



 HOSPITAL
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EUROPE

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COVID FOCUS 2020

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HOPE Governors' responses on the COVID-19 crisis

Data were obtained from the OECD, Eurostat and WHO. When data were not available for one of the specific years, the closer year was used (denoted by *). The comments from the Governors were provided between June and October 2020

AUSTRIA



Mr Nikolaus Koller
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

A general impact in Austria's health care systems is the decrease of non-COVID-19 patients. One reason might be from the patient side, in that they fear a higher possibility of infection in hospitals. Another reason is that the government expected a higher infection rate and, therefore, tried to prevent a possible shortage of capacities by recommending to suspend elective interventions and examinations where medically justifiable and to intensify counselling via telecommunication.

Currently the health system is trying to move back to normality and resume all activities. However, it is seemingly more difficult than expected. It is a big priority to regain the patients trust and to convince people that treatment of any kind should not be postponed anymore as it can lead to serious health issues in the long term.

Austria's comparatively high hospital and intensive care capacities have been very valuable in tackling the crisis. In the course of

the pandemic, Austria did not fortunately come close to reaching its capacity limits.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

Changes included a bigger focus on patients with severe symptoms that required intensive care and use of ventilators. In the hospital, adjusted triages were integrated to handle the increase in COVID-19 patients more efficiently and safely. In the outpatient sector, the use of teleservices such as e-medication or, particularly for psychiatric patients, teleconsultation, was made possible by social insurance.

Have you identified possible changes to your healthcare system?

One of the main priorities regarding future changes in the health care system continues to be strengthening of primary care to ensure an efficient and sustainable health system, and also ensuring the availability of structures and the workforce required for providing high-quality health care services in extraordinary situations.

AUSTRIA

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	9.4%	9.7%	10.4%
General government/compulsory current health expenditure, as % of total current health expenditure	74.8%	75.0%	74.0%
Hospital current health expenditure, as % of total current health expenditure	n.a.	38.7%	38.5%
Household out-of-pocket health expenditure, as % of total current health expenditure	18.6%	18.2%	19.2%
All hospital beds per 100,000 inhabitants	780.7	769.3	736.6
Acute care hospital beds per 100,000 inhabitants	666.7	629.3	544.7
Acute care admissions/discharges per 100 inhabitants	25.3	26.7	24.6*
Average length of stay for acute care hospitals (bed-days)	7.3	6.8	6.5*
Practising physicians per 100,000 inhabitants	403.1	460.4	518.3
Practising nurses per 100,000 inhabitants	567.7	636.0	685.0

BELGIUM



Mrs Valérie Victoor
HOPE Liaison Officer
Representing Wallonia
and Brussels Regions

Could you summarise the most important impact on hospitals, primary care and social care?

Hospitals were strongly affected, and a lack of communication between the nine health ministers in Belgium made decision making and preparations difficult. There were major dysfunctions and hospitals were left to deal with many issues alone, creating great discontent, which manifested during a visit of the Prime Minister to a hospital in which the workers formed a long queue and turned their backs to the Prime Minister to express their anger.

Furthermore, there was no preparation from the Federal health prime minister, who did not announce or prepare for the lack of protective equipment and COVID-19-specific medications. Consequently, at the start of the crisis, the hospitals had to work with less than three days' stock and quickly ran out of protective equipment. The federal minister and the competent administration regarding the hospitals have consequently been unable to supply the equipment the hospitals desperately needed. We had to help them find the necessary supplies, which sometimes had to be made by fabrication labs. There was also a scandal regarding the destruction of a stock

of FFP2 masks before the crisis and the deliberate negation to renew it from the Federal health minister.

In addition to the above problems, hospitals had to deal with a lack of coordination from the different administrations, resulting in them having to fill in many forms with different formats, and thereby increasing the already high workload.

To summarise, there was a lack of coordination, communication and help from the federal government, which led to hospitals being hugely affected by the crisis.

Did you experience major changes in the overall organisation of healthcare and if yes, which ones?

A major change in the organisation of healthcare included the cessation of all other activities in hospitals that were not directly related to COVID-19.

Have you identified possible changes in your healthcare system?

So far, no changes have been planned by the government, although the hospital federations are currently proposing changes to the government.

BELGIUM

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	9.4%	9.7%	10.4%
General government/compulsory current health expenditure, as % of total current health expenditure	73.8%	77.2%	77.2%
Hospital current health expenditure, as % of total current health expenditure	n.a.	33.4%	34.3%
Household out-of-pocket health expenditure, as % of total current health expenditure	n.a	18.4%	17.6%
All hospital beds per 100,000 inhabitants	653.9	624.9	566.4
Acute care hospital beds per 100,000 inhabitants	591.9	559.4	500.5
Acute care admissions/discharges per 100 inhabitants	16.4	16.5	16.3*
Average length of stay for acute care hospitals (bed-days)	7.6	7.1	6.9*
Practising physicians per 100,000 inhabitants	285.9	292.1	518.3
¹ Practising nurses per 100,000 inhabitants	n.a	931.9	1096.0*

BULGARIA



Mr Krasimir Grudev
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

It is important to note that Bulgaria was not as affected by the pandemic as some other countries. This could be due to a combination of a low number of the population being over 80 and living in nursing homes. Also, the population followed the restrictions and recommendations imposed by the government. Furthermore, some claim the percentage of the population that has been vaccinated with BCG (Bacillus Calmette-Guérin, a vaccine against tuberculosis) might have affected the infection rate.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

There has been an increase in the number ICU beds and transformation and training of existing departments to meet COVID-19 cases. Most of the hospitals were engaged, but only a few happened to receive COVID-19 patients. Private hospitals participated actively.



BULGARIA

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	n.a	n.a	n.a
General government/compulsory current health expenditure, as % of total current health expenditure	n.a	n.a	n.a
Hospital current health expenditure, as % of total current health expenditure	n.a	n.a	n.a
Household out-of-pocket health expenditure, as % of total current health expenditure	n.a	n.a	n.a
All hospital beds per 100,000 inhabitants	651.1	660.8	745.4
Acute care hospital beds per 100,000 inhabitants	n.a	554.4	616.8
Acute care admissions/discharges per 100 inhabitants	n.a	n.a	n.a
Average length of stay for acute care hospitals (bed-days)	n.a	n.a	n.a
Practising physicians per 100,000 inhabitants	353.3	366.4	424.5
Practising nurses per 100,000 inhabitants	363.8	431.3	437.5

DENMARK



**Mrs Eva
Weinreich-Jensen**
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

One of the impacts seen in Denmark was a decrease in visits to primary care and hospitals of non-COVID-19 patients. Like in other countries, this was due to fear of the population becoming infected; a solution to this was the use of telemedicine. However, hospitals still have fewer patients than normal and there is a great concern that patients with cancer and other possible critical diseases will become worse as they wait longer before they contact the health care system. A solution for this problem is currently being investigated.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

Regarding organisational changes, the

government passed laws that gave the health ministry more power and that suspended some patients' rights. There has been a major transformation of units into intensive care units and training of staff to participate in the expected care for COVID-19 patients. One of the main lessons from this health crisis is that it has been possible to transform the system and adapt to an unexpected large number of patients, as well as the incredible ability to work together nationally towards the common goal of being able to treat all patients with the virus.

Have you identified possible changes in your healthcare system?

The creation of a national authority for emergency preparedness.

DENMARK

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	8.7%	9.5%	10.1%
General government/compulsory current health expenditure, as % of total current health expenditure	83.8%	84.0%	84.0%
Hospital current health expenditure, as % of total current health expenditure	43.9%	44.5%	44.3%
Household out-of-pocket health expenditure, as % of total current health expenditure	14.7%	14.1%	13.7%
All hospital beds per 100,000 inhabitants	428.6	357.1	260.8
Acute care hospital beds per 100,000 inhabitants	425.7	350.8	253.6
Acute care admissions/discharges per 100 inhabitants	14.2	13.1	n.a.
Average length of stay for acute care hospitals (bed-days)	3.7	3.5	n.a.
Practising physicians per 100,000 inhabitants	303.7	357.9	399.8*
Practising nurses per 100,000 inhabitants	944.1	955.3	995.0*

ESTONIA



Dr Urmas Sule
HOPE President

Could you summarise the most important impact on hospitals, primary care and social care?

The initial response from the Estonian government was similar to other European countries and an emergency situation was announced swiftly for the whole country. Among the decisions made by the government was the use of testing to control the situation, which had positive results. Nevertheless, one of

the issues encountered was lack of protective equipment and lack of testing reagents but this was quickly solved.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

The State Emergency Act was for the first time in use and this meant that the Health Agency nominated Chief Medical Officer to be in charge



of coordinating medical services and a group of scientific professionals were appointed for the crisis committee. Furthermore, two regional units were formed for hospital care and ambulance services. Throughout the crisis there were big regional differences, with biggest island Saaremaa being one of the hardest hit regions, needing extra support of other hospitals. Out of 4000 confirmed cases in Estonia, 575 were in Saaremaa.

Have you identified possible changes in your healthcare system?

There have been big challenges for the health system during the crisis, but also positive outcomes. One was the fast development of telemedicine, especially in hospitals. Before the

crisis Estonia already had in place a good telemedicine service, but these quickly increased during the crisis. Estonian Health Insurance Fund (EHIF) in cooperation with hospitals have been working towards developing telemedicine and video consultation services. To provide quality services while considering patients' needs and safety EHIF started funding tele- and video consultation services widely. The emergency situation has significantly accelerated the uptake of remote services in the health system and provided an incentive for healthcare providers to purchase teleworking equipment. Hospitals and EHIF are planning to continue developing e-services in the next years.

ESTONIA

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	4.7%	5.8%	6.4%
General government/compulsory current health expenditure, as % of total current health expenditure	76.6%	77.0%	74.7%
Hospital current health expenditure, as % of total current health expenditure	31.6%	47.9%	46.0%
Household out-of-pocket health expenditure, as % of total current health expenditure	20.6%	20.7%	23.6%
All hospital beds per 100,000 inhabitants	598.0	563.2	469.5
Acute care hospital beds per 100,000 inhabitants	479.9	412.1	344.6
Acute care admissions/discharges per 100 inhabitants	17.0	16.7	15.5
Average length of stay for acute care hospitals (bed-days)	6.9	5.7	5.4
Practising physicians per 100,000 inhabitants	309.4	334.2	346.8
Practising nurses per 100,000 inhabitants	601.3	641.5	619.2

FINLAND



Mrs Hannele Hakkinen
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

In Finland, as in many other EU countries, there was a decrease in hospital and primary care activity for non-COVID-19 patients; this has created one of the most important impacts, that is, the huge accumulation of operations and elective care for autumn and 2021.

Numbers of elective surgeries decreased when preparing for COVID-19 patients and medical personnel were trained to be able to

work in ICUs. In social care, some services were also affected, for example, some group meetings allowed a maximum of only ten people aloud and many services were carried out by phone, social media, etc.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

There were no major changes in the overall organisation of healthcare, except for an increase in e-services.

FINLAND

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	7.4%	8.1%	9.2%
General government/compulsory current health expenditure, as % of total current health expenditure	73.8%	75.0%	75.2%
Hospital current health expenditure, as % of total current health expenditure	36.3%	34.1%	36.9%
Household out-of-pocket health expenditure, as % of total current health expenditure	22.0%	19.6%	20.2%
All hospital beds per 100,000 inhabitants	735.1	656.8	328.1
Acute care hospital beds per 100,000 inhabitants	383.2	349.8	279.5
Acute care admissions/discharges per 100 inhabitants	19.9	17.9	16.4*
Average length of stay for acute care hospitals (bed-days)	7.1	7.1	6.7*
Practising physicians per 100,000 inhabitants	252.7	272.1	n.a
Practising nurses per 100,000 inhabitants	1071.0	1314.0	n.a

FRANCE



Mrs Zaynab Riet
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

France was one of the hardest hit countries. Currently it is going through phased lockdown measures, in which hospitals are still mobilised and keep beds free for COVID-19 patients. Therefore, the treatment for other patients is still impacted. Hospitals were a key element in managing the outbreak at all levels. But although hospitals were of great help, the fact that too many patients had to reach the hospital level to receive care means the system might not be as efficient and shows a lack of preparation at national and regional levels.

Another heavily affected part of the healthcare system in France were nursing homes, with two-thirds of the COVID deaths.

Primary care also struggled due to the lack of preparation; there was not enough protective material and, as a consequence, primary care doctors stayed at home thereby affecting primary care services. Also like other EU Member States, patients feared going to the doctor and the number of visits by non-COVID-19 patients were also reduced.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

The Ministry of Health called "Ségur de la santé" has organised a large consultation on how the health system should look after this crisis and to make future changes. This led to a series of measures reshaping the healthcare system.

FRANCE

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	10.2%	10.5%	11.3%
General government/compulsory current health expenditure, as % of total current health expenditure	79.2%	76.6%	83.4%
Hospital current health expenditure, as % of total current health expenditure	35.6%	38.0%	38.3%
Household out-of-pocket health expenditure, as % of total current health expenditure	7.1%	10.0%	9.4%
All hospital beds per 100,000 inhabitants	771.3	690.3	598.0
Acute care hospital beds per 100,000 inhabitants	390.4	351.6	309.0
Acute care admissions/discharges per 100 inhabitants	19.1	16.6	16.3*
Average length of stay for acute care hospitals (bed-days)	5.7	5.8	5.8*
Practising physicians per 100,000 inhabitants	n.a	n.a	n.a
Practising nurses per 100,000 inhabitants	n.a	n.a	n.a

GERMANY



Mr Georg Baum
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

As in many other countries, the German government pursued a two-sided strategy. On the one hand, social distancing measures were taken to flatten the curve and to stretch the number of infected people over time; on the other hand, measures were taken to prepare the healthcare sector for a worst-case scenario. Regarding the second aspect, in the middle of March, hospitals followed an order to scale-down elective care procedures, in preparation for an increase in demand for intensive care and ventilation capacities for the treatment of COVID-19 patients. Additional intensive care capacities, respiratory beds, and isolation areas were also installed. According to official figures from the German Federal Statistical Office, Germany has 1925 hospitals and approximately 600 hospital beds per 100,000 inhabitants. Before the COVID-19 crisis, the 500,000 hospital beds included 28,000 intensive care beds, of which 20,000 were equipped with anaesthetic and respiratory equipment. After the enlargement, Germany has 40,000 intensive care beds, of which 30,000 are respiratory beds. As a result of this internal reorganisation, the downscaling of activities and the enlargement of the capacities, hospitals

have suffered from financial losses. These will be absorbed until the end of September 2020 by means of a financial rescue package for the economic stability of hospitals. However, it is already apparent that the compensation payments for hospitals provided by this law will not be sufficient to compensate the loss of revenue and the additional costs caused by the COVID-19 pandemic and the German Hospital Federation (GHF) is now engaged in a dialogue about hospital financing in the middle and long run.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

In Germany, the Federal States (Bundesländer) are responsible for the on-site organisation and planning of hospital care. Yet, from mid-March onwards, they have aligned themselves with a federal request and enacted regulations to get hospitals to scale-down elective care procedures, as a preparation for COVID-19 patients. While, of course, respecting the principle that the evaluation of elective procedures is subject to the primacy of medicine, hospitals followed swiftly followed the federal request and the Länder regulations. They freed necessary capacities, on the one hand, for the care of patients seriously affected by COVID-19, and, on



the other hand, for all other patients in need of acute and urgent treatment. In addition to this downscaling, they installed additional intensive care and respiratory beds and created isolation areas. In general, all parts of the hospitals were involved in the treatment of COVID-19 patients. Some Länder defined coordinating hospitals for certain geographically-defined care territories. In other territories, hospitals organised themselves voluntarily in care networks.

Have you identified possible changes in your healthcare system?

The GHF has identified different areas of changes but two in particular. First, there seems to be a certain 'change of mind' about hospital capacities in Germany. Thanks to the outstanding performance of the hospital staff and hospitals during the last months, the overall organisation of the hospital landscape in Germany is no longer under one of the most unwarranted critics of the last years; for years, politicians and health economists in Germany have complained that the country has too much hospital capacity. According to official figures from the German Federal Statistical Office, before the COVID-19 crisis, Germany had 1925 hospitals and approximately 600 hospital beds per 100,000 inhabitants. The 500,000 hospital beds included 28,000 intensive care beds of which 20,000 were equipped with anaesthetic and respiratory equipment. The capacities are widely distributed over a large area and are available in all different kinds of hospitals (regardless of the ownership, the hospital size or the degree of specialisation).

The coronavirus pandemic has turned this organisation into an advantage. Our hospital landscape has proven to be a viable network.

Second, it transpires that Germany has to reconsider its hospital financing system. The financing of the German hospital system is based on two pillars. On the one hand, the Federal States (Bundesländer) are bound to bear the investments into the infrastructure. For 20 years now, the Bundesländer have been neglecting this legal obligation to finance, in a sufficient manner, the investments of hospitals. The German hospitals have proven that they are willing to do everything to guarantee the protection of the population, also under never-before-seen health crisis circumstances. In order for the hospitals to be able to continue to provide these services and its quality in the short-, medium- and long-term, the GHF is calling for funds for the modernisation of the structural and medical infrastructure as well as for funds for digitisation, as one of the major future challenges. By contrast, the larger part of the financing is based on the hospitals activity: the health insurance funds pay for the costs of the treatment which is implemented by applying the G-DRG (German Diagnosis Related Groups) system. In a situation where we need to be ready and prepared to scale down activity at every moment, the strong focus on activity in hospital financing is no longer appropriate. The GHF is therefore entering into a dialogue about a system that reconciles the financing of activities and the financing of the costs of maintaining (crisis) capacities.

GERMANY

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	10.1%	10.2%	11.2%
General government/compulsory current health expenditure, as % of total current health expenditure	77.7	75.3	84.4
Hospital current health expenditure, as % of total current health expenditure	29.6%	28.8%	28.3%
Household out-of-pocket health expenditure, as % of total current health expenditure	12.5%	14.0%	12.5%
All hospital beds per 100,000 inhabitants	887.0	821.4	800.2
Acute care hospital beds per 100,000 inhabitants	663.5	613.0	601.5
Acute care admissions/discharges per 100 inhabitants	20.2	21.2	23.7*
Average length of stay for acute care hospitals (bed-days)	9.6	8.3	7.6*
Practicing physicians per 100,000 inhabitants	332.1	354.1	424.9
Practicing nurses per 100,000 inhabitants	1018.3	1113.1	1293.3

IRELAND



Mr Eamonn Fitzgerald
HOPE Vice-President and Governor

Could you summarise the most important impact on hospitals, primary care and social care?

Ireland has suffered quite a number of fatalities and while it is currently easing the lockdown measures, there is still fear of a second wave.

The most important impact on hospitals, primary care and social care has been disruption for patients and clients of social care services being able to access during the lockdown period. While emergency admissions have been accommodated in hospitals, there has been a dramatic reduction in any elective admissions and many screening programmes have been put on hold. Furthermore, people

have stayed away from their GPs and suffered as a consequence from timely healthcare provision for both acute and chronic conditions. For example, there have been fewer cancer screening programmes, and fewer oncology and cardiology patients; this will have consequences in the long-term. Social care settings, in particular nursing/residential care facilities, have been very significantly affected by COVID-19 infection of the residents.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

The major change in the overall organisation of



healthcare has most notably been in the acute hospital sector. The state entered into a 90-day agreement with the private hospitals sector comprising 19 acute hospitals to provide access to the state for the total capacity of all the private hospitals as part of a Common Purpose Agreement in response to the global pandemic. The effect has been to make available critical care capacity as well as 2000 additional in-patient beds and the provision of a significant amount of complex cardiac surgery and interventional care.

All patients treated during this period were deemed to be public patients and no patients with private health insurance were admitted and/or treated as a private patient.

Essentially private patients have not been able to access private hospitals for the past three months.

Have you identified possible changes in your healthcare system?

Some of the changes identified in the healthcare delivery system are most notably in virtual and remote care. There has been a proliferation of consultations provided remotely via Zoom, Skype and other virtual platforms. Social distancing is going to fundamentally impact the volume of patient care capable of being provided versus pre-COVID-19 levels.

Waiting lists and waiting times for access to care have deteriorated significantly and the cost of healthcare provision has risen considerably. There is an absolute imperative for a strategic partnership to be entered into between the public and private healthcare sectors in order to have any chance of improving citizens' access to diagnostic and therapeutic care.

IRELAND

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	6.7%	9.1%	7.2%
General government/compulsory current health expenditure, as % of total current health expenditure	79.0%	79.3%	73.3%
Hospital current health expenditure, as % of total current health expenditure	n.a	n.a	37.2%
Household out-of-pocket health expenditure, as % of total current health expenditure	10.5%	11.9%	12.3%
All hospital beds per 100,000 inhabitants	578.1	485.3	295.7
Acute care hospital beds per 100,000 inhabitants	280.7	252.7	276.6
Acute care admissions/discharges per 100 inhabitants	14.1	13.5	13.9*
Average length of stay for acute care hospitals (bed-days)	6.5	6.2	5.6*
Practising physicians per 100,000 inhabitants	n.a	n.a	30.6
Practising nurses per 100,000 inhabitants	n.a	n.a	n.a

LATVIA



Mr Jevgenijs Kalejs
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

From mid-March, hospitals only treated emergency cases and COVID-19 patients, but they have recently opened up to outpatients. However, there are huge waiting lists, sometimes up to a year, as a consequence of stopping normal activity.

There was also an initial problem with equipment, but there were not many health care workers infected.

Another important impact is the financing of the abnormal costs created by the crisis. There is still no bonus from governments or coverage of additional expenses, for example, for

protective equipment.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

Some changes that are currently taking place are the reduction of healthcare activity in rural areas and an increase in capital areas by the government.

Have you identified possible changes to your healthcare system?

There will also be a hospital reform by the end of the year, which is said to include fewer workers and health budget reduction.

LATVIA

	2002	2008	2017
General government/compulsory current health expenditure, as % of total current health expenditure	49.6%	60.3%	57.3%
Hospital current health expenditure, as % of total current health expenditure	n.a	42.6%	32.3%
Household out-of-pocket health expenditure, as % of total current health expenditure	47.6%	37.3%	41.8%
All hospital beds per 100,000 inhabitants	786.7	776.5	556.7
Acute care hospital beds per 100,000 inhabitants	552.3	527.7	329.9
Acute care admissions/discharges per 100 inhabitants	18.6	20.7	14.7*
Average length of stay for acute care hospitals (bed-days)	8.0	7.1	5.9*
Practising physicians per 100,000 inhabitants	278.9	323.3	320.5
Practising nurses per 100,000 inhabitants	456.4	555.3	456.8



LUXEMBOURG



Mr Marc Hastert
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

Luxembourg created a National Crisis Cell and local crisis cells in hospitals, which involved hospital workforce at all levels. Some of the impacts on healthcare systems include the cancellation of scheduled non-emergency interventions, the reorganisation of hospitals in COVID-19 zones and non-COVID-19 zones, and limited access by visitors to hospitals. Patients were informed that they will have to designate a visitor, who will be badged.

Furthermore, Advanced Care Centres (ACC) were generated; these are itinerant treatment centres that have the medical equipment necessary for initial treatment. However, emergencies had to respect the usual pathways in place in Luxembourg and not go through the ACC. However, if a patient sees his/her state of health deteriorate during treatment at the ACC, a medical evacuation is planned. The ACCs were designed to operate through two strictly separate consultation channels: the first is designed to accommodate patients with signs of COVID-19 virus infection; and the second allows patients who do not have signs of COVID-19 infection to come to the centre.

Acquisition of additional equipment, such as respirators and additional computer tomographies (CT-scans) was necessary. This was done following objective, transparent and verifiable criteria to ensure safety. Similarly, acquisition of protective equipment took place via a National Logistics Unit following an agreement on standards for the use of this equipment.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

Changes in the overall organisation of healthcare include an increase of intensive care while still keeping enough beds available for

other pathologies. A seizure of hospital and intensive care bed capacities is carried out twice a day, at 8 am and 4 pm.

Other changes include the development, together with hospital pharmacists, of a procedure for managing stocks and orders of drugs with a view to equitable distribution via an objective criterion. A new national regulation allowed the Luxembourg market to be considered as a single official hospital, which allowed Luxembourg to be active on the Belgian market. Also, Luxembourg allowed transfer of 12 French COVID-19 patients requiring intensive care (called the Grand Est solidarity action).

Work was also carried out to ensure good national coordination. Data sheets with COVID-19 indicators were completed every morning by hospital departments. The Minister received the information collected daily in the form of a 'dashboard'.

Similar to other populations, there is a fear and hesitancy to visit the hospital or primary care; therefore Luxembourg tried to raise awareness of the issues and the serious consequences that they could have for the future health of the patients.

Have you identified possible changes to your healthcare system?

After the current events, it is clear that a reorganisation of our health system is necessary. The health crisis has highlighted the limits of our current resources and there are many lessons to be learned. Changes include a better maintenance and availability of reserves of beds and equipment. The creation of a National Hospital Logistics Centre (including central purchasing), will take over the activity of the National Logistics Cell and develop it. There is also a need to strengthen the role of hospitals to enable them to face future health crises, as well as a public service able to respond to vital priorities.

LUXEMBOURG

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	6.7%	6.5%	5.5%
General government/compulsory current health expenditure, as % of total current health expenditure	83.0%	87.3%	84.0%
Hospital current health expenditure, as % of total current health expenditure	30.4%	31.9%	32.5%
Household out-of-pocket health expenditure, as % of total current health expenditure	13.9%	10.1%	10.5%
All hospital beds per 100,000 inhabitants	n.a	556.8	466.2
Acute care hospital beds per 100,000 inhabitants	n.a	432.2	377.5
Acute care admissions/discharges per 100 inhabitants	17.3	15.7	13.6*
Average length of stay for acute care hospitals (bed-days)	7.5	7.3	7.3*
Practising physicians per 100,000 inhabitants	225.7	271.6	298.5
Practising nurses per 100,000 inhabitants	776.4	n.a	1,172.5

PORTUGAL



Prof Carlos Pereira Alves
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

The government has announced that Portugal will be on contingency status until 14 October 2020. The political consensus and a good response of the health system helped in it never becoming overwhelmed, although the number of ICU beds being are lower in Portugal compared with other EU countries. Portugal only reached a maximum of 60% rate of occupation of ICU beds. Several campaign hospitals were prepared but practically never used. The low occupancy of beds meant other patients from areas such as, cardiology and oncology could be treated. However, hospitals also faced strong shortages of material in the beginning but after one month this was quickly controlled.

In September 2020, the number of daily cases increased as in all over Europe and we witnessed a slow pressure on the hospital system but without alarm.

The crisis has had a big impact on training, elective and non-emergency surgeries, which had to be stopped. The Ministry of Health is asking for plans to resume normal activity; but patients do not go to hospital as much as they did before, 70% of daily emergencies have disappeared. The low activity of hospitals will create economic problems because there is an activity-based funding mechanism. Central government will have to change the funding criteria of hospitals if they want the activity objectives to be met.

Additionally, private home care has been impacted badly.

Did you experience major changes in the overall organisation of healthcare and if yes, which ones?

Several campaign hospitals were prepared but practically never used. Only non-essential activity stopped at an early stage.

There is an effort throughout the system to replace on-site activities with virtual ones. The use of medical tele-appointments increased significantly as home working was adopted whenever possible. Delivery of hospital-only medicines is now done through hospitals instead of pharmacies.

Also, there have been many efforts in creating designated pathways to separate ingoing and outgoing patients and staff.

Have you identified possible changes to your healthcare system?

As mentioned above, the low hospital activity will create funding and financing problems as a consequence of the activity-based funding mechanism that is currently in place. Hence, the central government will have to change the funding criteria of hospitals if they want the activity objectives to be met. There is general consensus that though the economic impact of this crisis will be high (experts anticipate a 7%–9% GDP budget deficit in 2020) the National Health Service (SNS) must be reinforced in terms of the resources available.

PORTUGAL

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	8.6%	9.4%	9.0%
General government/compulsory current health expenditure, as % of total current health expenditure	72.6%	68.4%	66.3%
Hospital current health expenditure, as % of total current health expenditure	38.1%	38.3%	42.2%
Household out-of-pocket health expenditure, as % of total current health expenditure	22.6%	25.8%	27.5%
All hospital beds per 100,000 inhabitants	356.7	339.1	339.3
Acute care hospital beds per 100,000 inhabitants	351.2	332.7	324.7
Acute care admissions/discharges per 100 inhabitants	11.1	11.3	10.8
Average length of stay for acute care hospitals (bed-days)	7.2	6.8	7.2
Practising physicians per 100,000 inhabitants	n.a.	n.a.	n.a.
Practising nurses per 100,000 inhabitants	n.a.	n.a.	n.a.

SPAIN



Mrs Sara Pupato Ferrari
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

Spain has been strongly hit by the Coronavirus pandemic. During the first wave, the peak was acute and had a great impact on hospitals, public or private, and on the healthcare and social systems in general. This crisis has damaged Spain's image as one of the healthiest nations, with the highest life expectancy in Europe and a robust healthcare system.

Currently, at the end of October 2020, there are already a million cases in Spain, the fatality

rate is 3.5 (0.6 for second wave) and hospital admissions are growing in all regions. The whole country has 14% beds occupied in hospitals (17,000 persons), 25% of ICU beds occupied (around 2350 persons). Cumulative incidence of cases per 100,000 inhabitants is around 600.

Spain was on state of emergency until 21 June 2020. The 17 regions were coordinated by the Ministry of Health. There was also a centralisation of material purchasing due to the initial problems with acquisition of material. Now the different regions are able to organise the strategic storage of material and to make



purchase by themselves.

One of the undesired side effects of the pandemic is that patients with common diseases avoid going to hospitals while COVID-19 patients are being treated. As an example, Spain had 40% fewer myocardial infarction patients reported by hospitals compared with 2019, which might have affected the general death rate.

Like most countries, Spain is counting fatalities of those who have tested positive for coronavirus. For this reason, during the first wave, several deaths were not registered as caused by COVID-19, as they occurred in nursing homes without having a positive test.

Currently, within a severe second wave that is striking most of European countries, the Parliament has agreed on declaring a second state of alarm, in order to allow Autonomous Communities to adopt stricter lockdown measures if necessary.

Primary care is under great pressure under this second wave. Many professionals are positive or are at risk hence must stay at home. There is also a shortage of nurses and doctors.

Nursing homes have limited and even forbidden visits and are now better prepared than in the first wave.

The Track and Trace system has been implemented and diagnostic capacity has also increased. There is no longer a scarcity of PPE and critical care equipment. Information systems have improved although some autonomic regions still have delays in reporting. But the biggest issues are the understaffing and under strain health workforce.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

The health crisis caused by the COVID-19 emergency has forced hospitals and health services to look for new forms of organisation to respond to the health emergency. The adoption of innovative solutions and new organisational processes have given an essential role to medical services and managers and have guided the needs of infrastructure, patient flows and the material needed.

New healthcare facilities were created mainly in Madrid and Barcelona. Primary care was reorganised mainly in the form of telemedicine.

There has been a blurring of traditional medical specialties with the implementation of multi-professional groups or 'COVID teams', with the active participation of nursing, which has played new roles, enhancing telemedicine.

In the direct care of admitted patients, digitisation or telemedicine initiatives have been implemented or expanded. By telemonitoring in conventional hospitalisation rooms, with reduced devices that are easy to use and sterilise, and through telecare, or virtual consultations, to increase the number of visits

and reduce the exposure of professionals and the consumption of protective equipment. As well as calls with mobile devices to the patient or family. Home control of patients at intermediate risk, not admitted to hospitals, has been done in many centres with their active participation and the help of oximetric control devices, video calls and structured interviews. Avoiding unnecessary face-to-face consultations has been controlled by collecting samples in special devices or at home, by conducting virtual telephone consultations and with the home delivery of the medication for hospital use. Geolocation has been used for contact study and to ensure population estrangement. In short, the different modalities of telemedicine and communication technology have expanded exponentially in a few weeks.

The Ministry of Health has recently agreed with regions on a new Coronavirus alert system to clarify and to have a more homogeneous system in place. It is a risk system evaluating the situation with four levels of alerts and certain thresholds that should be evaluated in the different regions.

Have you identified possible changes in your healthcare system?

A seroprevalence study on 90,000 persons was performed after the first wave. Only 5% of population on average had been infected in July. The study is envisaged to be performed again during November 2020.

Due to the economic situation, a new guaranteed minimum income has been approved for vulnerable people.

In July, the Spanish Congress reached a broad agreement among political parties for introducing reforms in the public healthcare system focussed on public health, primary healthcare and digitalisation.

The Ministry of Health agreed with the Autonomous Communities on a new package of coordination measures to strengthen control of COVID-19. The Declaration of Coordinated Actions includes measures related to vaccination, screening, coordination with local authorities and an implementation of the new national seroprevalence study.

The role of citizens as an engine of change, together with that of professionals, has proved to be essential, emphasising their responsibility in self-care, in the fulfilment of social isolation and in the rational use of health resources.

Within the drama that has caused so much personal and collective suffering and subsequent economic catastrophe, we must draw on the best lessons learned to improve the health system as a whole, to make it closer and adaptable to the needs of patients, to avoid unnecessary clinical events and face-to-face visits and to make it more personalised, more efficient, and of higher quality.

SPAIN

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	6.8%	8.3%	9%*
General government/compulsory current health expenditure, as % of total current health expenditure	71.0%	73.6%	70.8%*
Hospital current health expenditure, as % of total current health expenditure	37.9%*	40.5%	42.5%*
Household out-of-pocket health expenditure, as % of total current health expenditure (2018)*	24.9%	21.0%	22.2%
All hospital beds per 100,000 inhabitants	n.a	n.a	329 (2018)**
Acute care hospital beds per 100,000 inhabitants	n.a	n.a	233 (2018)**
Acute care admissions/discharges per 100 inhabitants	11.8	11.4	11.6 (2018)**
Average length of stay for acute care hospitals (bed-days)	7.0	6.5	5.45 (2018)**
Practising physicians per 100,000 inhabitants	313.0	354.5	400 (2018)*
Practising nurses per 100,000 inhabitants	407.5	482.2	590 (2018)*

* OECD Health Statistics 2020. <http://stats.oecd.org/Index.aspx?DataSetCode=SHA>

** Ministerio de Sanidad. Sistema de Información de Atención Especializada (SIAE)

SWEDEN



Mr Erik Svanfeldt
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

The Swedish Government employed a partially different strategy than other European countries. There was never a complete lock down; Sweden instead established restrictions that were sustainable for a long time. In the Spring, Sweden had a higher total number of deaths than neighbouring countries, but the number of new deaths in COVID-19 has since dropped significantly. COVID-19 has hit Stockholm much harder than other parts of Sweden.

Sweden had a low number of ICU beds before the crisis, but the hospitals managed to increase this number very quickly. The maximum expanded capacity level was never reached. There was also an initial lack of certain equipment and pharmaceuticals.

A big problem was elderly care, not least in nursing homes. There is a clear policy to provide basic healthcare in nursing homes, but they are basically designed for encouraging social contacts and not for fighting pandemics. Nursing homes were closed for visitors from March, and social care staff have been given

extensive training in patient safety.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

As in other countries, some elective surgeries and planned treatment were postponed, and non-emergency dental care was cancelled. Therefore, there was less pressure on other parts of hospital services (cardiology, cancer) and less pressure on primary care. Now there is a huge 'healthcare backlog' to be dealt with.

Hospitals managed to transform wards into ICU, to transfer healthcare professionals from one part of the system to another, and also to recruit staff from other sectors. There has also been an increase of digital services.

Have you identified possible changes to your healthcare system?

Future changes, that we can foresee, include the creation of stocks, an increase of digital care and reviews of existing emergency plans. Furthermore, there will probably also be a discussion about responsibility: who and what level (local, regional, national, EU) should be responsible for what?

SWEDEN

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	8.3%	8.3%	11.0%
General government/compulsory current health expenditure, as % of total current health expenditure	82.2%	81.9%	83.7%
Hospital current health expenditure, as % of total current health expenditure	n.a.	n.a.	38.0%
Household out-of-pocket health expenditure, as % of total current health expenditure	16.8%	16.9%	15.0%
All hospital beds per 100,000 inhabitants	312.9	280.5	222.5
Acute care hospital beds per 100,000 inhabitants	282.7	255.1	203.6
Acute care admissions/discharges per 100 inhabitants	15.3	15.7	13.9*
Average length of stay for acute care hospitals (bed-days)	6.6	6.2	5.4
Practising physicians per 100,000 inhabitants	327.8	374.2	411.7*
Practising nurses per 100,000 inhabitants	1014.3	1096.0	1090.2*



UNITED KINGDOM



Mr Niall DICKSON
HOPE Governor

Could you summarise the most important impact on hospitals, primary care and social care?

The UK has suffered a general increase in demand across the whole health and social care system, having to even establish field hospitals across the country. Furthermore, the initial focus on acute care to mitigate those more in need has led to mental health, primary health, community and social care being overlooked and lacking capacity.

Similar to other countries, the UK also suffered supply challenges, particularly for the procurement and distribution of personal protective equipment across the system, especially in primary, community and social care. This has created staff anxiety and lack of confidence, but the situation is resolving slowly.

There have been significant workforce issues, as staff members fell sick, or were required to quarantine or shield at the same time as an increased need for services. This led to the reallocation of staff to sites in need, including task shifting and bringing staff back from retirement.

In terms of support for the health service and preparing it for the challenges of COVID-19, focus was rapidly shifted away from elective and other routine care, which was paused, care quality inspections were scaled back, and national coordination of the crisis response was put in place.

All of the factors above have culminated in significant financial stress with increased costs across all parts of the health and care sector.

The UK government has provided increased funds, although we expect challenges in the medium-long term.

Did you experience major changes in the overall organisation of healthcare and, if yes, which ones?

The pausing of non-urgent services to meet COVID-19 demand has caused much concern about unmet need, including fewer presentations to the emergency department with heart attacks and stroke and fewer people accessing cancer screening; and concerns about growing waiting lists.

There are concerns about restoring non-urgent services when there is still a risk of a second peak; plus, the usual increased winter demand towards the end of 2020. As we move into the service restoration phase, there is a challenge in delivering care in facilities that separate people who are positive and negative for COVID-19.

We are also expecting increased demand for mental health services and rehabilitation services.

Have you identified possible changes to your healthcare system?

As mentioned above, possible changes to the healthcare system include the increase of waiting lists as well as the restructuring of healthcare in COVID-19 and COVID-19-free areas. Other changes include a demand on mental health and rehabilitation services.

UNITED KINGDOM

	2002	2008	2017
Total current health expenditure as % of Gross Domestic Product (GDP)	6.6%	7.6%	9.6%
General government/compulsory current health expenditure, as % of total current health expenditure	79.7%	82.8%	78.8%
Hospital current health expenditure, as % of total current health expenditure	n.a.	n.a.	41.8%
Household out-of-pocket health expenditure, as % of total current health expenditure	11.3%	9.4%	16.0%
All hospital beds per 100,000 inhabitants	397.9	333.3	253.7
Acute care hospital beds per 100,000 inhabitants	n.a.	n.a.	211.4
Acute care admissions/discharges per 100 inhabitants	11.2	13.0	12.5
Average length of stay for acute care hospitals (bed-days)	7.5	6.3	6.0
Practising physicians per 100,000 inhabitants	210.0	256.6	281.1
Practising nurses per 100,000 inhabitants	865.4	866.7	782.5

COVID-19: Impact on allergy care in Italy

Although cases of COVID-19 were documented in other countries a little earlier than the first Italian cases, Italy was the first European country to be severely affected by the pandemic

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The first cases of COVID-19 in Italy were diagnosed on 30 January 2020; these were two Chinese tourists who were visiting Rome. Other isolated cases – all arriving or returning from China – had already been reported in France (24 January) and Germany (27 January). At that time, isolated cases or small outbreaks, all related to people who had recently been to China, had been reported in most European countries.

On 20 February 2020, in a climate of growing concern, in which – however – the real risk still seemed ‘far away’ (the World Health Organization would only declare a Sars-CoV-2 ‘pandemic’ on 11 March), the Italian public and the world of healthcare were shaken by the news. The first Italian case (‘Patient 1’) was a 38-year-old man admitted to Codogno Hospital (in a village of 15,000 inhabitants in the province of Lodi, Lombardy, Northern Italy) with severe pneumonia and the need for ventilatory support in the intensive care unit. He was defined as Patient 1 because he was considered the first to fall ill with COVID-19 on Italian soil, having not made trips abroad previously.

Over the next 24 hours, another 16 patients between Lombardy and Veneto tested positive for Sars-CoV-2; all of whom had not travelled to China recently. This was the start of the outbreaks of COVID-19 in Italy. As of 1 March 2020, Italy had 3089 confirmed cases and 109 deaths, most of them in the northern regions, and was, by far, the European country most affected by COVID-19, second only to China and South Korea.

It was almost impossible to understand what was happening in Italy: we were the first western country hit by a large-scale spread of Sars-CoV-2, where the virus seemed to have arrived extremely suddenly and disruptively, thereby seriously impacting on the response capacity of the public health service.

Epidemiologists in regions of northern Italy were on the hunt for ‘Patient 0’; that is the person who – after returning from other countries already affected by COVID-19 – had infected Patient 1 and spread the virus between Lombardy and Veneto.

Over time, however, it became clear that there was no Patient 0 because Patient 1 was evidently not the first Italian case. In retrospect, the common opinion, and also the official position of the Italian Ministry of Health, was

that the Sars-CoV-2 virus had already been circulating in Italy for at least a few weeks prior causing, for the most part, less acute (and therefore more difficult to identify) cases, together with sporadic cases of interstitial pneumonia (which is also associated with other infections such as influenza) that would go undiagnosed.

Which new strategies were adopted? ‘Red zones’ and lockdown

As early as 21 February, the Italian Prime Minister had ordered the creation of ‘red zones’ for the municipalities of Lombardy and Veneto, which were the most affected. Knowing that the situation was no longer contained at a local level, a national lockdown was decreed from 4 March, with the closure of schools of all levels, universities, and non-essential production sites and a lockdown on free movement.

The objective was to ‘flatten the curve’ of the infection, reducing the risk of saturation of the healthcare system resources, so as to be able to guarantee better patient care and provide time to find effective therapeutic strategies.

Suspension of non-urgent clinical services

From the point of view of the organisation of health services, different Italian regions have adopted different strategies: in fact, in Italy, the public health service is organised and regulated on a regional basis by the relevant administrations.

In most cases, non-urgent clinical activity – on an in-patient and out-patient basis – was initially suspended. Emergency services (emergency room, acute hospitalisation, urgent surgery, deliveries, among others) and non-postponable activities (oncology services, for example) were maintained, while other elective activities were postponed.

Outcomes

In doing this, two things were achieved:

- the spread of Sars-CoV-2 infection in hospitals was limited (at least in many regions), and
- resources (medical and healthcare personnel) to support the services that were under most stress were freed up.

The lockdown had a significant impact on care activities: although these were not formally limited by law, worried and anxious citizens meant that hospitals and clinics – and even



emergency rooms – were deserted. This is certainly because many individuals had preferred to postpone important but non-urgent visits and procedures; however, several facilities reported that there was also been a sharp drop in acute procedures, probably due to individuals' (especially those most at risk) apprehension to go to hospital.

Personal perspective

In Tuscany, the region in which I practise, clinical activity for patients with asthma and allergies was reduced by approximately 75%. Only emergency management and continuity of care for certain conditions remained active.

In our allergy and immunological clinic unit of the San Giovanni di Dio Hospital in Florence, a non-university centre, which is a referral centre for the territorial hospitals of most of the region, urgent consultancy services were maintained, as well as the continuation of treatments for subjects with life-saving therapies (for example, immunotherapy for hymenoptera venom allergy). Withdrawing these therapies would have greatly increased their risk of potentially fatal anaphylactic reactions. This required a considerable effort, in terms of clinical reorganisation and management of social distancing, considering that in our unit approximately 700 patients are currently treated with this therapy, and who, on average, return for treatment every two months.

Services relating to diagnosis of suspected drug and food allergies were also maintained; in this case, priority was given to subjects with a greater risk of a new reaction, or with established complex clinical circumstances.

Ensuring continuation of clinical assistance required a complete rethink of the organisation's activities. First, the use of masks by both staff and patients were now mandatory. The use of disposable gloves (to be worn when entering the health facility) or frequent hand disinfection was also made mandatory for patients.

Access to hospitals and care facilities was limited to patients (and to a single companion in the case of minors or people requiring assistance), and visits to hospitalised patients were suspended or greatly reduced. Each subject's body temperature was measured upon entering the hospital, while triage centres were set up in the remote emergency room where – in addition to the temperature measurement – a nasopharyngeal swab to test for Sars-CoV-2 was performed. The first treatments – except in cases of emergency – were guaranteed at the same facility, whereas access to the hospital was possible only after the swab was processed, with direct dispatch to the 'Covid' ward if this was positive.

Inside the hospital, major reorganisation was required: separate routes for entry and exit were created in order to facilitate distancing, and the seats in waiting rooms were reorganised in order to guarantee a space of at least 1m between any individuals.

Personnel used different personal protective equipment according to the risk associated with their task. Everyone was obliged to wear surgical masks and disposable gloves when

close to patients; the work surfaces had to be thoroughly disinfected between one patient and the next. In cases of assistance to people with fever or respiratory problems, and therefore the greatest at risk of already being carriers of COVID-19, disposable gowns and face shields were compulsory. In the Emergency Department, or in wards dedicated to the care of patients with COVID-19, the use of complete protective suits was imposed – which are still in use today, despite the improvement in the infection curve.

Italy has never been particularly rapid in embracing new technologies. However, since the March lockdown, many general businesses have had to offer their services remotely. Schools activated distance learning, and millions of office workers moved to home working, a situation that had been postulated for some time but never fully realised before the COVID-19 pandemic.

The world of healthcare had to transform itself in this way too: but it was not done so swiftly. The priority for healthcare facilities, in the early stages of the lockdown, was being able to respond (or organise themselves to respond) to the first wave of patients with respiratory failure from COVID-19.

Only when this goal (thanks to an increase in resources for intensive and sub-intensive care, and the reduction in the number of new cases 3–4 weeks after the start of the lockdown) was achieved, could the health facilities focus on new ways for the provision of non-urgent services.

As has already been the case for schools and other workplaces, technology has made an impact in the field of health too. The use of telemedicine services for all activities that could be carried out remotely has increased hugely.

It is surprising to think how the necessary technologies (just think of the video calls that can be taken via any smartphone, with which almost all of us are equipped) have been available for some time, but how, despite this, it is difficult to change established habits and ways of working. In Italy, in this regard, the majority of patients and health professionals had never used telemedicine services before this pandemic.

Today, a considerable number of the non-urgent clinical activities are carried out through telemedicine services. This is particularly useful for the follow-up of frail subjects, in order to limit their chances of infection. But it is useful in general to guarantee a better social distancing, also taking into consideration that – although the epidemiological condition has improved considerably since last March and April – still today and we do not yet know for how long we will not be able to use the facilities and waiting rooms in the same way we were used to before the arrival of coronavirus.

Surely, the Sars-CoV-2 pandemic is one of the most dramatic global situations in modern times. Italy, for reasons still unknown, was the first European country to face the precipitous spread of this virus. Because of this, it was not possible to wait and take inspiration from the decisions made in other countries, which found themselves experiencing situations very similar



to that in Italy but one or two weeks later: a short time interval, but with disastrous potential in the event of an exponentially growing epidemic such as this.

Errors of evaluation have certainly been made on many levels, but this is only to be expected in the face of a situation that has no equal in the last century. The only possible comparison is with the 'Spanish 'flu' epidemic of 1918-1920, which occurred in a world so different from the present one that its precedent could be of no help.

As a health professional, my opinion is that Italy has coped courageously with this dramatic situation, and, in some ways, has been an inspiration for the choices that many other countries had to make – be it days or weeks later – during this pandemic.

Conclusions

At the time of writing, 35,154 people have died as a result of COVID-19 in Italy, which is one of the highest mortality rates per million

inhabitants in the world. We have had to pay a very high price in terms of human life, not to mention accompanying psychological impacts and economic repercussions. But the health service and civil society endured, perhaps unexpectedly according to some observers, so much so that The New York Times conceded: "... when Italy was the stuff of COVID nightmares, Trump and Biden, and much of Europe, mocked it as a shorthand for uncontrolled contagion. Now the pariah has become a model – however imperfect – of viral containment as the US and Europe struggle."

Now the situation here has improved, many families are taking vacation at the sea or in the mountains. But we are keeping our guard up, the memories of the days of March and April still etched in the minds of the population and the healthcare workers at the forefront of care. We sincerely hope a second wave of COVID-19 will not come, but if it does, we hope to be able to face this fully prepared.

Medicines management challenges in a cardiothoracic centre during COVID-19

This article details the key operational challenges experienced by the pharmacy department in a specialist cardiothoracic centre during the pandemic, and also touches on the emotional impact on staff dealing with these complex issues

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In January 2020, the World Health Organization (WHO) was informed that a novel coronavirus had been identified in Wuhan City, Hubei Province, China.¹ WHO declared the outbreak as a pandemic on 11 March,² and, by 1 July, more than 10.4 million cases worldwide, in more than 188 countries and territories had been recorded.³

The Royal Brompton & Harefield NHS Foundation Trust is a specialist centre for the treatment of heart and lung diseases in London with 480 beds across both hospital sites. It is the largest cystic fibrosis (CF) centre in the UK, treating adult and paediatric patients and is one of the largest and most experienced centres for cardiothoracic transplantation and ventricular assist devices (VADs). Other services offered across the Trust include treatment of interstitial lung disease, cardiothoracic surgery, a dedicated heart attack centre, and intensive care.

Once the pandemic reached the UK, there became an urgent need for a significant expansion of critical care beds, including an escalation into unusual ward areas. Critical care capacity across the UK is around 4000 adult critical care beds under normal circumstances; however, it was reported that this would need to be increased to 10,000.⁴

In order to prepare for a large surge in the number of critical care patients at each hospital site, adult and paediatric cardiothoracic and cardiology elective pathways were changed. Adult and paediatric patients with complex cardiac or respiratory conditions such as pulmonary hypertension, CF, asthma, interstitial lung disease, heart/lung transplantation and those supported with VADs were increasingly largely managed as ambulatory care or in the community, to reduce their risk of contracting the virus. At the peak of the pandemic in London in April 2020, 117 patients were concurrently being treated at both the Brompton and Harefield hospitals, 90 of which required level 3 critical care support. The number of patients requiring veno-veno extracorporeal membrane oxygenation support for severe acute respiratory failure due to COVID-19 also reached a new milestone of 27 patients at a single point in time across three critical care units compared with five patients under normal circumstances.

Operational pharmacy changes

Alongside the wider NHS, the pharmacy department had to adapt quickly to the overwhelming challenges ahead. Participation in face-to-face ward rounds and multi-disciplinary team meetings moved to more innovative methods of communication using virtual platforms, and senior pharmacists took on additional roles such as replenishing medicine stock lines (usually the responsibility of pharmacy technicians or assistants) to monitor stock levels very carefully and reduce pharmacy staff numbers on the wards. Individuals visiting COVID-19 Red Zones were expected to wear full personal protective equipment and working hours at the weekend were extended to support the medical and nursing teams to focus on their complex case load. Working from home, where possible, was encouraged to reduce footfall within the department and to implement social distancing.

There were also challenges in writing and updating guidelines with evidence as it emerged necessitating a couple of 'live documents' that were presented and ratified at bi-weekly virtual Trust committee meetings.

Shortage of oxygen

The demand for oxygen to cater for a surge of ventilated patients was a great cause for concern for the senior pharmacy management team. This is not normally an issue for hospitals as most patients are on no oxygen or low-flow oxygen. A substantially greater proportion of patients requiring oxygen therapy and ventilation was seen during COVID-19.

A patient safety notice from NHS England requested immediate attention to the use of high-flow oxygen therapy devices during the pandemic.⁵ There was a collaborative effort between Pharmacy, Estates and Clinical Engineering to ensure that adequate oxygen delivery could be provided to all areas with patients with critical care needs.

To monitor oxygen capacity, it was necessary to ascertain the maximum flow rate (l/min) from the vacuum insulated evaporator oxygen tank and a daily review of the number of high flow rate ventilatory systems. Urgent upgrade work was undertaken to increase output of piped oxygen across the organisation, by more than twofold.



Training and support

As the number of critical care patients increased, staff were redeployed to critical care areas, which necessitated timely and extensive training in a very short period of time. This urgent need to upskill staff was recognised both internally and externally by the Royal Pharmaceutical Society and the UK Clinical Pharmacy Association and live seminars hosted by expert panellists on various aspects of critical care on a twice-weekly basis were available/provided. Training was provided to staff required to undertake alternative roles, in addition to internal presentations and support provided by the adult critical care pharmacy team. Nursing staff, re-deployed to critical care wards, were also trained on commonly used drugs on an intensive care unit.

Educating the paediatric medical and nursing teams on medications in adult critical care was supported by the paediatric pharmacy team who upskilled themselves quickly under the guidance of their adult counterparts. A guide to critical care medication for adult COVID patients was created, the most challenging aspect of this being weaning from sedation and managing adults with delirium.

Establishing new pathways for supporting and supplying medicines for shielding patients

All pharmacy teams outside critical care had to adapt their services to provide safe care to long-term patients shielding in the community.

The paediatric pharmacy team were particularly challenged as children were required to be cared for at home to make way for the increase in adult COVID patients and the paediatric intensive care unit (PICU) changed to an adult unit (PAICU).

Children who required home IV antibiotics and would previously have been seen in out-patient clinics were now being reviewed in their own home, via video platforms or telephone clinics, to reduce face to face contact and medication was sent out by post or courier. Independent prescribing scopes of practice were expanded to support the medical teams. Home care arrangements were extended, and new contracts set up, enabling biologics for asthma and other treatments to be undertaken at home.

The respiratory pharmacy team also supported innovative ways to treat patients at home. In excess of 400 patients with asthma were taught how to self-administer biologics at home to reduce the need to attend a face-to-face hospital appointment. Home intravenous therapies were expanded for patients with CF and non-CF bronchiectasis. Out-patient clinics became virtual and medication posted to a patient's home address to ensure shielded patients did not have to venture out to collect their supplies. Patients requiring regular IV immunoglobulin had dose adjustments to extend the infusion interval and some patients were also switched to a subcutaneous route for self-administration at home.

Cardiothoracic transplant and VAD patients continued to require specialist support in the hospital and the occasional in-person follow-up in out-patients, however, where possible

patients were supported at home. The specialist pharmacy team developed new ways of working to support this vulnerable group of shielded patients in their homes by using Telehealth (virtual and telephone clinics), a roll-out of finger-prick testing for the immunosuppressant tacrolimus, expanding homecare service for intravenous antibiotics, and oral immunosuppressants and other medicines as required. Tailored information was provided to patients via SMS texts, patient support groups newsletters and social media platforms. A 'live webinar' was established between consultant physicians, a consultant pharmacist and a clinical psychologist to support lung transplant recipients, with approximately 140 patients joining the event; this provided an exciting platform to answer numerous questions and concerns from patients.

The anticoagulation service was also adapted to meet the needs of patients requiring these where appropriate. Patients were switched to direct-acting oral anticoagulants to reduce test requirements, local INR testing with GPs and district nurses for warfarin was actively encouraged, and there was an expansion of self-testing at home to reduce need to attend hospital sites.

Clinical trials

The randomised evaluation of COVID-19 therapy (Recovery) and Remap-Cap are novel adaptive clinical trials that commenced during the pandemic to evaluate several treatments, simultaneously, as new evidence emerged. These trials were adopted into the Trust very quickly, providing huge challenges to the pharmacy clinical trials team. A number of steps were necessary for the successful implementation of a particular domain such as the creation of a dispensing prescription template, design of standard prescription orders on two electronic prescribing systems and dissemination of administration guidelines. It was also necessary to ensure that all staff were familiar with the randomisation process (particularly at the weekend) and ensuring that patients transferred from other NHS Trusts were continued on a particular domain or standard of care arm. It was also necessary to respond to substantial amendments when treatments were suspended, or new arms created.

In line with NHS guidance at the time, clinical teams were also discouraged from using novel therapies (hydroxychloroquine, remdesivir, angiotensin 2, azithromycin) outside of clinical trials due to unproven benefit and risk of harm to patients and depletion of supply to existing patients with other long-term conditions.

Daily situation report (SITREP) for critical medicines

A SITREP report was set up to identify concerns regarding the supply of critical medicines. This was to assure the senior management and clinical teams in the Trust of drug availability before accepting new patients. A significant proportion of these drugs were supplied on allocation to regions and Trusts, under central control and delivered on a 'just-in-time' basis to ensure supplies were shared across all hospitals



TABLE 1

SITREP for critical medicines for single hospital site on a day in April 2020 (selected lines shown)

Drug	Lead time (hours)	Current stock level	Number of vials per patient per day	Number of patient days	Number of hours of stock in pharmacy
Argipressin 20units/ml	24	38	3 vials	3.3	77.1
Cisatracurium 150mg/30ml injection	24-72	0	3 vials	0	0
Fentanyl injection 2.5mg/50ml	48	116	2 vials	1.2	29.7
Midazolam injection 100mg/50ml	48	0	3 vials	0	0
Midazolam injection 50mg/10ml	24	45	6 vials	2.8	67
Noradrenaline injection 4mg/4ml	24	41	4 ampoules	0.7	17.6
Propofol 2% injection 50ml	24	0	5 vials	0	0
Rocuronium injection 50mg	48	547	30 vials	2.8	67.5

and to prevent stockpiling. At the height of the pandemic in Europe, stockpiles of essential drugs were depleted and stock within the EU was under pressure from several countries. An example SITREP is shown in Table 1.

In order to create this SITREP table, it was necessary for members of the pharmacy purchasing team to conduct a stock count of critical drugs daily. This table was pivotal in informing clinicians of drug shortages, and clinical teams were very supportive to switching to alternative agents.

A SITREP for dialysis fluid and filter sets was also launched, as it became clear very early on that a substantial proportion of COVID-19 patients requiring critical care support were suffering from acute renal failure that required haemofiltration. Levels were assessed daily to inform clinicians of potential shortage issues. Haemofiltration bags were in very short supply and meetings were held regularly to discuss and monitor the use of renal replacement therapy and citrate haemofiltration was used as an alternative for non-COVID elective cardiac surgery patients. Nurses were supported where they were required to use unfamiliar products and, in some circumstances, additional electrolytes had to be added to bags. A risk assessment of adding high-strength potassium to these bags had to be undertaken rapidly between the pharmacy and clinical teams and gain approval by the Medicines Management Board, which would have taken longer, under normal circumstances.

A doubling of the fleet of nitric oxide machines and cylinders across both hospital sites was necessary as emerging evidence suggested that pulmonary vasodilatation may provide some benefit in the short-term to treat the complications of COVID-19 infection.

Intravenous therapies

Following discussions with the senior nurse management team, it was clear that nurses on the front line were having difficulties with the

demand for complex infusions due to the sheer volume and frequency of syringe changes. Pre-prepared drug syringes were outsourced to reduce nursing time in preparing commonly used parenteral medicines and to free up time for other clinical duties. The senior pharmacy management team were ready to deploy pharmacy staff to make up IV drugs on the ward, but the procurement of pre-filled syringes became a more viable option with a longer shelf life. Pre-filled syringes that proved very successful were magnesium injection 20mmol in 50ml, noradrenaline injection 8mg in 50ml and rocuronium injection 500mg/50ml.

Following discussion and approval between pharmacy critical care and clinical teams, other measures were taken to reduce intravenous drug burden and reduce reliance on drug infusion pumps by opting for medicines with longer half-lives (for example, pantoprazole IV 40mg od instead of ranitidine IV 50mg tds) and the administration of drugs as bolus/short infusions in favour of extended infusions (pip/tazobactam IV 4.5g over 30mins and meropenem IV 1g over 5mins instead of over 4 hours as per protocol). Novel ways to administer intravenous drugs in the same syringe, namely sedation, were also explored should the availability of infusion pumps become limited.

Amendment of controlled drug (CD) requirements

Temporary changes were made to the Medicines Management Policy to enable nursing staff to access CD in a more timely manner. The requirement for using the paper register to record entries of administrations was replaced with the use of the electronic register for critical care areas with automated drug cabinets.

The requirement for a second witness check was also temporarily removed for some CDs where a second check was undertaken as part of the administration process. This represented a huge challenge, particularly for a large number of staff re-deployed to critical care areas



unfamiliar with local procedures and availability of opioid and sedative agents. Additional guidance was frequently updated and circulated and support made available. Temporary changes were kept under regular review.

Any stock discrepancies which occurred during the height of the crisis were resolved in a timely manner by thorough scrutiny of the electronic CD register, dispensary records and paper CD orders. The main factor in the majority of discrepancies was due to unfamiliarity of a particular product line and subsequently it was decided to re-instate the second witness check. Positive user experience meant that electronic register could continue to be used to record CD transactions in automated drug cabinet areas in line with pre-existing project plans.

Psychological impact on pharmacy staff

The COVID-19 pandemic has caused significant loss of life and disruption in every walk of life. For pharmacy staff, it has represented the most intense and stressful time of their career, causing anxiety, near burnout and emotional stress. The critical care pharmacy team has had to deal with a very high number of critical care patients; other teams have re-modelled their services to care for their patients safely in the community and the procurement team have had to deal with very challenging drug shortages. Regular ward stock checks and monitoring of drug shortages to prevent interruptions in therapy were very time

consuming and stressful. Teams had to quickly adapt to latest critical medicine drug shortages and communicate this in a timely and effective manner. Coupled with daily uncertainty and an ever-changing landscape, few would argue that this pandemic has presented a situation like no other.

Reflection and conclusions

This challenging period of our careers has provided some positive developments to service delivery, that would normally take months or years to develop and implement. Some of the successes that can be celebrated include the use of virtual platforms for MDT and patient consultations and the use of IT to make processes more efficient, such as record keeping for CDs, ordering of parenteral nutrition and the use of electronic outpatient prescribing.

Information sharing between organisations across various specialties and regions (national and international) was pivotal to help hospital Trusts manage themselves effectively through different stages of the pandemic. Well-established critical care networks across north and south London were vital to update users on critical care bed capacity, guideline updates and drug shortages. As a specialist heart and lung institute, our specialist teams were able to provide advice to other centres on the use of anticoagulation, steroids and pulmonary vasodilators to treat the complications of COVID-19 infection.

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COVID and emergency care: a view from the UK

The UK's main initial preparations for the first COVID wave involved reconfiguring urgent and emergency care systems, increasing ICU and bed capacity, and enhanced infection control measures in healthcare. Concerns about sustainability in the long term are discussed

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In late 2020, less than a year after reports of a new virus first emerged from China, we are only just beginning to appreciate the potential impact of the COVID pandemic on healthcare in general, and on emergency care in particular. This view offers one perspective on our journey so far.

As information started flowing about the potential impact of COVID on emergency care, our initial preparations focused on:

- 1 Reconfiguring prehospital care and Emergency Departments (EDs)
- 2 Increasing and reconfiguring ICU capacity
- 3 Increasing general hospital bed capacity, and developing separate streams for COVID patients
- 4 Reconfiguring the wider system.

Initial thinking centred on what seemed likely to be an overwhelming surge of patients requiring hospitalisation, intensive care and/or ventilation.

For EDs, the focus was on protecting staff and patients and generating additional capacity, while maintaining core business. This primarily involved the adoption of more stringent IPC measures, and separation of flows so that patients deemed at higher risk of COVID were managed in cohorted areas or were treated in rooms deemed more suitable for aerosol-generating procedures (cubicles). In many departments, there was rapid adaptation of existing facilities, or co-located areas were subsumed into the ED footprint to help generate floorspace. In some departments, minor injuries and illness were moved off-site. Additionally, there was widespread development of ambulatory treatment or 'streaming' pathways designed to avoid admission. There was improved access to specialist teams, whose availability was in turn enhanced as a result of service reconfiguration and changes to working patterns.

There was considerable attention to generation of ICU capacity within hospitals, with early models suggesting the need for substantially increased numbers of ventilated beds. Additionally, much elective surgery was cancelled nationally to free up inpatient beds, and there was extensive redeployment of clinical teams to acute areas. These included the ED, ICU and inpatient medical floors. Arrangements to improve discharge of 'medically fit' patients from hospitals were introduced, designed to reduced 'delayed transfers of care.' In England seven 'Nightingale'

Hospitals were developed, mostly in convention centres, with an additional three hospitals in each of Wales, Scotland and Northern Ireland. These were intended to provide additional critical care capacity.

Underpinning the creation of additional capacity was a massive effort to increase the available workforce. This not only included redeployment, but also the early awarding of medical qualifications to final year medical students, deployment of nursing students to wards, and a call for volunteers from retired staff. There was extensive reorganisation of rotas with cancellation or postponement of what was deemed non-essential work. Regulators produced guidance designed to offer regulatory and legal protection for staff working outside of their normal scope. Planned rotations of medical trainees to different specialities, due in April for the final four months of the training year (August to August) were postponed so that staff were working in areas already familiar to them. Lockdown also resulted in the cancellation of most educational events and exams. This will of course require some unpicking down the line and regulators are working together with training bodies to do this.

Within the wider system there was attention to demand management strategies. Existing prehospital telephone services were developed as a source of enhanced remote clinical advice, with additional clinical support brought on-line. There was also a drive to introduce improved access to alternatives to hospital admission, such as ambulatory care (known as Same Day Emergency Care). Ambulance services focused heavily on prioritisation and the need for conveyance. Many specialties changed the way they delivered care to their most vulnerable patients, again through the use of virtual consultations. The increase in the use of telemedicine extended to many sectors in acute care, including fracture clinics, primary care and mental health services. There was also careful consideration around the value of hospital admissions and end-of-life care for some patients. Many of these changes were welcome, perhaps overdue, but they were implemented at pace and the normal safeguards to ensure they worked as intended may have been missing. In these cases, it is important to consider the changes carefully and adapt them where necessary.



When COVID did start appearing in hospitals, it was doing so contemporaneously with efforts to ramp up capacity. There was an early initial focus on ensuring that staff working in higher risk areas had access to adequate higher-level PPE, and that the risk to patients from cross infection was reduced. The basic pathways adopted in most organisations involved separation of patients more likely to have COVID. These patients were managed through higher risk areas until their COVID status was known, and those who were COVID positive were then treated in cohorted areas. There was also a need to ensure that access for patients needing the services of EDs and hospitals was maintained. These pathways have subsequently been improved and embedded, such that they are now part of routine NHS practice.

National lockdown was introduced in the face of rising infections. The impact of lockdown on demand for emergency care was profound, with significant reductions in attendances, although patients with more severe illness did continue to present. Possible reasons for this include changes in disease patterns or behaviour, patients being treated by alternative pathways, or anxiety over presenting to hospitals. The balance of each possibility is not fully understood, nor is the harm that may have arisen from delayed presentation for either emergency or less acute care. The impact of COVID itself was more variable, with some parts of the country much harder hit than others. The NHS as a whole was never completely overwhelmed, although some urban hospitals did reach full general and ICU capacity. Nightingale facilities were, in most cases, not required.

During the initial phase of the pandemic crowding disappeared from EDs. This is an observed phenomenon internationally and prompted emergency medicine leaders to call for improvement in the emergency care system to be made so that it did not return. In the UK, the Royal College of Emergency Medicine published 'COVID-19, Resetting Emergency Care' with this in mind.

Many organisations reported an improved sense of cohesion, and better collaboration between specialists and the ED. In addition, there was a reduction in bureaucracy and perceived barriers to innovation, with clinicians feeling more in-control. One might observe that the scope to leverage the organisational capacity of the NHS was demonstrated, with the entire national health service across four nations reorientated towards a single problem, whilst at the same time continuing to provide ongoing care for the population as a whole.

Information sharing, along with sharing of experience, was crucial. Within emergency medicine the introduction of video conferencing involving clinical leaders from across the nation has proved extremely valuable and is likely to continue into the future. International networking has also been improved in a similar fashion.

Lockdown eventually suppressed the first

COVID peak and has gradually been easing, although at the time of writing there is concern about rising cases. Demand for emergency care has steadily risen from its nadir and is returning to normal. There is concern that the phenomenon of ED and hospital crowding is threatening to return. There are considerable challenges ahead for the emergency care system, particularly as we enter winter with a predicted increase in respiratory illness. Primary care services are still adjusting to the current situation and calibrating what can be safely achieved through virtual consultation, and with the demands of face-to-face assessment of potentially higher risk patients. Similar challenges exist for mental health services. EDs and hospitals now have systems to deal with symptomatic patients, although developments in more rapid testing may help decision making. Acute hospital capacity is believed to be significantly reduced as the result of attempts to distance patients (for instance, by reducing the numbers of patients in shared bays), while elective services have restarted with a need to start reducing backlogs. There is also an imperative to ensure that patients leaving hospital to care and residential facilities are discharged safely with regard to potential contagion.

In the immediate future, the NHS is investing more in forward-facing facilities, with a view to increasing capacity. There is a drive towards improved triage and direction of patients seeking urgent and emergency care to reduce ED attendances and help patients find the best avenue to secure the help they need. There is also a focus on the use of ambulatory care and early specialist involvement in care to avoid admission. The biggest challenge remains around overall acute capacity and workforce, along with the ongoing need to make improvements in hospitals around acute flow, since the main driver of ED crowding in the UK remains exit block. ED crowding in the face of a highly communicable endemic disease, which is so dangerous for many of the patients likely to be in our departments, is even more unacceptable than it was before the pandemic.

Conclusions

COVID 19 has proved an immense challenge to the emergency care system in the UK. The speciality of emergency medicine has demonstrated its ability to adapt to change and work to continue providing care to its patients, whilst the acute care system on the whole has changed profoundly in the face of this threat. The effects will be long lasting, with some of the adaptations likely to become permanent. Although there is a tendency to focus on the technological innovations, it is how we use existing technology that is new. However, it is the changes in culture, resource, and process in our systems that will have the greatest long-term impact, and our ability to learn from mistakes, and embed the positive lessons, which will be the greatest measure of our determination to change.

Impact of COVID-19 on imaging services in the UK

Although imaging services are working hard to regain momentum by restoring capacity and regaining patient confidence, it remains clear that fundamental changes can only be made with significant investment to address the chronic underfunding in radiologists, radiographers, and imaging equipment

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At the beginning of full lockdown (23 March 2020 in the UK), elective imaging services virtually ceased overnight. Referrals from primary care were hugely reduced. There was a significant reduction in elective referrals from secondary care. Emergency referrals reduced drastically to those either with COVID-19 or those with immediate life-threatening emergencies, especially in surgery.

An unexpected bonus of this was that imaging backlogs were rapidly demolished. The imaging service functioned for the full benefit of patient care with reporting in real time aiding patient discharge and flow through secondary care. Changes in acute service delivery meant a more effective dialogue between senior clinicians with targeting imaging to the problem to be answered rather than the quickest imaging test available. This improved patient experience in that fewer, more relevant tests were done, to enable the patient to move forward on their pathway.

Infection prevention and control (IPC) measures in the form of personal protective equipment (PPE) and social distancing as well as deep cleaning of COVID exposed equipment significantly reduced the capacity and throughput of imaging across all modalities. In some geographies, where excess staff time was available due to reduced throughput, imaging staff were redeployed to medical wards to support acute COVID activity. In other geographies staff sickness rates and the requirement for shielding further reduced patient throughput.

In the UK, the aerosol generating nature of anaesthesia coupled with perceived poor outcomes for those patients developing COVID post-operatively, resulted in a shift of care from surgery to interventional radiology (IR). This was most marked in those hospitals with dedicated IR beds and/or day case facilities. This improved patient outcomes and experience with a reduced risk of nosocomial exposure to COVID.

With anaesthetic and intensivist time being taken up dealing with patients in intensive care (ITU), IR also provided an invaluable resource to assist in central venous line placement and effusion aspiration for the sickest of our patients. They also trained juniors from other disciplines in these procedural skills.

New protocols and guidelines to protect patients and clinicians

The main protection for patients and clinicians was the introduction of enhanced IPC measures, including social distancing and the use of PPE. Guidance on PPE was at times difficult to tease out for different clinical areas and presence of aerosol generating procedures (AGPs). Many medical special interest groups developed their own guidance, sometimes at odds with Public Health England (PHE) – government – guidance, leading to further confusion. Anecdotally, some hospitals did not feel that the imaging service was sufficiently patient facing to require PPE, which led to higher levels of infection amongst imaging staff than would have been expected, especially those in image acquisition. This was addressed in updated PPE guidance issued during the pandemic. Shortages of PPE were widely reported at the start of the pandemic but, for the health sector, were addressed at a reasonable pace, given global supply chain issues. The social care sector struggled throughout lockdown, but especially during the initial weeks, with PPE supplies.

Individualised risk assessments were introduced for staff groups including those who were pregnant, immunocompromised or had significant medical comorbidities. Generally, adjustments such as remote working were introduced for those high risk groups. The emerging understanding of the excess risk to Black, Asian and other minority ethnic (BAME) groups was wholly unexpected and required reconsideration of what being ‘at risk’ meant. Expansion of risk assessments with a further depletion of patient facing staff was necessary to protect those at highest risk.

Testing infrastructure and therefore capacity was poor initially and took a long time to reach levels able to assist positively with contact tracing and aiding restoration of elective services including imaging. To maintain ‘COVID-lite’ diagnostic spaces patients were requested to self-isolate for two weeks prior to having an imaging test (if possible) and undergo PCR swab testing 72 hours in advance of the test. Swab testing capacity is now at the required level. All NHS staff who wish to undergo antibody testing have been given the opportunity to do this.

Initially there was concern raised by surgical colleagues about poorer outcomes in patients



operated on who were, or subsequently became COVID positive. The Royal College of Radiologists (RCR) in conjunction with the surgical colleges developed interim guidance on preoperative chest CT imaging in those with an acute abdominal presentation. We went on to audit the outcomes for patients treated under this protocol, determine that it did not alter clinical judgement or patient outcomes so withdrew the guidance at the earliest opportunity.

Employment/adoption of new/existing technologies

Expansion of home reporting allowed the workforce to socially distance more effectively, reducing risk of COVID transmission. It also allowed those shielding or self-isolating due to viral exposure to contribute to maintenance of the imaging service. Unfortunately, not all NHS staff had access to sufficiently high-quality home reporting equipment or hospitals had sufficient IT bandwidth to support a massive increase in the number of remote workers. Home workers sometimes lacked sufficient IT bandwidth to report from home. Many hospitals invested in rapid deployment of equipment. Hospitals also invested in remote solutions for attendance at cancer multi-disciplinary team meetings (MDTs).

Training of junior colleagues has been hugely disrupted. Expanded access to home reporting for trainees has allowed vulnerable doctors to continue to support the service and gain the competencies to progress through their training. This challenge to our traditional model of training can be built upon to deliver high quality training throughout a region, reducing doctors' time spent travelling. Improved IT connectivity is necessary to fully realise the benefits of this. Networked reporting solutions also help with making maximal use of available radiologist time to report, but need to be supported with high quality IT.

High fidelity simulation has allowed IR, as well as other practical procedural training, to continue with risk to patients, staff and trainees mitigated to the fullest extent.

Artificial intelligence solutions looking to spot classical characteristics of COVID on chest CT scans are being accelerated through NHSX, including the necessary image sharing protocols. A national chest imaging database has been set up, with input from the British Society of Thoracic Imaging (BSTI), hosted by NHSX, to allow training and validation of COVID related algorithms.

Summary of impact and key learning points

As with everywhere and everything else, the impact of COVID on imaging services has been massive. Time needs to pass for the full impact to be demonstrated. Improved access to home reporting coupled with better IT connectivity allow best use of limited radiologist time. Coupled with an acceptance of increasingly flexible working patterns, this should promote retention of the workforce, especially towards retirement age. With the current workforce shortage of at least 20%, the UK desperately needs to retain all competent radiologists within

the workforce. All measures which assist this need to be supported by all employers as well as government.

New ways of working remotely, including providing training, have been rapidly adopted proving the flexibility and adaptability of the workforce.

The impact on patient care and outcomes from IR procedures has been demonstrated. The ability to treat patients under mild sedation, avoiding the risk of anaesthesia, with same day discharge have proven that investment in a sustainable IR workforce is both clinically and cost effective.

As with all aspects of life, turning off a service is much easier than turning it back on. The chronic underinvestment and subsequent lack of capacity in UK imaging services has been revealed, especially in the relative slowness of service recovery.

Regaining momentum post-pandemic

In the UK, there has been a significant amount of discussion around how best to regain momentum. Nationally, this work has been titled "service restoration". Restoration of imaging services is complex and multi-factorial covering issues related to baseline demand for imaging as well as the necessary "catch-up" of imaging requests paused during the pandemic. Prior to the pandemic imaging services in the UK suffered from chronic underinvestment with a lack of capacity in both image acquisition and reporting. These were related to significant workforce, but also equipment shortages. Coupled with new IPC measures, especially social distancing of 2m in all healthcare settings, these shortages have meant current CT capacity at the time of writing is 40 - 70% of pre-COVID levels. MRI is slightly better at 80%. Prior to the pandemic, timely image reporting was a greater problem than image acquisition. Post-pandemic image acquisition is the main bottleneck in the imaging pathway. An investment in extra equipment would aid restoration but not without matched funding to support workforce expansion in both radiographer and radiology staff.

Patient attendances to primary care (the main route into diagnostic pathways) remain below the expected pre-pandemic level. The urgent suspected cancer referral pathway has recovered to 75% of expected in July (compared with 30% nadir in April), but there is still a cohort of patients who have worrying symptoms who are not utilising the health service as expected. The outcomes for patients, for cancer and other potentially life-threatening conditions such as cardiovascular disease, are likely to be negatively impacted for some time to come. There was a media campaign running to assure the public that NHS services are 'open for business' and to encourage those with worrying symptoms to seek healthcare advice.

At the end of July, the shielding restrictions on the most vulnerable patients - the elderly and those with significant underlying health problems - were lifted. These patients had been encouraged to stay at home since March, with allowance of outside exercise not being recommended until June. Some patients,



especially the elderly and most clinically vulnerable, remain worried about attending hospital to undergo imaging tests. In the UK, the majority of imaging equipment is located in acute hospital settings. A media campaign on the safe practices adopted by imaging departments to ensure patient safety is also running in the UK at present.

The NHS has retained (at time of writing) extra independent (private) sector capacity in some areas of the country. This is enabling development of 'COVID-lite' or 'COVID minimal' hubs for diagnostic procedures, including imaging, endoscopy, and low risk elective surgery. In some hospitals mobile CT scanners are being deployed to support on-site 'COVID-lite' areas, maximising image acquisition capacity.

Reduced capacity has shone a light on appropriateness of imaging investigations. This has become more, not less of a problem, as remote consultations for patients in both primary as well as secondary care become the accepted default position. The relative difficulty in examining (or in some cases just seeing) a patient has meant clinicians are anecdotally more likely to request imaging as a result of a consultation. RCR has, for many years, been encouraging the NHS to deploy iRefer, a web

tool, which highlights the evidence base for requesting imaging. We have, with partners, launched a clinical decision support software version of iRefer, which is inter-operable with electronic imaging order comms, enabling best use of limited resources. The RCR have also supported the national Evidence Based Interventions programme looking at, amongst other procedures, which imaging tests were of no or limited clinical utility for various clinical presentations.

Prior to the pandemic, the NHS was looking at establishing rapid diagnostic centres (RDCs). The need for 'COVID-lite' diagnostic spaces to maximise available capacity has shifted this toward the development of Community Diagnostic Hubs. These require extra funding in terms of buildings and equipment as well as staffing but are an attractive solution to expand capacity in a way that maximises patient safety and confidence in the COVID endemic era.

Although imaging services are working hard to regain momentum by restoring capacity and regaining patient confidence, it remains clear that fundamental changes can only be made with significant investment to address the chronic underfunding in radiologists, radiographers, and imaging equipment.

Examining the impact of COVID-19 on hospital provision: a rheumatologist's perspective

Associate Clinical Professor and Consultant Rheumatologist at Leeds Teaching Hospitals NHS Trust, Kulveer Mankia, offers his insight of how COVID-19 has affected clinical practice within his department

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How has the continuum of care and throughput been impacted by the pandemic?

According to Dr Mankia, a significant amount of a rheumatologist's clinical workload is undertaken in an outpatient setting where there is often a high turnover of patients. Prior to the pandemic, the department held large clinics, which typically included up to 40 patients who were seen every 15 or 20 minutes, with all of them seated in close proximity. As a consequence of the pandemic, all this changed, literally overnight, with routine face-to-face consultations suspended and moved to being largely undertaken remotely over the telephone. A further effect of the pandemic that had an important impact on the running of the service was how many of the clinical staff were re-deployed and Dr Mankia himself was tasked with working as a consultant on a general medical ward for a couple of weeks.

However, although the vast majority of consultations were undertaken remotely, it was still possible for urgent cases to be seen in the clinic. Nevertheless, an interesting phenomenon observed by Dr Mankia was the existence of a fear factor among patients, that occurred across all specialties and even led to lower attendance at Accident and Emergency departments. People were simply concerned about catching the virus and, in many cases, newly referred patients were happy to effectively 'sit it out' and receive telephone advice from a clinician, rather than visiting the department. However, this has led to increased pressure on certain services. For example, there has been a surge in calls to the rheumatology advice telephone line; this service, usually managed by clinical nurse specialists, has required significant additional support from consultants and other doctors.

Fortunately over the last few months, services have gradually re-opened and Dr Mankia felt that the department has reached a new equilibrium, whereby the stable patients, who under normal circumstances would be asked to attend the department for a review appointment, are instead being managed remotely. With protective measures in place in the rheumatology department, confidence has begun to return and more patients are being seen at the department although several precautionary measures are in place. For instance, those with an appointment are contacted a few days prior to their appointment

and asked whether they have any COVID-19 symptoms and are required to wear face masks at the department and seen by clinical staff in full personal protective equipment (PPE). The rheumatology department is therefore divided into areas where phone consultations take place and designated rooms in which patients can have face-to-face consultations. A downside to this approach is that fewer patients can be seen and appointment times have been extended, due to the need for thorough cleaning of the consultation rooms between each patient and to give time to clinicians to change their PPE.

What new protocols or guidelines were deployed to protect patients and clinicians during the pandemic?

At the start of the pandemic, Dr Mankia explained how the Leeds Teaching Hospitals NHS Trust developed PPE guidance for clinical staff although specific guidance for patients has evolved over time. Initially, the British Society for Rheumatology (BSR) produced guidance for members, as many patients with rheumatological conditions were prescribed immunosuppressant therapy and were thus presumed to be at high risk from the virus. The consultant body at Leeds developed an algorithm adapted from a risk stratification document originally produced by the BSR and the algorithm is now available on the Leeds Teaching Hospital Rheumatology website. This allows patients to check for themselves as to whether they should be shielding or socially distancing based on their individual circumstances. Interestingly, Dr Mankia noted that the Trust's guidance has been used by other hospitals and can even be seen on YouTube, although Leeds has been cited as the original source.

While initially most consultations were conducted via phone, some video consultations were undertaken by some staff either in clinic rooms at the department or even from home. This was particularly useful for members of staff, who for various medical reasons, were themselves required to shield. Video conferencing also became the new platform for multi-disciplinary team (MDT) meetings, case reviews and educational meetings.

The pandemic forced a re-think in many areas of medicine and, as Dr Mankia explained, there was an urgent need to triage patients and



ensure those with the most urgent cases could access services in a timely manner. For a speciality such as rheumatology, it was case of adapting to achieve a balance that you think will work. For example, some rheumatology care has been delivered remotely provided that staff have access to information such as blood test results. Moreover, the chronic nature of many rheumatological conditions mean that talking to the patient about their symptoms, and any possible treatment-related side-effects, is an extremely useful part of the assessment process. Nevertheless, remote consulting is not perfect and there will be plenty of instances where a patient is having problems or experiencing a disease flare which requires that they are seen and examined due to the obvious difficulty of remotely assessing the extent of joint inflammation.

How would you summarise the impact of the pandemic and what are the key learnings?

Perhaps the most important thing is that the departmental team have all worked together and managed to adapt and transform a service that had been established over many years in response to the pandemic. Dr Mankia also believes that the pandemic has highlighted to staff that remote consultations could work for stable patients and that even if the pandemic were to disappear tomorrow, it is possible that remote consultations, for some patients, would remain. However, the long-term implications of such changes on patient care would need to be considered carefully.

Challenges posed by the pandemic

One of the more challenging aspects of the pandemic, which has required a lot of thought, has been the modification of practical services such as ultrasound and joint injection clinics. The ultrasound service requires staff to be in close contact with patients for three to four hours per session and was thought to be one of the higher-risk practices in rheumatology. Factors that needed to be considered ranged from the size of the room in which the ultrasound scanner was housed, current levels of ventilation, the need for before and after cleaning of equipment, even down to where patients would have to sit and wait before their scan. While it was relatively straightforward to simply move the ultrasound scanner to another room with sufficient ventilation, appointment times have had to be extended to allow for cleaning between patients. A further difficulty created for clinicians and patients was that immediate 'ad hoc' scans were no longer possible. Whereas in the past, if a clinician felt that a patient needed a scan, this could happen after their consultation; now, all of these requests have to be planned and the department has had to create a new standard operating procedure for the ultrasound service.

Though there has been a clear impact on the number of scans than can be performed at any one time, a further difficulty highlighted by the pandemic has been how staff receive training on use of the ultrasound scanner. Ultrasound training, by its very nature, requires a 'hands-on' approach that invariably involves a degree of

closeness with a trainer as the trainee needs to be able to read a scan on the screen to interpret the data and has to become familiar with how to operate the machine. During the pandemic, such practical training was no longer possible and is in the process of being re-designed to include a significant amount of online teaching including demonstration videos.

Rheumatology departments also provide joint injection clinics for patients and these have also reduced, although as Dr Mankia found, early in the pandemic, many patients were initially reluctant to visit the hospital and made the decision to try and manage for longer periods of time between injections. Again, this procedure has required a lot of thought because it involves close contact with patients.

Dr Mankia says how navigation through the department has changed radically because of the pandemic and is carefully structured with patients only brought in if they have a specific appointment and that relatives are no longer allowed in the same area. Patients are seated outside the specific room for their appointment and then leave the department. Overall, he feels that face-to-face consultations have reduced considerably and in fact currently, even new referrals are initially contacted by telephone to discuss their symptoms. With access to the GP records, relevant blood tests and the patient history, Dr Mankia felt that a diagnosis can sometimes be made armed with these facts. However, in many cases a physical examination is required and the patient will need to be seen in person.

One of the key learnings from the pandemic has been that the conventional model in which every patient consultation had to be face-to-face may be adapted and clinicians are now very much in tune with new ways of managing patients. Furthermore, there are possible benefits for those patients who are stable and for whom regular blood tests and monitoring are performed, in that they might no longer need to travel to the hospital for some routine appointments.

How quickly do you anticipate regaining momentum post-pandemic?

Dr Mankia thought that many of the changes implemented as a consequence of the pandemic could remain in place and that it was not really a question of regaining momentum to go fully back to the old way of working. It was highly probable that the department would continue with some virtual MDT meetings and, as he pointed out, interestingly, more people can attend these compared with the original face-to-face meetings. Both case discussions and academic educational meetings have been successfully delivered via a virtual platform and a proportion of these may continue to be done remotely. He thinks the pandemic has forced the pace of change, not just in rheumatology but in different specialties, as witnessed from discussion with consultant colleagues. Out of necessity, most colleagues in other clinical areas appear to have embraced the new mode of working and patients seem to be adapting to this as well.

Impact of COVID-19 on rheumatology services in Italy

Among clinical specialties, rheumatology has been at the epicentre of COVID-19 since the earliest phases due to five pivotal observations, spanning from insights into the disease pathogenesis to organisational opportunities

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As of 10 May 2020, there were reports of over 4 million cases of SARS-coronavirus-2 disease (COVID-19) worldwide with 218,000 cases diagnosed in Italy, one of the most affected countries especially in the first three months of the pandemics.¹ Cases of pneumonia of unknown origin were first reported from the Hubei Province in China and later defined COVID-19 in association with the infection by SARS-coronavirus-2. Approximately 20% of cases develop severe respiratory symptoms and may require invasive or non-invasive ventilatory support with variable mortality rates. Two hospitals from the Humanitas Group that we represent (that is, Humanitas Clinical and Research Hospital and Cliniche Humanitas Gavazzeni) are located in two of the highest-impact cities (Rozzano and Bergamo, respectively) in Northern Italy and were designed with a strong surgical vocation. While both organisations were significantly affected by the pandemics, the Humanitas Clinical and Research Hospital is the larger Institution and had to develop organisational changes rapidly. By 8 March 2020, all non-emergency admissions and outpatient visits were suspended. In fact, between 1 March and 17 May 2020, a total of 736 COVID-19 patients were admitted to the Humanitas Clinical and Research Hospital; of these, 482 were dismissed and 165 patients died, mostly due to respiratory failure. The treatments proposed for COVID-19 remain merely supportive as the main cause of death is in fact a severe acute respiratory distress syndrome² with biochemical features resembling acute inflammation, including a progressive increase in C-reactive protein, ferritin, interleukin-6, and D-dimer.³ Based on the viral aetiology and the hyperinflammatory state, proposed agents to treat COVID-19 have included immunosuppressants such as glucocorticoids,⁴ anakinra,^{5,6} and baricitinib,⁷ immune modulators such as hydroxychloroquine,⁸ and direct antivirals,⁹ cumulatively with inconclusive results. Our effort in treating a large number of patients in Bergamo and Rozzano is mirrored by one of the earliest and largest studies on the use of tocilizumab, a monoclonal antibody targeting the interleukin-6 receptor, to treat inflammation in COVID-19.¹⁰ In an ancillary study, we addressed the issue of predicting the response to tocilizumab in patients with COVID-19 and

utilised, for the first time, a supervised machine learning approach of artificial intelligence and we are currently validating our observations (*unpublished data*).

The five reasons that make rheumatology a privileged point of observation on COVID-19

Among clinical specialties, rheumatology has been at the epicentre of COVID-19 since the earliest phases due to five pivotal observations, spanning from insights into the disease pathogenesis to organisational opportunities. These observations, indeed, well represent the challenges provided by the new condition and our responses may suggest new ways to address these challenges in other areas.

First, our understanding of the pathogenesis and treatment of rheumatic diseases has been central to understand the uncontrolled amount of literature on COVID-19. In late April 2020, it was estimated that the COVID-19 literature had grown to more than 31,000 papers since January, the biggest explosions of scientific literature ever.¹¹ We have discussed that SARS-Cov-2 triggers a vigorous inflammatory response, as represented by the high levels of interleukin-6, especially in older subjects, and this is similar to what observed in the chronic inflammation associated with rheumatological conditions, particularly rheumatoid arthritis.¹² Nearly all anti-rheumatic drugs, that is, tocilizumab, glucocorticoids, anakinra, and hydroxychloroquine, among others, have been proposed to treat COVID-19. It has been hypothesised that patients with rheumatic diseases who were already receiving these medications might be at either higher or lower risk of developing a severe infection, based on the apparent opposing factors of the ongoing immunosuppression versus a potential protective effect of the drugs.

The second issue is that patients with immune-mediated chronic diseases, including rheumatic conditions such as arthritis (that is, rheumatoid or psoriatic arthritis, ankylosing spondylitis) or connective tissue diseases (that is, systemic lupus erythematosus, Sjogren syndrome, systemic sclerosis, and myositis) had to be considered as fragile individuals that had to be strongly advised to avoid being infected by SARS-Cov-2. To address these two questions, we analysed the data from the Humanitas Immuno Center, which coordinates the clinical



and research activities of gastroenterologists dedicated to inflammatory bowel diseases, dermatologists dedicated to psoriasis and atopic dermatitis, allergologists, and rheumatologists. Out of approximately 10,000 patients being followed for such immune-mediated inflammatory diseases, we identified only 41 patients who had COVID-19 infection and evaluated the factors associated with a more severe respiratory impairment or death. Our data showed that comorbidities, particularly hypertension, diabetes, obesity and chronic lung disease, were the factors increasing the risk of hospitalization and the need of oxygen supplementation while supporting using extra caution when patients were receiving glucocorticoids. Our most important conclusion, however, was that an ongoing biologic therapy is not associated with a worse pattern of COVID-19 infection,¹³ as also confirmed in other Italian cohorts.¹⁴

The third issue is that rheumatic diseases are largely viewed as non-emergency conditions and this has led to the cancellation of nearly all the scheduled outpatient appointments during the COVID-19 pandemics. In the case of the Humanitas Clinical and Research Hospital, a total of 544 rheumatological outpatient visits took place between 1 March and 17 May 2020, compared with 2759 performed in the same period of 2019, with an 80% decrease. At the same time, six out of nine physicians from the Division of Rheumatology were dedicated full time to attending inpatients, particularly within the COVID-19 wards, and coordinating the investigational use of anti-rheumatic drugs. Starting 17 May 2020, we could re-open non-emergency services and 1100 patient visits were rescheduled between 1 June and 1 September, 2020. The rescheduling had to consider the new rules of outpatient physical presence in the hospital (which limited the efflux to the premises and thus required a longer time allocated for each visit) as well as the previously scheduled appointments, thus requiring a dedicated task by our Operations division.

Fourth, there was the need to reach out to patients with rheumatic diseases to address their numerous questions regarding the need to continue or withdraw chronic treatments or the possible shortage of the anti-rheumatic treatments that were in use for COVID-19. Since the earliest phases of the pandemics, we received a growing number of inquiries by patients from our Division or being followed at other hospitals, especially asking whether they could continue taking their rheumatological medications or should withdraw. The Italian Society of Rheumatology was one of the first National societies to provide a clear guidance against stopping medications, based on the assumption that an inflammatory flare would have been characterized by the need for strong immunosuppression and thus a higher risk from COVID-19 infection.¹⁵ Together with four other academic Rheumatology Centres in the Lombardy region, we signed a letter to all patients which was disseminated by the local patient support organisation (ALOMAR) to prevent patients from stopping their treatments

in the absence of signs of COVID-19. The Italian recommendations were then followed by the same messages provided by the American College of Rheumatology and the European League Against Rheumatism (EULAR). At a local level, a dedicated telephone line was activated to answer the patients questions and an average of 20 calls was received daily. The Divisional email address also continued to be accessible for patients to send inquiries and all messages were answered within the same day. Of note, we became aware of a very small number of cases in which patients could not find their usual medications due to a COVID-19-related shortage, which could be expected due to the widespread use of hydroxychloroquine for example to treat or prevent the infection, an assumption that was not supported by experimental data. The hospital pharmacy was proactive at contacting patients receiving biologics to provide the home delivery of refills.

Fifth, and last, considering the chronic nature of rheumatic diseases and the often non-invasive evaluations, rheumatology might be an ideal playing field to experiment the potential of teleconsultations. While physical examination remains crucial to the rheumatology practice, the natural history of chronic inflammatory diseases includes phases of activity (flares) alternating with phases of remission or low disease activity. In the former case, the therapeutic target is not reached and a tight control of patients, with frequent visits requiring physical examination, is recommended. However, if the patient condition is under acceptable control (very low or minimal disease activity or remission) visits can be scheduled with lower frequency. In these cases, teleconsultations represent an ideal option to minimise the risk related to hospital visits and reduce the inconvenience of long commuting, particularly for patients living in other regions throughout Italy. During the COVID-19 pandemics, one rheumatologist from our group started teleconsultations one day a week with very encouraging, yet preliminary, results. We envision that an integrated approach using telemonitoring of disease activity through a dedicated app that is being developed for our patients and the possibility of teleconsultation would be an ideal method to select the patients eligible for this new tool. The availability of such monitoring app would be also central to a more accurate real-time monitoring of infectious events, including COVID-19, in patients with chronic diseases.

What rheumatologists learned or should have learned from the pandemic

The COVID-19 pandemic hit our hospitals very hard and affected the practice of medicine and rheumatology significantly. As we were all involved at different levels in the care of patients with COVID-19 without abandoning patients with chronic diseases, we learned several lessons that will impact our future practice:

1 Immunology is key to medicine, well beyond chronic inflammatory diseases; as well represented by the use of immunomodulators in COVID-19, we should never overlook the role of



the immune system in the development of disease;

2 Rheumatological patients are well aware of the possible implications of their disease and the ongoing treatments; informing patients and making timely recommendations available is crucial in the management of a health crisis such as the COVID-19 pandemics;

3 Patients with immune mediated inflammatory diseases know how to behave in a storm; we have observed very few treatment discontinuations and very few cases of COVID-19 among our patients;

4 Patients with rheumatic diseases need to have a quick and reliable access to the rheumatologist to obtain information in case of symptoms of infection, as well as other issues which primary care physicians prefer not to address;

5 Logistical difficulties in getting biologics

(distributed by hospital pharmacies) or other drugs (that is, hydroxychloroquine) due to the requests for COVID-19 need to be foreseen and overcome with innovative processes, such as the home delivery of drugs, which allow continuity of treatment and reduce the need for hospital access;

6 A new paradigm is needed for the long-term care of patients with rheumatological diseases; chronic diseases with an intermittent activity are ideal settings to establish a combination of telemonitoring, teleconsultations, and physical examination when needed;

7 New tools, including artificial intelligence, an organisational effort from hospital administration to adapt, and a data-driven approach to new scenarios, are key to the appropriate treatment of chronic diseases in a setting of limited resources and uncertainty.

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