

## **How has Covid-19 changed how we collect, share and use medical evidence and knowledge?**

The COVID-19 crisis presented the NHS – and health systems around the world – with an unprecedented situation. Hospitals adopted a crisis footing as a way to manage and treat the rising tide of patients flooding through their doors. This meant that many clinicians found themselves working in an unfamiliar setting, treating an unknown disease.

Resources and bed space were limited and time was tight, with life-critical decisions being made every minute. However, with relatively little known about COVID-19, and evidence changing daily, there was a lack of authoritative information to support these decisions. This made it highly challenging for clinicians to match symptoms with treatment recommendations, raising the need for constantly updated and trustworthy information at the point of care.

### **Clinical decision support comes to the fore**

The response to the COVID-19 crisis has required continuous, real-time innovation that affects the way care gets delivered on the front lines, across geographies and the care continuum. It took a rethinking of how we get the best evidence to clinicians, guide them through decision-making care pathways, and retrain scores of re-deployed health workers. At the same time, clinicians needed help connecting the dots between what they see in the patient before them and what is indicated by the evidence of the moment.

In this fluid and uncertain picture, the role of clinical decision support (CDS) technology came to the fore. The Wolters Kluwer CDS tool UpToDate, with 1.9 million users worldwide, is the leader in this fast-growing field. The rapid onset of the pandemic quickly made UpToDate a go-to source of information on the COVID frontline, requiring its team to rapidly gather the latest COVID-19 evidence and guidance to help hard-pressed clinicians at the point of care.

However, with so little known about the disease and ever-more conflicting and often inaccurate information about COVID-19 confusing the picture, UpToDate's doctor-led editorial team needed to work around the clock to evaluate and synthesise the latest evidence and best practice as it came in from multiple sources around the world. From there, they needed to work fast to develop actionable recommendations. Unlike any previous public health emergency, the pandemic showed how clinicians often need trustworthy and dependable treatment recommendations that don't yet exist in peer-reviewed literature.

Rising to the challenge, UpToDate showed it was more than up to the task and became an indispensable tool for NHS, and other health organisations around the world.

Already used extensively across the UK, the demand for UpToDate's authoritative COVID-19 topics, which have attracted over 12 million views worldwide, saw more Trusts come on board. These included

Leeds University Hospitals NHS Trust, Walsall NHS Trust, University Hospital Southampton, Great Ormond Street Hospital for Children, South Tees Hospitals NHS Foundation Trust and The Dudley Group NHS Foundation Trust.

### **Mobilisation of information**

One of the key attractions of UpToDate during the pandemic is its ability to facilitate the faster mobilisation of information. As the most global CDS tool, with content curated by over 7,000 specialist authors and editors from around the world, UpToDate is uniquely positioned to stay across the latest COVID-19 intelligence. Few other organisations have the reach and expertise to sift through the ever-growing volume of COVID-19 information. This is important work: providing clinicians with the most authoritative and recent guidance and evidence, immediately available at the point of care anywhere in the world.

Even before the pandemic, doctors faced an uphill struggle staying on top of the latest medical literature. COVID-19 has made this situation even worse, creating an information race as the medical community strives to close the knowledge gap on the disease. To illustrate, it is estimated that around 150,000 scientific publications and preprints related to COVID-19 have been produced since January 2020. The journal [Science](#) says the volume of COVID-19 papers has continued to double every 20 days, calling it [one of the biggest explosions of scientific literature ever seen](#).

### **Doctors can't know everything**

To get a snapshot of what it is like for an NHS doctor in this age of information overload, especially in a pandemic when guidance changes quickly, Dr Steve Jackson, Consultant Physician, Diabetes and Endocrinology and Chief Medical Information Officer at University Hospitals of Leicester NHS Trust says: "There is so much new evidence and research coming out every day that doctors can't possibly be across everything. The more experienced you get, the more you become comfortable with that. You realise there are inevitably going to be things you don't know, and where the wisest course of action – in the best interests of the patient – is to seek support, whether that's from a CDS tool like UpToDate or the advice of specialist colleagues."

As it is written by clinicians for clinicians, UpToDate's constantly updated guidance is organized in line with how clinicians work through a clinical scenario. Tailoring evidence-based guidance to clinical pathways and workflows is an essential element of UpToDate's value, especially when it is embedded into the Electronic Patient Record (EPR).

Dr Amed Khan, neurosurgical registrar at University Hospital Southampton NHS Foundation Trust, builds on this point with a practical on-the-ground view of using UpToDate during the pandemic.

He said: “Our teams found it reassuring that the information they were using was peer-reviewed and evidence-based. It’s good to know you’re not taking decisions in isolation, and that the information is underpinned by a vast and sound base of expertise. The app’s COVID-19 topics have been viewed more than eight million times since the start of the crisis. This proves that other doctors in the same situation in thousands of hospitals across the world are receiving the same guidance. In a crisis, this can provide some peace of mind at time when you may be second-guessing yourself.”

Dr Khan says that feedback from clinicians treating COVID-19 patients showed that using UpToDate “helped in understanding pathophysiology (abnormal changes in body functions caused by the disease processes), and provided important guidance on how to ventilate COVID patients, which is more complicated than with other diseases.”

As Dr Khan found, the feedback functionality within UpToDate allows doctors to tap into a global network of peers, all tackling the same problem. Doctors could send feedback on particular topics or ask questions as they arose. This was all available in a new “Questions and answers” section curated by the UpToDate team.

### **Reducing unnecessary testing and improving drug therapies**

Dr Khan also said UpToDate boosted speed and efficiency by reducing the need for unnecessary testing: “It’s sometimes tempting when faced with the unknown to request multiple tests to make sure we cover all eventualities to reach the right diagnosis. CDS can help to reduce the trial and error approach to testing. One of the ways technology does this is by suggesting tests you may not initially have considered, which can set you on the path to the right answer a lot faster.”

Drug treatment is another area of uncertainty in the COVID-19 pandemic. While the world waits for an effective vaccine, new and experimental drug therapies are being tested, with conflicting theories of success and effectiveness. Once again, UpToDate and drug decision support resources like Lexicomp – another Wolters Kluwer solution that works alongside UpToDate – can significantly help clinicians separate fact from fiction.

For example, the corticosteroid dexamethasone has attracted a lot of interest due to favourable findings from a recent study in the UK, while Remdesivir, interleukin-6 pathway inhibitors, hydroxychloroquine, and several other agents are also being discussed as possibly effective treatments. Unfortunately, the interactions between these treatments can cause serious illness in some patients, which increases the need for more understanding of drug interaction considerations. The latest evidence and guidance offered in tools like UpToDate and Lexicomp can help clinicians minimise the consequence of any such interactions to limit the risk of adverse outcomes.

## **Untapped potential of CDS – future predictions**

Just as the pandemic has highlighted the value of clinical decision support in treating COVID-19, it has also shown its potential for predicting future outbreaks – of this virus and others that may follow.

Because UpToDate is used by clinicians for 50 million topic views per month – 605 million per year – the app can provide a detailed picture of what doctors are searching for at any given time. As doctors commonly use UpToDate when faced with unusual symptoms or to double check guidance on a particular condition, it's possible to see peaks in search activity around specific topics. In the case of COVID-19, researchers have been able to draw a clear correlation between search intensity for selected COVID-19 terms, for a specific location, with subsequent numbers of confirmed cases. Previous studies have suggested that this search-based approach to bio-surveillance was effective in other outbreaks, such as MERS in 2012. Analysis by Wolters Kluwer of these outbreaks and the current pandemic shows that an increase in search intensity in a particular location precedes documented cases, offering a useful tool for predicting hotspots in advance. The live data was used to create an interactive map, linking search activity to location-specific outbreaks around the world.

In the U.S., Dr. Mauricio Santillana, Director of the Machine Intelligence Lab, Boston Children's Hospital, and an Assistant Professor of Paediatrics and Epidemiology at Harvard Medical School, has taken this further, using UpToDate data to create an algorithm to forecast coronavirus outbreaks. It uses doctors' search activity on UpToDate, combined with data streams from social media, internet search trends and mobile data from smartphones. Put together, it provides a coronavirus early warning system that its developers say can forecast an outbreak two or three weeks in advance.

To test the algorithm's ability to forecast outbreaks, researchers compared how each data stream correlated with case counts and deaths in states in the U.S. in March and April. For example, an abrupt increase in tweets about COVID-19 appeared over a week before reported cases spiked dramatically in New York in the middle of March. Related Google searches and Kinsa temperature readings increased several days before the spike as well. The hybrid algorithm estimated outbreaks by an average of 21 days.

## **Clinical decision support and remote healthcare**

Another key medical trend that CDS is enabling is the rise of the virtual consultation – a clear consequence of the COVID-19 pandemic as many GPs and hospital doctors have switched to video-based appointments wherever possible.

In this case, medical content can play an important role in the clinician's workflow. It can also provide vital patient education materials to engage patients in their own care, increase adherence to treatment plans and ultimately improve clinical outcomes.. Dr Steve Jackson from University Hospitals of Leicester NHS Trust says this has had a big impact on how he works:

“The more I do virtual consultations – and they are now the default option – the more I see an opportunity for patients to be engaged with information about their conditions. That’s far easier in a virtual consultation, when I can be looking at my screen to consult information sources and share information with the patient.

Working remotely also means my time is not limited in the same way as used to be in the consulting room. This means I can prepare better for each consultation. Previously, I would look at my previous letter about a patient and that was it. Now, before I see the patient, I can open the patient’s GP record, laboratory system, radiology system, and also my previous notes. If I’m not sure about the plan of action, I can use the CDS to support my decision-making. All of this means I can hit the ground running with the patient, which makes the consultation much more efficient from both perspectives.”

The potential for CDS to be used with the patient to engage them in their treatment also facilitates the trend towards remote home-based care. Especially in a pandemic, patients need to be more engaged in their healthcare and be aware of the need to protect others. Research shows that engaged patients have better outcomes and CDS is responding to this with more patient-centric content. Multi-language materials and video adapted from clinician content can reach more of the population with easy to digest and accessible information.

### **Cookbook medicine?**

One criticism that some may level at the growing use of CDS is that it risks breeding a new generation of technology-reliant clinicians, replacing their own knowledge with the search results from an app. Some have called it the rise of ‘cookbook medicine’. Just like GPS navigation devices have reduced the need for taxi drivers to learn their routes, some worry that the doctors of the future will be driving on auto pilot.

However, this fear is to misunderstand the true role of CDS, especially in the post-pandemic world. The key to the successful and effective implementation of CDS is that it needs to be ‘smart’. Information needs to be delivered in a way that is seamlessly embedded into the physician’s workflow, supporting his or her reasoning process – not replacing it. When CDS technology can be embedded into an EPR – which is the case with UpToDate in many hospitals – then it moves from being an information resource to a personalised and dynamic tool.

A guiding principle for the use of this powerful technology is that it needs to support the decision-making process rather than replace it. It recognises that clinicians can’t be expected to know everything, while at the same time requiring their brains to be truly switched on. In this sense, CDS technology is about giving clinicians the tools that ultimately help them make the right decisions at the right time, helping the patient receive better and safer care while delivering efficiencies and lowering the cost of care.



To access the free-to-use UpToDate Covid-19 resources, click below.

<https://www.uptodate.com/home/covid-19-access>

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