guideline* have very high frequencies, and together with *rule, protocol, precaution* and *measure* appear in the top ten almost every month as medical and scientific advice increasingly informed political decision-making (16 & 17), although by September there was doubt surrounding their efficacy (18 & 19).

(16) Everybody will be following the **protocols** being preached by school and local health officials: pre-screening, masks, frequent sanitizing and distancing as much as possible. (July)

(17) For governments to institute effective public health control **measures** they need the support and compliance of the general public. (Aug)

(18) For every person who follows the **rules** and keep to social distancing **protocol** - there are others who do not. (Sept)

(19) A 50% increase in transmissibility means that the previous levels of **restrictions** that worked before won't work now.　　(Dec)

Another trend over the year is the changing focal participants, *officials*, *experts* and the voices of *authority* (20 & 21) are predominant early on. This gradually shifts, however, towards the medical and economic victims of the pandemic as it progresses with *workers, students, children, employees* and *kids* increasingly seen (22 & 23):

(20) In designating 2019-nCoV a global public health emergency, WHO **experts** took into account the evidence that the rate of human-to-human transmission outside China is increasing.　　　　　　　　(Jan)

(21) As **officials** announced the first deaths from the coronavirus in the U.S. and testing ramps up across the country, health **experts** are warning that more cases are bound to be identified.　　　　　(March)

(22) Hospitality **workers** are hard hit by the pub closures.　　(Dec)

(23) Many **children** voluntarily wore masks Monday as school began, and several schools handed them out to **children** who forgot them. (July)

Some items capture the Covid limelight briefly and then disappear. *Human* and *animal* are prominent in January as the media speculated on the transmission of the new disease (24) while *mainland* (China) is frequently mentioned in February as the suspected source of the virus (25), as is *national* as discussion centres on international travel and transmission (26). Even the more optimistic *benefit* appears in April (27).

(24) We haven't learned anything yet about the likely **animal** reservoir and what that means for potential future transmission of this new virus to **humans**.　　　　　　　　　　(Jan)

(25) A growing number of airlines have suspended flights to and from **mainland** China as fears escalate over the spreading coronavirus. (Feb)

(26) Several countries, including the United States, Japan, and South Korea, have evacuated their **nationals** from the virus-hit city.　　(Feb)

(27) We have the **benefit** of improved medical knowledge and a multitude of communication methods, so we won't see anywhere near 4.3% of our population succumb to Covid-19. (April)

While general advice about tackling the virus remains throughout the corpus after March, we see more specific measures such as *mask* wearing and restrictions on *gatherings* begin to emerge (28 & 29)

(28) The US CDC has … considered broadening its **guidelines** on who should wear face **masks**. (April)

(29) All public and private **gatherings** of any number of people occurring outside a single household or living unit are prohibited. (June)

By May attention had started to turn away from the direct health consequences of the virus to its economic and social impacts, especially on students and those employed in various sectors of the economy, particularly schools, bars, sports and restaurants:

(30) Chinese authorities also delayed the **reopening** of schools in the hardest-hit province and tightened the quarantine in one city. (June)

(31) Due to Covid-19 regulations …. **students** there are allowed to come to school wearing their training gear (Nov)

In August, *restrictions, guidelines, requirements* and *rules* continued to dominate the news, although this was now often in the context of the frustration created by months of restrictions:

(32) Orange County supervisors…. are increasingly itching to relax **restrictions** that were imposed in response to the coronavirus outbreak and reopen businesses and public spaces. (Aug)

(33) … putting pressure on the government in recent weeks to ease the **rules**, with many coming forward with heart-breaking stories of children having to say goodbye to their dying parents over video chat. (Aug)

These vexations were also expressed in reference to the social and economic costs created by Covid-19 as companies failed, unemployment rose, and government debts increased to levels never previously seen:

> (34) State and local governments are already reeling from pandemic-forced losses in tax revenue as well as added **costs** to fight the virus.
>
> (Aug)
>
> (35) There are not just the added costs of protective supplies, but the increased labor **costs** as well: Workers are being redirected to police how many people are in a store and routinely wipe down surfaces.   (Aug)

August also saw the emergence of early optimism about the development of vaccines to fight the virus and this continued to be a keyword for the remainder of the year. Scientists had raced to develop vaccines since the identification of the virus in January, but only in August did it begin to look a realistic possibility and henceforth reporting it became more confident, especially when Russian scientists reported successes with their vaccine (Banerjee, 2020).

> (36) Fauci also reiterated his belief that a coronavirus **vaccine** will be developed by the end of the year   (Aug)
>
> (37) Russia has named the **vaccine** Sputnik-V, and explicitly likened it to that iconic show of force.   (Oct)

7. Digging deeper into the Covid news: noun phrases

A complementary view of topics of concern to the press in reporting Covid stories through keyword nouns can be shown in high frequency noun phrases. Noun phrases pack information into compressed chunks and so are common in headlines and news stories (Biber, 2003). Newspaper texts seek to characterise, describe and explain aspects of the world which means noun phrases are useful to create an environment of terms systematically related to each other, while enabling writers to organise and comment on the compacted entities (Biber & Gray, 2011; Hyland & Jiang, 2021b). Complementing keywords, then, noun phrases suggest the "preoccupations" of news reports (Bednarek

& Caple, 2012) and allow us to see the changing focus of the news. We identified 70,800 noun phrases in the C2020 corpus, and Table 4 shows the monthly changes.

Table 4 Distribution of noun phrases across months

	January	February	March	April	May	June
Token	3784	4386	5716	6183	8748	9492
Per 10,000 words	39.88	50.05	61.17	66.69	81.68	82.64
Type	450	488	543	582	743	793
Type/Token	0.119	0.111	0.095	0.094	0.085	0.084
	July	August	September	October	November	December
Token	9701	11068	11722	11931	12022	12074
Per 10,000 words	94.37	92.87	101.96	112.59	102.61	144.40
Type	802	883	930	941	952	961
Type/Token	0.083	0.080	0.079	0.079	0.079	0.080

Table 4 shows a consistent increase in the normed frequency of both the number of different noun phrases (types) and the times they were mentioned (tokens) over the year, with a significant rise of 262% (*log-likelihood*=5668.30, *p*<0.001, *%DIFF*=-72.38). This indicates the growing value of these phrases to journalists as they establish what come to be commonly recognised entities, such as *face covering, herd immunity* and *death toll*. Their increasing frequency indicates a growing reliance on terms gaining greater familiarity with the public. They are items strengthened by repetition to become the 'facts' of the epidemic for readers (Hyland & Jiang, 2021b). In addition, the rise in the number of different expressions (types) and fall in the type/token ratio show that news reports included a wider range of topics as the year progressed. These frequencies therefore represent the textual traces of how the news reported the coronavirus, cataloguing the changing focus. Table 5 shows the most frequently used phrases each month.

Table 5 Most frequent noun phrases by month

January	February	March	April	May	June
coronavirus outbreak	coronavirus outbreak	coronavirus outbreak	coronavirus pandemic	coronavirus pandemic	coronavirus pandemic
Lunar (New) Year	bat coronavirus	coronavirus pandemic	coronavirus outbreak	coronavirus outbreak	coronavirus case
Hubei province	cruise ship	health official	health care	death toll	health care
bat coronavirus	Diamond Princess	coronavirus case	coronavirus case	face mask	state government
climate transition	Hubei province	Department of Health	coronavirus crisis	health care	World Health (Organization)
disease control	World Health (Organization)	health care	World Health (Organization)	health official	nursing home
World Health (Organization)	death toll	bat coronavirus	death toll	coronavirus crisis	death toll
Wuhan virus	disease control	div class	face mask	World Health (Organization)	face mask
health official	health official	World Health (Organization)	Department of Health	coronavirus case	health crisis
Department of Health	cases of infection	disease control	community guideline	health crisis	contact tracing
July	**August**	**September**	**October**	**November**	**December**
coronavirus case	coronavirus case	coronavirus case	Covid case	coronavirus pandemic	coronavirus pandemic
face mask	face mask	face covering	face mask	health care	coronavirus disease
death toll	health official	coronavirus vaccine	health care	coronavirus case	spread of coronavirus
health official	death toll	health official	number of cases	health official	coronavirus vaccine
health care	face covering	death toll	death toll	face mask	PCR test
press release	community transmission	coronavirus crisis	health expert	coronavirus vaccine	health care
method of testing	contact tracing	health care	infection rate	public health	health crisis
health crisis	coronavirus vaccine	disease control	coronavirus vaccine	herd immunity	number of coronavirus
coronavirus infection	coronavirus crisis	test result	health crisis	number of cases	herd immunity
hand sanitizer	infection prevention	health crisis	health ministry	Johns Hopkins	cause of death

While naming the virus as a new health risk consistently comprised the most frequent noun phrase through the year, this name took time to settle. *Coronavirus outbreak, Wuhan virus* and *bat coronavirus* were all used in the first few months, simultaneously expressing the suspected source and the name of the disease. Only when the World Health Organization officially declared a pandemic on March 11, with 118,000 cases in 110 countries, did the phrase *coronavirus pandemic* predominate. *Coronavirus case* was used as the singular term throughout.

> (38) Indonesia was hit hard by the **coronavirus outbreak**, and millions of residents have been under sweeping travel restrictions and stay-at-home orders for months.   (May)
>
> (39) The **coronavirus pandemic** is shutting down industrial activity and temporarily slashing air pollution levels around the world.   (March)
>
> (40) North Korea has maintained that it hasn't found a single **coronavirus case** on its soil, a claim disputed by outside experts.   (Nov)

The early themes concern the time and place of the outbreak such as *Wuhan virus, Hubei province* and *Lunar New Year* together with high profile infection sites such as *Diamond Princess and Cruise ship*. These soon gave way to the health impacts of the virus, such as *death toll, community transmission* and *number of cases* and measures for its control such as *face mask, contact tracing, PCR test* and *coronavirus vaccine*. Some phrases, such as *health officials* and *health care*, are clearly vital to the reporting of the virus and remain prominent in news reporting during every month.

To better understand the focus which newspapers took of the pandemic over 2020, we categorised what the keyword nouns and noun phrases referred to. We therefore manually read and grouped all the keyword nouns and noun phrases, and arrived at the following categories of high frequency topics:

1. Describing and naming the virus (e.g. *symptom*, *coronavirus pandemic*)
2. Origins and infection sites (e.g. *cruise ship*, *animal*)
3. Health impact (e.g. *death toll*, *health crisis*)

4. Social and economic impacts (e.g. *restriction*, *work from home*)

5. Safety measures (e.g. *face mask*, *precaution*)

6. Medical treatments (e.g. *health care*, *vaccine*)

While the categorisation is far from 100% water tight, it helps trace the changing topics over the year. Perhaps unsurprisingly, this showed a declining interest in the origins and infection sites as the disease overwhelmed the world. Reference to the name of the virus, once established, grew by 25% over the period and there is a significant increase in treating the virus (by 148.9%, *LL*=784.19, *p*<0.001, *%DIFF*=-59.82), its social impact (134.1%, *LL*=671.04, *p*<0.001, *%DIFF*=-57.29), health impact (122%, *LL*=579.13, *p*<0.001, *%DIFF*=-54.96) and precautionary measures (116.8%, *LL*=637.51, *p*<0.001, *%DIFF*=-53.80).

The increases in reportage naturally reflects the growing concerns of the communities served by the press and the wide range of media comprising our C2020 corpus indicates emerging, and sustained, worldwide anxieties. Following stories identifying the virus and its features, interest naturally turns to recognising the impacts and possible countermeasures (Qiu & Cameron, 2007). It is, however, interesting to see that mention of safety measures and treatments (*face masks*, *health care*, *coronavirus vaccine*, etc.) quickly exceed those concerning the destructive consequences to economic and social wellbeing (e.g. *death toll*, *cruise ship*, *coronavirus crisis*). Table 6 shows that from July onwards, attention turns towards fighting the outbreak and away from discussing its impact.

In addition, descriptions of the virus continued to gradually increase through the year, rising by 25.5% over the year. These represent the themes of the continuing story, through the summer and into the winter.

(41) The world has been dealing with the **coronavirus pandemic** for six months now and frontline warriors especially medical caregivers are one of the strongest and crucial pillars of this fight against Covid-19. (Aug)

(42) In less than 12 months, nearly 70 million people have been infected and, regrettably, more than 1.6 million have died because of the **coronavirus pandemic**. (Dec)

Table 6 Categories of noun keywords and phrases by month (per 10,000 words & %)

	Describing the virus	Origins	Health impact	Social impact	Safety measures	Medical treatments
January	26.35 (6.71%)	23.52 (9.80%)	13.63 (4.36%)	13.51 (4.27%)	16.21 (4.26%)	13.32 (4.12%)
February	27.66 (6.50%)	21.24 (8.17%)	16.28 (4.81%)	14.28 (4.17%)	19.36 (4.70%)	17.89 (5.10%)
March	28.35 (7.11%)	20.19 (8.28%)	19.34 (6.09%)	18.39 (5.73%)	21.84 (5.66%)	19.72 (6.00%)
April	28.94 (7.20%)	18.56 (7.56%)	20.55 (6.42%)	20.26 (6.26%)	24.94 (6.41%)	20.10 (6.07%)
May	29.48 (8.47%)	18.62 (8.76%)	23.66 (8.54%)	23.51 (8.40%)	30.95 (9.19%)	22.12 (7.71%)
June	29.81 (9.18%)	17.69 (8.92%)	24.23 (9.38%)	24.17 (9.26%)	31.12 (9.91%)	22.28 (8.33%)
July	30.87 (8.51%)	17.37 (7.84%)	26.22 (9.09%)	26.76 (9.17%)	33.34 (9.50%)	26.47 (8.86%)
August	30.35 (9.70%)	16.25 (8.50%)	26.31 (10.57%)	26.99 (10.72%)	33.42 (11.04%)	26.21 (10.17%)
September	31.88 (9.83%)	17.20 (8.68%)	27.07 (10.49%)	28.94 (11.09%)	32.61 (10.39%)	30.92 (11.58%)
October	32.12 (9.13%)	16.89 (7.86%)	28.11 (10.04%)	29.26 (10.34%)	33.14 (9.73%)	31.13 (10.74%)
November	32.59 (10.24%)	17.23 (8.86%)	29.54 (11.67%)	30.12 (11.77%)	34.10 (11.07%)	32.22 (12.29%)
December	33.08 (7.42%)	18.41 (6.76%)	30.26 (8.53%)	31.63 (8.82%)	35.09 (8.13%)	33.15 (9.03%)
Totals	**30.20 (20.0%)**	**18.45 (12.2%)**	**24.03 (15.9%)**	**24.30 (16.1%)**	**29.23 (19.3%)**	**24.88 (16.5%)**

The origins and infection sites, on the other hand, have showed a significant drop of 55.4% between January and December (*LL*=55.36, *p*<0.001, *%DIFF*=27.76) with only nursing homes in June's top ten following the unprecedented deaths in them during the

previous months. While political disputes remain around the source of the virus, interest had moved on by May to its effects and control. The impact of the virus on public health (43 & 44) rose substantially, with the word *crisis* predominant throughout the year in various noun phrase forms (45 & 46).

(43) Despite the surge in cases, India's **death toll** of 96,318, and pace of growth of fatalities, remains below those of the United States, Britain and Brazil. (Sep)

(44) Meetings and conferences should not be done physically and may be organized through video conferencing only, and **work from home** should be facilitated in case of an emergent situation. (Oct)

(45) Macau 2Q retail sales were down 61pct during the **Covid-19 crisis**. (Nov)

(46) A study from Feeding America forecasts that 18 million children may face food insecurity because of the **public health crisis**. (June)

Despite this sense of ruin, crisis and death, the data suggest that reporting was centrally focused on attempts to ameliorate the situation through protective measures (47) after April and, especially after August, medical treatments as accurate PCR swab tests became available and predictions for an early vaccine began to emerge (48 & 49):

(47) Monitoring student temperatures, providing **face masks** and **hand sanitizer** - with our already stretched resources, who is going to be responsible for these things? (July)

(48) The administration earlier this month announced an agreement to help distribute an eventual **coronavirus vaccine** to long-term care facilities like nursing homes, with no out-of-pocket costs. (Nov)

(49) If the nation doesn't get to **herd immunity** once the vaccine becomes widely available and has been independently validated, we're all out of luck. (Dec)

8. Taking action: keyword verbs in news reporting

While the keyword nouns discussed above indicate the topics and subject matter themes in public news media, keyword verbs help us to see the principal activities associated with reporting the pandemic. Table 7 shows their distribution across the year.

Table 7 Keyword verbs in the corpus by month

January	February	March	April	May	June
base	base	base	distance	distance	distance
originate	originate	expose	base	base	base
infect	infect	infect	infect	say	compare
confirm	evacuate	relate	announce	compare	say
kill	confirm	confirm	warn	announce	relate
screen	relate	warn	test	infect	describe
announce	screen	test	confirm	struggle	announce
report	quarantine	cancel	struggle	force	point
declare	warn	contract	report	issue	drive
occur	announce	report	urge	warn	explain
July	**August**	**September**	**October**	**November**	**December**
distance	distance	base	base	base	base
base	base	compare	compare	compare	say
compare	compare	lose	design	say	compare
say	say	plan	say	describe	warn
explain	record	achieve	record	announce	force
relate	explain	launch	force	force	confirm
announce	force	expect	reveal	warn	tell
infect	infect	test	issue	tell	test
wear	test	force	test	indicate	release
indicate	publish	require	introduce	launch	experience

Immediately, we can see from Table 6 the keyword *base* (used as a phrasal verb +on) in one of the top two frequency spots in each month through the year. This refers to the grounds that the press reported decision-makers were taking regarding real world actions, although there was considerable variation in the authority of sources referred to, ranging from specific data (50) to less certain authorities (51):

(50) Across New York State, **based** on 219,442 tests, the overall infection

rate Thursday was 3.72%.   (Nov)

(51) Downing Street said the UK's chief medical officers were continually

reviewing symptoms of the virus **based** on advice from experts.   (June)

Infect and *announce* are two other keywords which appear in the keyword verb lists of

every month. *Infect*, like *contract*, was normally attached to numbers of cases (52) or

referred to specific carriers or issues in the pandemic (53):

(52) First detected in Wuhan, China, about six months ago, the new

coronavirus has already **infected** more than 10.4 million people across the

globe, killing more than 500,000.   (July)

(53) Super-spreaders are those people who generally **infect** a large number

of individuals.   (Oct)

Announce is the other ever-present verb and, together with several other reporting verbs

in the lists, concerns the journalistic reporting of news-relevant pronouncements and

statements by key players. *Announce* predominates as it indicates the frequent public

notices issued by officialdom, the pronouncement of restrictions, warnings and deaths

through the pandemic (54 and 55),

(54) Tunisia is the second country in North Africa to **announce** a

confirmed case after Algeria.   (Mar)

(55) The government will **announce** on Thursday which tiers English

cities and regions will be placed into…   (Nov)

We also see *report, issue*, *publish*, *launch* and *release* used in the same way to inform

news readers of important proclamations by recognised medical bodies, government

authorities or other respected sources (56, 57 and 58):

(56) The Union Health Ministry on Tuesday **issued** fresh guidelines for

coronavirus patients….   (May)

(57) A Spanish study **published** in The Lancet journal in the first week of July cast doubts over the feasibility of herd immunity as a way of tackling the pandemic.   (Aug)

(58) County officials on Saturday **released** new restrictions in light of the rising caseload and instituted a ban on all on all professional, collegiate and high school sporting events.   (Dec)

These announcements by the powerful were strengthened by journalists in the first six months of the year by the use of *urge* and *warn* to encourage compliance with public health guidelines (59):

(59)   The Foreign Office updated its advice on Tuesday to **warn** against all but essential travel to mainland China.   (Jan)

While these verbs invest the pronouncements of experts or politicians with authority, and simultaneously bestows authority on those cited, journalists made frequent use of other reporting verbs such as *tell* and *explain* in the second half of the year, with *say* occurring every month from May onwards (60 and 61).

(60)   Critics **say** Johnson's Conservative government responded too slowly when COVID-19 began to spread.   (June)

(61) Many Americans **say** they would refuse to get vaccinated, and our country's medical experts have only themselves to blame.   (Aug)

Say carries a less official stamp of power or expertise and is therefore either attached to the opinions of interviewees or more peripheral players, offering readers a sense of opinion or provisionality. Together these verbs highlight the dependence of press reporting on the views and decisions of participants in the story.

Finally, we want to draw attention to the change of keyword verbs from *confirm* in the first four months, and again in November and December, to *compare* in the second half of the year. *Confirm* is largely used by reporters to describe the action of official spokespeople to declare new measures or Covid statistics (62), although at the end of

the year it was often correlated with the efficacy of safety measures, test and the possible potential of vaccines (63).

> (62) On February 26, Brazil became the first country in South America to **confirm** a COVID-19 infection. (April)
>
> (63) With suspected COVID-19 case, the DOH cautioned against using antigen tests to **confirm** or rule out possible infections. (Nov)

The use of *compare* also seemed to change over the May – December period, moving from a comparison with other infections and earlier outbreaks (64) to considerations of Covid testing and vaccine research (65).

> (64) But how strong has the coronavirus comeback been and does it **compare** to the infection numbers seen in the spring? (July)
>
> (65) Mr. Pangalos said the company is planning a global trial to **compare** the two dosing regimens. (Dec)

9. Final comments and conclusions

Based on collocations of common nouns, keyword noun/verbs and frequent noun phrases, we have explored patterns in a 12.3-million-word subset of the Coronavirus Corpus to understand the central concerns of the public reflected in its news media. We have identified *symptom*, *guideline* and *restriction* as the most common words in the corpus and show how these have been collocationally framed over the 12 months of 2020.

In terms of topics, we were not surprised to find items relating to *symptom* and *origin* of the virus in the early months giving way to the *guideline* and precautionary *measure announced* and *issued* by *official* and *expert* as medical information and scientific advances begun to illuminate the picture from April onwards. The impact of the pandemic on social, economic and health matters saw *student, passenger, employee, patient* and *worker* identified in the press as being particularly hard hit and *flight, restaurant* and *holiday* closed and cancelled. Occasional glimmers of optimism shone through at different points with *reopening* (in June) and *solution* (August) appearing,

but it was not until the keyword *vaccine* emerged in August was this sustained. Analyses of noun phrases offered us a more nuanced understanding of the changing foci of the news and showed how the press tracked the outbreak from its beginnings in January.

While concerned with the reporting of the virus in written news media, we are intrigued with the rise and fall of topics across the months. Many of the topics are represented by vocabulary which is either new or previously little-used before the outbreak, with the term *coronavirus* itself being one of the most frequently used nouns in the English language. Other dramatic examples of increased usage during the year were *contact tracing, herd immunity, infection prevention* and *face mask.*

This linguistic description of the evolving story of the coronavirus pandemic is enabled by corpus methodology which starts with the examination of relative frequencies and emerging statistically significant lexical patterns in the corpus. The "pattern map of data" (Baker et al., 2008, p.295) produced by this kind of analysis can arguably help guide our reading of the changing public interest in the pandemic. In this way the analysis of individual words and phrases does not disregard context, but is a clear indication of changing circumstances. For this reason we have included a considerable number of examples to illustrate the use of language at different stages of the crisis. The longitudinal presentation of lexical items revealed by large-scale corpus, moreover, can help to infer the social concerns of the press and public at specific times to recreate the context of the evolving pandemic.

The topics we have discussed here depict an unfolding and unprecedented health crisis and the attempts of English language news media around the world to react to it. Covid-19 is clearly not ready to retreat just yet and the scale of the infodemic also seems to persist. No doubt the reporting of events is changing as the pandemic progresses, but as Oxford Languages (2020: 3), points out with regard to Covid reporting in 2020:

> The English language, like all of us, has had to adapt rapidly
> and repeatedly this year.

The shifting foci, the growth of new and reinvented words, and the very scale of the story itself in the first 12 months, as documented in the running themes and changing landscape of the news, has been both medical and linguistic journey.

Notes

1. https://www.edelman.com/research/trust-2020-spring-update

2. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf

3. https://www.ofcom.org.uk/research-and-data/tv-radio-and-on-demand/news-media/coronavirus

4. https://www.english-corpora.org/corona/

5. For a better presentation of typical collocates, frequency threshold is set at 5.

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