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This research was funded by UK government. The views expressed are those of the authors and do not represent UK government, positions or policy.
This report provides a high-resolution analysis of **rumours and uncertainties about the efficacy of Ibuprofen** versus Paracetamol in managing the symptoms of Covid-19. This event was significant as it **induced a direct behavioural effect, causing shortages of Paracetamol** across the UK, thus demonstrating how online misinformation can rapidly translate into real world consequences.

The empirically-led analysis is important in identifying the principal components of a **conceptual model of complex misinformation communications**, which will be vital in establishing a capacity and capability to detect similar processes in the future.

We define this as an episode of ‘complex misinformation’ (as opposed to ‘simple misinformation’) on the grounds that its transmission pathway involved: multiple authors making distinct contributions in evolving the narratives; interactions across multiple mainstream and social media platforms; contributions in different languages; a range of influencing techniques. Importantly further warrants for understanding it as ‘complex’ reflect how, not all of the material communicated was false, but rather there was a **‘kernel of truth’** in much of what was conveyed.

The concept of ‘soft fact’ familiar to social science research, captures the ‘plastic’ quality of the base narrative, as it was repeatedly edited and reconfigured. Where ‘hard facts’ are viewed as stable and objective, soft facts are malleable and contingent, providing information of limited provenance where no other insights are available.¹

Based upon the empirical data assessed we identify several key features of complex misinformation construction and communication:

• It is misinformation because there was no obvious intent to deceive or disinform on the part of the various multiple authors. However, each of the contributors made a distinct contribution to evolving the content of the misinforming narrative about the risks of Ibuprofen. Viewed in isolation, each misinforming message had only a modest impact, but in aggregate and sequenced together, they generated more significant distortions with direct impacts on public health. Overall, the effect is a bit like that which occurs in a game of ‘Chinese Whispers’.

• A combination of uncertainty, ambiguity and urgency rendered audiences especially receptive to the doubts about Ibuprofen use. Uncertainty reflected how even key authoritative experts, such as Sir Patrick Vallance, publicly stated he was unsure about the risks of Ibuprofen, and so suggested, on balance, it would be safer for people to take Paracetamol; Ambiguity existed in terms of how the existing research evidence base, and some complex medical considerations should be interpreted in relation to the specifics of CV-19 virus; Urgency came from the fact that the spread of the virus was accelerating and so there was a clear perceived imperative for decisive action to be taken.

• For the purposes of this analysis, we trace ‘patient zero’ for concerns about Ibuprofen back to a letter published in the medical journal the Lancet on 11/03/20. Although, talking principally about non-Covid medical issues, it has subsequently been invoked by multiple social media commentators as an authoritative source for their concerns. Several of whom have over-stated its provenance, implying it was a full peer-reviewed academic paper when it was not.

• In terms of how it travelled, traces of the rumour / debate were detected across multiple platforms and channels, including: WhatsApp; Twitter; Facebook; Instagram; Reddit; mainstream media; a specialist medical journal. This accents the importance of having an all-source monitoring and analysis capacity and capability.

• In terms of the dynamics of the transmission pathway there were three key ‘super-spreader’ events that induced the misinforming process: uncertainty and invocation of the precautionary principle in public statements by de facto experts. In this specific episode an important role was played by the French Health Minister; the collective contributions of various ‘pseudo-experts’ who have surface credibility because of the use of ‘Dr’ in their social media accounts handles, but who turn out not to be medical doctors, but pronounce on CV-19 anyway; reporting of the accounts of the prior two groups and others by mainstream media sources.

• The fact that audience members were encountering similar messages about Ibuprofen risks, across multiple platforms, communicated by multiple messengers, seemingly enhanced the plausibility of the concerns being raised. In turn, this encouraged many people to adapt their behaviour.

• Three different sets of motives for people disseminating the information online can be identified: (1) some of the WhatsApp messages required a degree of technical sophistication and effort to conduct, suggesting an element of inorganic behaviour and malign intent; (2) others were clearly acting with prosocial motives, relaying the information because they felt people needed to know in an emergency situation; (3) other constructions of the information appeared more explicitly designed to target and play off the fears of parents. The motives here are more difficult to discern.

• That there are variants in the narrative was important in attracting the attention of multiple different thought communities in terms of cohering with their established interests and values. So different audience segments were attending principally to specific iterations.

• Several distinctive influencing techniques can be distilled from the interventions of different authors that they used to evolve the narrative: Add – introduces new information; Omit – leaves out important, often technical or complex, information; Simplify – reduce the complexity of what is being conveyed; Misinterpret – the author clearly misconstrues the underlying information; Blend – two previously distinct pieces of information, or interpretations are brought together, to create a new implication.

Tracking and tracing complex misinformation episodes presents particular challenges for analysts. This is because they require considerable work and effort to ‘mosaic’ data from across different platforms and sources, in order to build a comprehensive and rounded view. Moreover, it is time-consuming work which is difficult to complete when decision-makers are working to tight deadlines. As a consequence, many ‘hot’ analyses reported in the media and to government display a tendency to focus in upon particular high profile episodes without linking them to wider sequences and processes. Ultimately this can lead to inaccurate diagnoses of causes and consequences.

It is worth noting that at the current time, there remains considerable uncertainty about whether or not there are any risks with using Ibuprofen to manage Covid-19 symptoms. Indeed, this is a key element of the learning from this analysis, that ambiguity and uncertainty creates a conducive environment for misinformation soft facts to reproduce via social media, and it is difficult for authoritative sources to control the narrative under such conditions.
Seeding Doubt About Ibuprofen and COVID-19

In mid-March 2020 multiple claims started circulating across social and mass media that Ibuprofen (also known as Motrin/Advil in the US), and other non-steroidal anti-inflammatory drugs (NSAIDs) are to be avoided in the management of COVID-19 symptoms (fever) in favour of paracetamol (acetaminophen). The key claims mounted being:

• Ibuprofen aggravates infection, e.g. “accelerates multiplication of the virus”;

• Ibuprofen increases mortality risk:
  o For young people, who end up in ICU;
  o Ibuprofen use can account for high fatality rate in Italy “Ibuprofen in their system.”

In terms of how the subsequent consequences unfolded, it is significant that there may be a ‘kernel of truth’ to these concerns. There is pre-existing scientific debate over the use of NSAID drugs like Ibuprofen and Cortisone because their anti-inflammatory action may impact on immune system response. There is also scientific inquiry into the role of ACE2 receptors and respiratory disease, as reported for SARS.

For the purposes of this analysis, we track and trace how multiple sources of (mis)information were constructed and communicated to ‘evidence’ and reinforce misleading messages that Ibuprofen usage is accountable for high COVID-19 fatalities. Ultimately, this resulted in public behavioural change and a shortage of Paracetamol. The sources were:

(1) A letter in the Lancet, 11 March:
(2) WhatsApp text and voice messages, 13+ March: VIENNA HOSPITAL
(3) Tweet by French Health Minister, 14 March
(4) WhatsApp messages: CORK HOSPITAL, 15+ Mar
(5) ‘Confirming’ media article in UK Press, 15 Mar

(1) Contained a scientific hypothesis in a highly reputable journal; (2) (4) and (5) conveyed a more informal, accessible and ‘human interest’ message via an empathetic messenger; (3) was a single tweet from a highly credible source with government and medical expertise.

The impact of the Ibuprofen message was accentuated by ambiguous, and at times contradictory, messaging by official bodies and medics. This reflects genuine scientific ambivalence towards the hypothesis of an Ibuprofen risk and the difficulty of finding a balance between social responsibility and the precautionary principle during a rapidly evolving health crisis.

2 https://www.bmj.com/content/368/bmj.m810/rr-20
01 LANCET CORRESPONDENCE.

11/03/2020 letter to the Editor in The Lancet: Are patients with hypertension and diabetes mellitus at increased risk for COVID-19 infection? Contains the following extract:

“Human pathogenic coronaviruses (severe acute respiratory syndrome coronavirus [SARS-CoV] and SARS-CoV-2) bind to their target cells through angiotensin-converting enzyme 2 (ACE2), which is expressed by epithelial cells of the lung, intestine, kidney, and blood vessels. The expression of ACE2 is substantially increased in patients with type 1 or type 2 diabetes, who are treated with ACE inhibitors and angiotensin II type-I receptor blockers (ARBs). Hypertension is also treated with ACE inhibitors and ARBs, which results in an upregulation of ACE2. ACE2 can also be increased by thiazolidinediones and Ibuprofen.”

Whilst the Lancet correspondence and the scientific questioning is genuine, subsequent citations of it as fact have been called misleading or false because the Ibuprofen question is:

(a) a scientific hypothesis expressed in a letter, not a peer-reviewed research paper;
(b) discussing long term NSAID use in specific patient populations;
(c) not evidenced in relation to the novel coronavirus.

On 17/03/2020, the Twitter account for Lancet Respiratory Medicine quoted the authors as follows:

“The authors do not claim that these drugs, including Ibuprofen, increase the severity of #COVID-19”.

This tweet got little engagement (10 RTs and 27 Likes).

By contrast, by 24/03/2020, the article link in the Lancet had been shared to:

- 340 Facebook pages;
- 8 Instagram pages;
- 13 subreddits;
- 499 Tweets.

Analysis of Lancet Shares & Misinformation

Using the CrowdTangle plug-in, data was collated for all shares of the Lancet URL to social media platforms Facebook, Twitter, Reddit and Instagram from its publication date of 11/03 through to 23/03, the peak period of Ibuprofen-COVID-19 story.

3 https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30116-8/fulltext?fbclid=IwAR0ca0qW4HNM7BbqPc6E1xSLsdP1cZeXDrPC4KXrZ2b8_o_o8uQ-AxamvW5E
4 The Lancet has a reputation as a world class medical journal
How sharing of this evidence varied across social media platforms

• Figure 1 shows that the first share was onto Facebook and occurred 2 days after the letter’s publication in The Lancet. This share was to a Spanish medical page Área Blanca, where the post discussed the co-morbidities outlined in the paper and did not mention Ibuprofen.

• Between 13/03 and 15/03, a steady growth in article shares was limited to Facebook before it appeared at high volumes on Twitter on 16/03 (N=149 shares), the same day that Facebook shares peaked at a lower level (N=42 shares). Shares onto Instagram were far lower in volume and over a much shorter time period (8 shares over 4 days), whilst shares onto Reddit were also low in volume, but spread over a longer time period of 9 days.

• The surge in Lancet article shares on 16/03 was two days after French Health Minister Olivier Véran’s tweet. However, by way of context it is estimated that WhatsApp disinformation messages had been circulating from 13/03 onwards. In the UK, Facebook posts and UK media articles5 about a young girl hospitalised after taking Ibuprofen were circulating on 15-16 March (see 3).

• The volume of shares on Twitter was highest for 2 days (16-17 March) then fell by more than a third on March 18th to a low of 18 shares on 20/03. A smaller peak in shares, limited only to Twitter was on 23/03.

These data patterns are summarised in Figure 1 below.

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How this specific scientific article became used as evidence to support the misinformation about Ibuprofen and COVID-19 fatalities, in particular its combination with false WhatsApp messages circulating at that time.

On 14/03, there were 35 shares of the Lancet URL onto social media, 33 of which were on Facebook and 2 on Reddit. The most engaged with post on this date (1.3K likes and 590 shares) was from the German language page ‘Doc Fleck’ where Dr Ann Fleck referenced:

> a “big fuss over a voice message haunting the network that describes the alleged connection between severe Covid19 courses and certain medications (Ibuprofen)”. Dr Fleck then urged for objectivity and competence, ending the post with #StopfakeNews #nopanic #fightcorona.

A highly shared post (1K shares) also on the 14/03 was to a Portuguese page for Nursing Debate called Enfermeiro.pt. The post cited a lengthy extract from the Lancet but prefaced it with text attributed to WhatsApp messages as follows:

> “Ibuprofen / COVID-19 Preliminary information, they are studying why the disease pathway in Italy is more serious. One factor was that most patients took Ibuprofen at home. They joined the virus and Ibuprofen in the laboratory and came to the conclusion that the administration of Ibuprofen accelerates the multiplication of the virus and that it is related to a more serious course of the disease. They recommend to avoid Ibuprofen and to administer paracetamol, aspirin, diclofenac.

Taken together, these posts suggest that WhatsApp messages in (2) were circulating within days of The Lancet article.

Hybrid Messaging

At its peak on 16/03, there were a number of examples of ‘hybrid’ messages, blending extracts from The Lancet article with core disinformation text from WhatsApp messaging [in bold above]. These messages gave the false impression that the Lancet letter was specifically connecting the COVID-19 fatality rate in Italy to Ibuprofen use (see Fig. 2).
Over-Simplification and Doctor Profiles

On social media, the Lancet letter was repeatedly cited and/or the link shared as a ‘study’ or a ‘paper’ and the scientific argument simplified, at worst implying that people are in danger from their pre-existing medication. Significantly, this involved social media accounts prefaced with ‘Dr’, which may have greater source credibility with audiences, some of which adopted an alarmist tone:

Are you using an #ACE2 or an #ARBinhibitor? Are you using #Ibuprofen?! This #Lancet paper states that these people may be at increased risk of becoming infected with #increasedrisk of becoming infected with #COVID19.

Lancet (Prestigious Medical Journal) said: 2 drugs to be avoided: IBUPROFEN and ACE inhibitors (BP tablet) So if you are on ACE inhibitors urgently switch to Calcium channel blockers. Logic: COVID 19 acts through ACE2. Ibuprofen and Sartans both amplify it

Behavioural Directives and Doctor Profiles

There were also examples of non-specialist Doctor profiles on social media giving behavioural directives and/or incorporating rumours circulating on WhatsApp and in Vérán’s tweet. Note: these message types were communicated in a variety of languages (Dutch, Arabic, Portuguese).
Figure 4: 1) Account holder is a Doctor of Philosophy and has a blue tick account on Twitter (high surface credibility). RHS 2): Account holder’s profile states they are an Ophthalmologist. Has 48.1K followers on Instagram and the post tells the audience to change their medication. 3) Account holder profile states occupation as a general surgeon. RHS 4) This doctor’s profile states they are an Engineer; connects the Lancet article with Veran’s tweet in a reply to a user who views the tweet as the official position of the French government. 5 & 6) This Doctor profile begins with the WhatsApp disinformation and then shares the Lancet URL as evidence.

Language

A key feature of the Ibuprofen-Lancet messaging on social media is that it occurred in multiple languages. Taking the top 15 posts to Facebook on engagement, the language breakdown is shown below (Figure 5). A total of 10 different countries were listed under page management. None of the languages or country of origin was English/UK.

Figure 5: Language and page origin of most engaged with Facebook posts sharing Lancet URL (n=15).
Facebook page Русскоговорящие Portimão caters for Russian speakers in this area of Portugal. A poster to this page used the WhatsApp disinformation text and added the Lancet article as a source. The same poster, whose profile is judged inauthentic, wrote a reply directly underneath citing the National Security and Defence Council of Ukraine as saying that the virus originated from a secret lab in Wuhan, going on to claim that the virus has selective effects on the population. This links to a wider digital ecosystem of disinformation and conspiracy narratives that has arisen in respect of Covid-19’s causes and consequences.

**Figure 6:** Russian-language disinformation on Facebook page Русскоговорящие Portimão (audience size 2,098) posted by an inauthentic profile: 15 comments, 20 shares.

**Chains of Misinformation and Disinformation**

The circulation of several forms of communication, each advocating against the use of Ibuprofen, appeared persuasive to audiences who were able to draw on any one of them for credibility. For example, when the University of Vienna formally debunked the WhatsApp message it was cited in, social media users were able to rebut it by providing a link to Véran’s tweet or the Lancet article (Fig 7).

**Figure 7:** The chain effect of multiple confirming sources

The fact that people had come across different, multiple sources of information conveying the same message meant that it rapidly became familiar to them in a time of crisis. One tweeter reasoned:

“That's right, but I've seen this in several articles myself. Otherwise I would. don't tweet it. Mind you, there is a chance. So not with certainty. But then you can just to be sure to take acetaminophen".
The above examples, along with several other similar messages, demonstrates how one effect of the global health crisis may be the shelving of the precautionary principle (pausing and reviewing) in favour of social responsibility to protect the public from harm, even when those harms are unproven. This is fertile ground for the spread of misinformation and disinformation.

02 VÉRAN TWEET

The French Health Minister, Olivier Véran, tweeted the following message on Sat 14 March.

Translation: #COVID-19 | Taking anti-inflammatory drugs (Ibuprofen, cortisone, ...) could be a factor in worsening the infection. If you have a fever, take paracetamol. If you are already on anti-inflammatory drugs or in doubt, ask your doctor for advice.

As a French Minister and a qualified doctor and neurologist, Véran has high source credibility. His tweet got more than 43K RTs and 40K Likes.

Significantly, Véran’s tweet did not give an evidential source for his claims and there have been no further tweets from him on the subject. The following day, Bulgarian news agency Novinite wrote that his account was hacked in an article titled “Fake News: Ibuprofen and Cortisone may Worsen your Condition if you are Infected with COVID-19”. However, the day after this headline was changed to “Not Fake News: Ibuprofen and Cortisone may Worsen your Condition if you are Infected with COVID-19 - UPDATED”. Both versions continued to contain the following statement:

“It turned out that the minister’s profile had been hacked and the information disseminated was incorrect. False information was reported by Figaro newspaper and quickly circulated through the media.”

In seeking to establish provenance for Véran’s claims, a number of social media users interpreted the source as being The Lancet article, whilst other rumours concern French clinical cases, as illustrated on the following page (Fig. 8).
I’ll make an important tweet. Because the Japanese government is unlikely to say. With regard to corona, all young people who were hospitalized severely in France were taking drugs containing ibuprofen as a cold medicine. The French Ministry of Health has announced the dangers of that and has warned them against using it.

In the UK, Véran’s tweet was amplified by an article in The Guardian published later that day. This article was shared more than 500 times to Facebook pages, 55 times to Twitter, 45 times on Reddit and twice on Instagram.
03 TWO WHATSAPP VOICE MESSAGE CAMPAIGNS

VIENNA EXAMPLE – German and English

The German newspaper Die Welt reported on 14 March about the circulation on WhatsApp of a voice message 1 minute and 41 seconds long, featuring a woman claiming she spoke on the phone to a friend who works at the Vienna University Hospital where they did “some research” about why the corona virus often has such severe consequences in Italy. “They found,” says the woman, “that the people who were brought to the clinic with these severe symptoms had more or less all taken Ibuprofen at home beforehand.” that Ibuprofen accelerates the multiplication of the virus. Therefore, doctors at the university clinic would advise against taking Ibuprofen; instead, you should take other pain-relieving medication”. The message ends with a plea to spread the message.

Another German source\(^1\) said that the woman speaks “in a soft voice”, as if sharing a confidence and that she introduces herself by saying: “Hello here is Elisabeth, the mother of Poldi” ...

The WhatsApp voice message also justified its mode of communication, “because it is not a large-scale study and one does not want to get involved in a lawsuit with the pharmaceutical companies”\(^1\). It also said that after the high number of cases in Italy, a little research was done and “the coronavirus and Ibuprofen were brought together” – which has been described as “scientifically perfect nonsense”.

Two transcripts translated from German and one in English are below\(^1\):

“A friend of mine is at the university clinic in Vienna and she called me today and they just did a bit of research, why there were so many violent corona cases in Italy and found that the people who were there These serious symptoms were brought to the clinic, more or less all of them had previously taken ibuprofen at home, and have now brought the virus and ibuprofen together in the laboratory, and there is very good evidence that ibuprofen accelerates the multiplication of the virus.”

Eine Freundin von mir ist an der Uniklinik in Wien und die hat mich heute angerufen und die haben halt mal so’n bisschen Forschung betrieben, warum in Italien so viele, so heftige Coronafälle aufgetreten sind und haben festgestellt, dass die Leute, die mit diesen schweren Symptomen in die Klinik eingeliefert wurden, mehr oder weniger alle daheim Ibuprofen vorher genommen hatten, und haben dann jetzt mal im Labor den Virus und Ibuprofen zusammengebracht, und da gibt’s sehr stichhaltige Hinweise, dass Ibuprofen die Vermehrung des Virus beschleunigt”

“A European university link has instructed its doctors to advise patients from using ibuprofen at the moment. This is the findings of a study they themselves carried out on the cause research into the Corona cases in Italy. They took a look at the peculiarity there that many cases with some very severe courses have occurred there. In doing so, they discovered that the affected people had taken Ibuprofen at home. The university clinic investigated this clue and tested the interaction of the virus and ibuprofen in the laboratory. There was evidence that ibuprofen greatly accelerates the propagation of the virus.

That’s why they give oral advice to take other painkillers such as paracetamol, aspirin, voltares (in case of bone pain).

The recommendation is not yet available in writing because the long-term studies required by law are not yet available.”

\(^{11}\) https://www.nordbayern.de/panorama/Ibuprofen-und-corona-falschmeldungen-auf-whatsapp-1.9940013
\(^{13}\) Source: https://www.mimikama.at/allgemein/coronavirus-falschmeldung-Ibuprofen-verschlimmert-covid-19/
CORK EXAMPLE - ENGLISH

A second, similar WhatsApp message in circulation following Véran's tweet cited Cork Hospital and was signed off as “Dr. Tim” (see Fig 11). The fake message cites a “specialist” at Cork University Hospital, and claims that using non-steroidal anti-inflammatory drugs, like Ibuprofen and Difene, exacerbates Covid-19. The fake message also suggested that people use physiotherapy as an alternative to treat the virus.

In an additional twist, the day after Véran’s tweet, parents of a child in Manchester posted to Facebook an account of how their young daughter’s health deteriorated after taking Ibuprofen. In the Facebook posts, accompanying pictures were of a media article written by the Manchester Evening News with the headline: “Urgent warning for people with coronavirus symptoms NOT to take Ibuprofen after ill girl deteriorates rapidly’ (later covered by the Daily Mail) as well as a screenshot combining the rumour about young people and ICU and a reference to the French minister’s tweet (Fig. 12). This confirms the technique of blending multiple sources together to convey the message.
Debunking

Several attempts were made to debunk and correct these misinformation and disinformation narratives:

14/03: In Germany, Ibuprofen claims using The Lancet + Véran were being refuted on the same date as Véran’s tweet 📌.

14/03: The Medical University of Vienna refute WhatsApp text and voice message claims about their research on social media, with 4K shares on Facebook and 303 RTs on Twitter (Fig. 13).

15/03: The Spanish Agency for Medicines and Health Products (AEMPS) report that there is currently no data to confirm an aggravation of infection by COVID-19 with Ibuprofen 📌.

15/03: The National Authority for Medicines and Health Products (Infarmed) confirms: “there are currently no scientific data to confirm a possible worsening of covid-19 infection with the administration of Ibuprofen or other non-inflammatory anti-inflammatory drugs 📌.

16/03: Public Health England: “Currently there is no published scientific evidence that Ibuprofen increases the risk of catching Covid-19 or makes the illness worse. There is also no conclusive evidence that taking Ibuprofen is harmful for other respiratory infections.”

17/03 Lancet authors refute Ibuprofen claims deduced from their letter (Fig. 14).

17/03 Giving evidence to the House of Commons the Government’s chief scientific adviser health and social care committee, Sir Patrick Vallance said 'it may or not be right, I don’t know, but the sensible thing to do at the moment would be to say “well, don’t take them, take something else, paracetamol or something’.

18/03 WHO tweets “WHO does not recommend against the use of Ibuprofen”. This message was widely criticised for its use of a double negative and its contradiction from a statement made by WHO spokesman Christian Lindmeier who told reporters the day before “we recommend using rather paracetamol, and do not use Ibuprofen as a self-medication. That’s important.” 📌 (Fig. 15).

18/03 Department of Health message ‘until we have more information… take paracetamol’. It took down existing advice online recommending Paracetamol and Ibuprofen (Fig. 16).

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15 https://www.welt.de/wissenschaft/article206555049/Ibuprofen-und-Corona-Ist-das-Schmerzmittel-gefaehrlich-fuer-Infizierte.html?fbclid=IwAR2UkGdwgMKyLj_UgSq6W4LXh1u7oa5Ysa5DCxk9Nv_V6CpJMMfZ9R2Yr
Figure 13: Debunking of Vienna Hospital WhatsApp disinformation on Twitter and Facebook.

Figure 14: Tweet via the Lancet debunking claims attributed to the authors about Ibuprofen and the severity of COVID-19.

Figure 15: Conflicting online advice attributable to the World Health Organization (WHO)
There is currently no strong evidence that ibuprofen can make #coronavirus worse.

But until we have more info, take paracetamol to treat the symptoms of coronavirus, unless your doctor has told you paracetamol is not suitable for you.

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**Ibuprofen for adults: painkiller**

NHS medicines information on ibuprofen - what it’s used for, side effects,...
CONCLUSION

This high resolution empirically led analysis has dissected the causes and consequences of how a series of linked rumours and uncertainties about the efficacy of Ibuprofen versus Paracetamol in managing the symptoms of Covid-19 were constructed and communicated. This event was significant as it induced a direct behavioural effect, causing shortages of Paracetamol across the UK, thus demonstrating how online misinformation can rapidly translate into real world consequences. The intent underpinning the analysis is to draw out the principal components of a conceptual model of ‘complex misinformation communications’, that can be used to detect similar patterns of collective behaviour going forward.

We define this as an episode of ‘complex misinformation’ (as opposed to ‘simple misinformation’) on the grounds that its transmission pathway involved: multiple authors making distinct contributions in evolving the narratives; multiple mainstream and social media platforms; contributions in different languages; a range of techniques. Importantly further warrants for understanding it as ‘complex’ reflect how, not all of the material communicated was false, but rather there was a ‘kernel of truth’ in what was conveyed.

A combination of uncertainty, ambiguity and urgency rendered audiences especially receptive to the doubts about Ibuprofen use. In terms of the dynamics of the transmission pathway there were three key ‘super-spreader’ events associated with the misinforming process: an important role was played by the French Health Minister; there were also important contributions made by various ‘pseudo-experts’ who have surface credibility because of the use of ‘Dr’ in their social media accounts handles, but who turn out not to be medical doctors, but pronounce on CV-19 anyway; and, finally when the story was picked up and reported by mainstream media sources.