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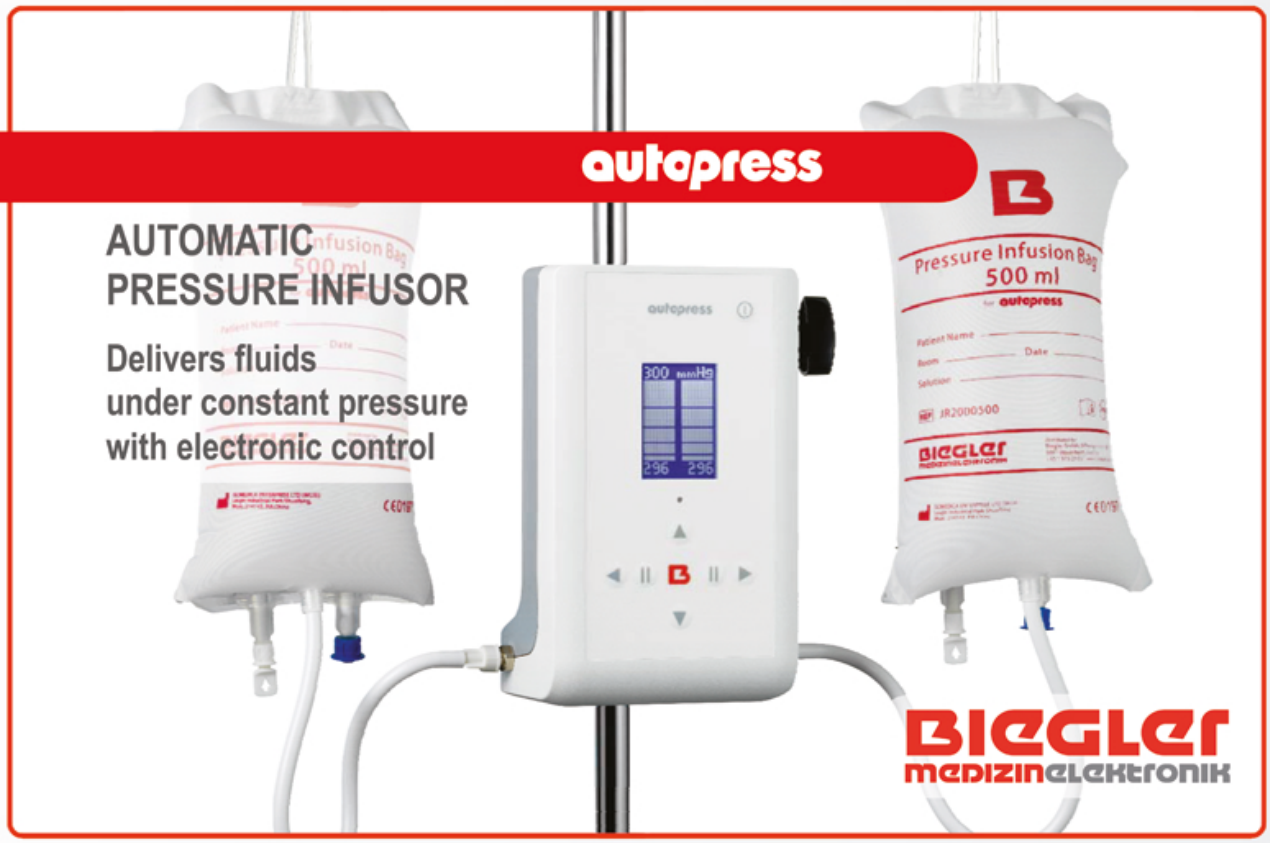

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HELPFUL TIPS

Given the current situation worldwide, we warmly invite you to check trade shows dates, venues and booths location listed in this magazine

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Digital Transformation. All About the Customer, Not Technology

The COVID-19 pandemic has heightened several kinds of uncertainties, but one trend has become clear: it has vastly accelerated digital adoption. All you need to do is search "digital transformation of the economy" to quickly find data demonstrating the rapid pace at which digital transformation is happening. McKinsey, the US global management consulting company, released a study showing that the rates of adoption are years ahead of the average rate, stating that "respondents are three times likelier now than before the crisis to say that at least 80% of their customer interactions are digital in nature." Forbes similarly cited a study reporting that 79% of executives said COVID-19 increased budgets for digital transformation. But, if we dig deeply into micro, small, and medium-sized enterprises around the world that have relied on face-to-face interactions to do business and now have to adapt at a rapid pace, when internet access is limited, and the costs of digital tools may be prohibitively high, suddenly we realize that technology has turned into a source of inequality and vulnerability. Yes, because in spite of the myriad benefits of digital operations, the fact remains: digitizing business operations is demonstrably hard. Over 70% of digital transformations fail, according to research. Of those companies that don't fail, only 16% see actual performance improvement. Companies cannot afford that kind of waste of money.

Because when it comes to digital transformation, *digital* is not the answer. *Transformation* is. Technology does not provide value to a business. It never has, except for technology in products. Instead, technology's value comes from doing business differently because technology makes it possible.

On the other hand, companies cannot afford doing business-as-usual without digitizing some measure of their business either.

So, while more people are going full steam on digital transformation, can anyone really explain what it actually means? At a very basic level, the answer is simple: the much-used term simply means adapting an organization's strategy and structure to capture opportunities enabled by digital technology. This is not a new challenge after all, computers and software have been around for decades and have brought changes both to products and services and to how we make and deliver them. But the point I am making is that it has become increasingly difficult for a company to translate that answer into an action plan.

As sexy as it is to speculate about new technologies such as AI, robots, and the internet of things, the focus on technology can steer the conversation in a dangerous direction. Because when it comes to digital transformation, *digital* is not the answer. *Transformation* is. Technology does not provide value to a business. It never has, except for technology in products. Instead, technology's value comes from doing business differently because technology makes it possible. E-commerce is not about the internet – it's about selling differently. Analytics is not about databases and machine language algorithms – it's about understanding customers better, or optimizing maintenance processes, or helping doctors diagnose cancer more accurately.

Managers often think that digital transformation is primarily about huge new investments in technology. They might struggle to grasp what digital transformation actually means for them in terms of which opportunities to pursue and which initiatives to prioritize. Of course, technology change is involved–but smart companies realize that transformation is ultimately about better serving customer needs, whether through more-effective operations, mass customization, or new offer. For sure, change is involved, and sometimes radical replacements for manufacturing processes, distribution channels, or business models are necessary; but more often than not, transformation means incremental steps to better deliver the core value proposition. Your company shall continue to serve the same core customers even in the digital era. The challenge is to find the best way to serve those needs using digital tools.

The digital forces are clearly very revolutionary and powerful and can be frightening at times. But be assured, keep your focus on strategic transformation, not technology adoption, and you will get more powerful results. Understanding that digital transformation does not change the reason your business exists will help you identify the technologies you should focus on, without ending up running in a thousand directions.

Infomedix International spends its time and resources using and studying some of the greatest innovations and trends. I would personally never tell a company to avoid new technologies, and to ignore fast-emerging digital innovations. But I will continue to warn managers when I see a digital transformation conversation going in the wrong direction. Technology helps you do business differently, but the right strategy incorporates the right technologies for the right jobs. It uses high tech where those capabilities are important and low tech where a simple solution can do the job. And when technology is done right, it can help a company launch wave after wave of business innovation - innovation that becomes possible as new technologies become real.

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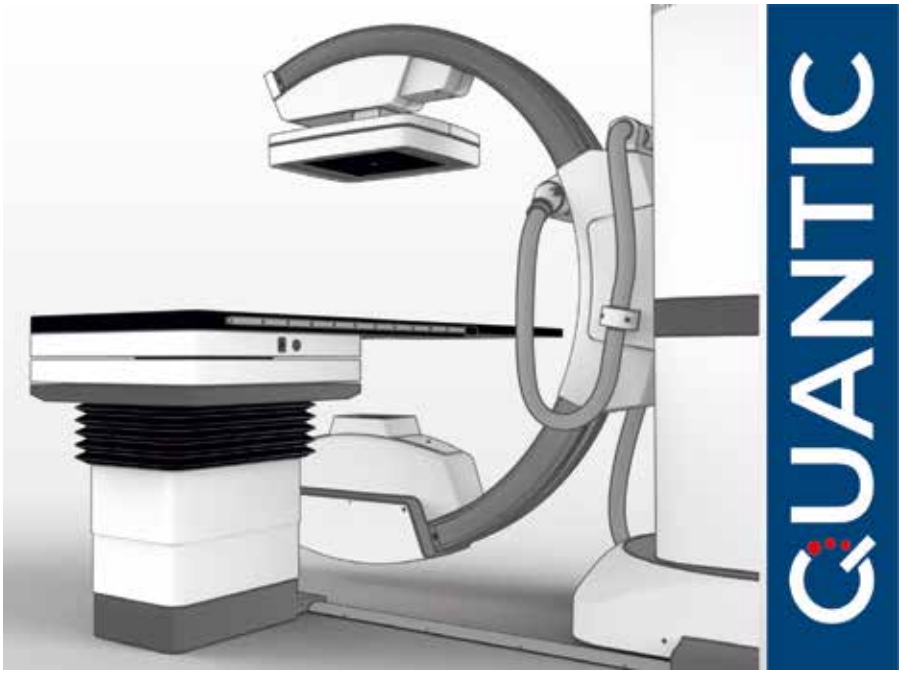

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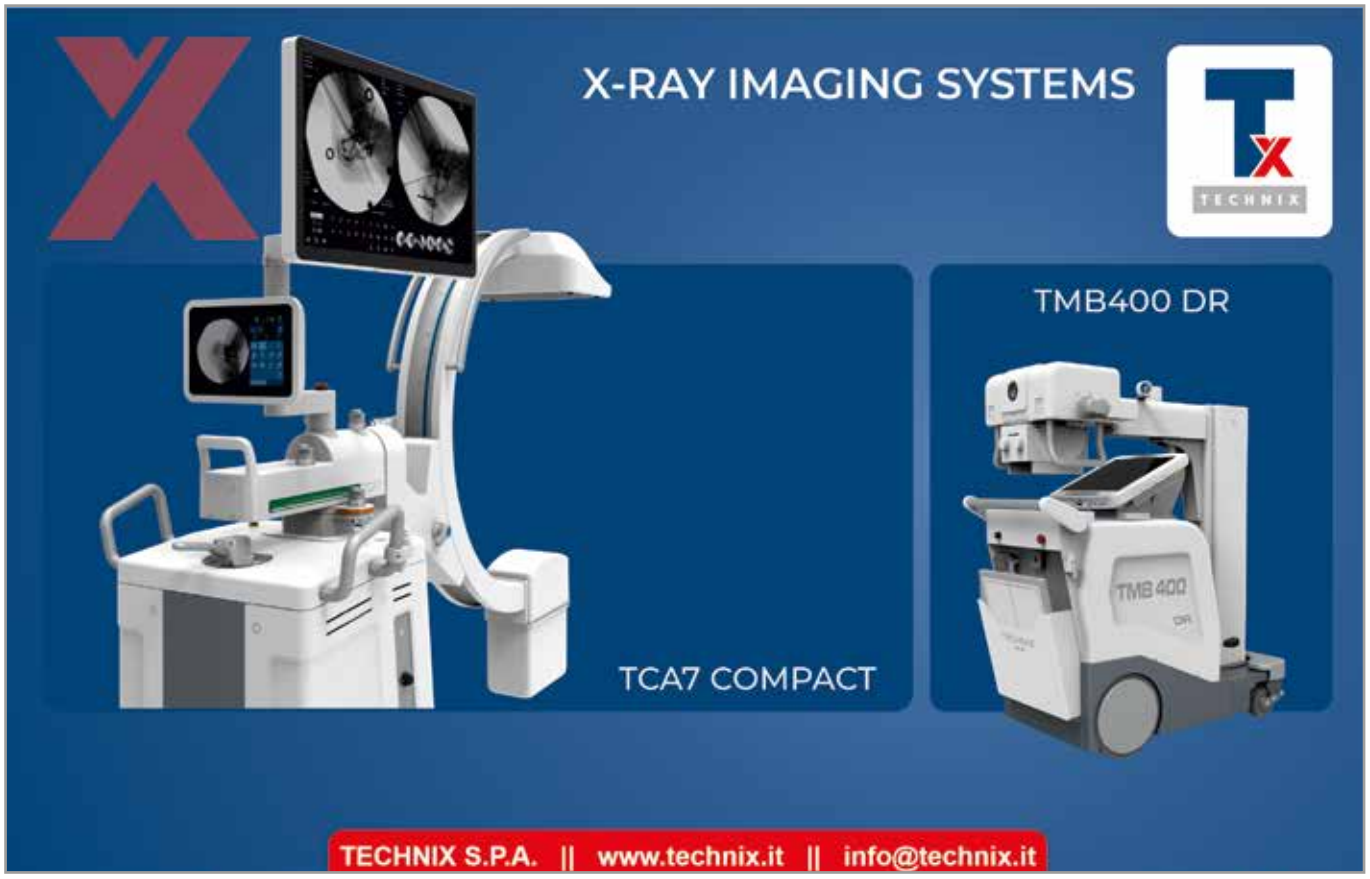

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IBA and SCK CEN Join Forces to Enable Production of Actinium-225

Collaboration marks first step in evaluating the potential of the rapidly growing theranostics market

September 17, 2021 – IBA (Ion Beam Applications S.A., EURONEXT), a world leader in particle accelerator technology, and SCK CEN (Belgian Nuclear Research Center) announced a strategic R&D partnership to enable the production of Actinimum-225 (225Ac), a novel radioisotope which has significant potential in the treatment of cancer.

New perspectives in the treatment of cancer

Nuclear medicine has evolved considerably over recent years with the emergence of radiotheranostics, a modality which combines targeted diagnosis and therapy with radio-isotopes, offering an important alternative in the treatment of many cancers. Radiotheranostics is based on the use of radio-isotopes which, when they disintegrate, emit radiation that enables cancer cells to be precisely located and/or destroyed.

Actinium-225: fighting both prevalent and rare cancers

Among these isotopes, one of the most promising is alpha-emitting Actinium-225. This is due to its useful characteristics: in its decay, it kills cancer cells, having high cytotoxic potency within a very short range (limited to few cancerous cells while sparing surrounding healthy tissues). Moreover its half-life (10 days) enables a smooth process for logistics and centralized distribution. To date, extensive research and numerous studies are underway which aim to tackle both high prevalence cancers including prostate, lung, colon, breast, pancreatic, blood (leukemia and other rare forms) and kidney cancers, but also rarer forms of cancer like glioblastoma, the deadliest form of a very invasive brain cancer. One of the main challenges to making this therapeutic solution accessible for the greatest number of patients is ensuring the availability of high-quality Actinium-225 in large quantities. By joining their unique expertise and resources, SCK CEN and IBA will be able to work towards the large-scale production of Actinium-225 for patient use. Concurrently, this collaboration will allow them to establish themselves as leading global partners in the production of Actinium-225.

A new generation of nuclear medicine

This strategic R&D partnership consists of an in-depth evaluation of the technical and economic feasibility of the project. Based on the outcome of this first phase, SCK CEN and IBA plan to undertake the construction and commissioning of a production unit on the SCK CEN site in Mol, Belgium.

Alignment with Belgian coalition agreement and European recovery plan

This collaboration highlights the implementation of the Belgian coalition agreement, which pledges significantly more and better cancer treatments and confirms Belgium's leadership at the forefront of nuclear medicine. It is supported by Pierre-Yves Dermagne, Belgian Deputy Prime Minister and Minister of Economy and Employment, Tinne Van der Straeten, Belgian Minister of Energy, and Thomas Dermine, Belgian State Secretary for Recovery and Strategic Investments. This initiative is also in alignment with the recent European recovery plan for Belgium – a plan in which the European Commission designated Lutetium-177 and Actinium-225 as promising isotopes. "We are excited to join forces with such a prestigious and highly experienced partner as SCK CEN," said Olivier Legrain, CEO of IBA. "Considering our global leadership and long-standing expertise in nuclear medicine and proton therapy, we see theranostics as an important addition to our portfolio of activities in the fight against cancer. We look forward to taking the first steps in evaluating the strategic growth potential in this significant new market." Eric van Walle, Director General of SCK CEN, commented: "Theranostics have the potential to revolutionize the way we treat cancer. By partnering with IBA, we can use our nuclear knowhow to transform isotopes meant to become radioactive waste into therapeutic compounds. Our complementary expertise will enable us to work towards providing the greatest number of patients with the benefits of this latest generation of nuclear medicine."

"I am particularly pleased with this unprecedented partnership between two key players with unparalleled expertise," said Pierre-Yves Dermagne, Vice Prime Minister. "This research partnership has promise for the future. One of the two players is recognized worldwide (SCK CEN, a federal research center), while the other is a worldwide leader in the particle accelerator industry (IBA). This union will make it possible to treat patients much more effectively," notes Pierre-Yves Dermagne. Tinne Van der Straeten, Minister of Energy, stresses the importance of this project and the expertise of both partners. "Belgium wants to remain a world leader in the production of medical isotopes. Therefore, we have provided support in the framework of the European recovery plan to allow SCK CEN to innovate in the field of therapeutic radiopharmaceuticals. SCK CEN and IBA are combining their extensive expertise into this R&D partnership to collaborate on isotopes that can be used in moretargeted cancer treatments. I am delighted to support these developments in Belgium and watch them grow." "This strategic R&D partnership is one of the first concrete results of the recovery plan, which allocates a total of more than EUR 800 million additional resources to research and development," explained Thomas Dermine, State Secretary for Recovery and Strategic Investments. "Together, SCK CEN and IBA are stepping up the fight against cancer. This is an excellent example of how our country can play a key role in the development of future technologies and techniques worldwide. The medical application of radioisotopes is an area of global excellence for Belgium that the recovery plan aims to consolidate."

For more information:
www.iba-worldwide.com

Source: taken from https://www.itnonline.com/content/iba-and-sck-cen-join-forces-enable-production-actinium-225

Researchers Create A QIBA Profile For Cartilage Compositional Imaging

Sept. 7, 2021 - New recommendations will help provide more reliable, reproducible results for MRI-based measurements of cartilage degeneration in the knee, helping to slow down disease and prevent progression to irreversible osteoarthritis, according to a special report published in the journal "Radiology".

Osteoarthritis is the most common type of arthritis, with a prevalence of more than 33% in adults older than 65 years. It exacts a major toll on society in the form of costs related to pain, disability, and reduced quality of life. There is currently no way to cure or reverse it.

MRI-based cartilage compositional analysis is a promising tool for revealing biochemical and microstructural changes in the early stages of osteoarthritis. Two advanced MRI techniques,

T1rho and T2 mapping, have been established for assessing cartilage composition. T2 mapping is the only one currently available commercially. While the techniques are promising, clinical applications have been limited.

"The issue with these compositional cartilage imaging measurements is that the reliability and reproducibility of the numbers are not great," Dr. Chalian said. "They can be different from one scanner to another or when you use the same scanner at different times."

To address these shortcomings, Dr. Chalian and his colleagues from the Radiological Society of North America's (RSNA) Musculoskeletal Biomarkers Committee of the Quantitative Imaging Biomarkers Alliance (QIBA) collaborated to create a QIBA profile for cartilage compositional imaging. They analyzed major publications in the field and made several important determinations. First, they found that cartilage T1rho and T2 values are measurable with 3T MRI with a variation of 4% to 5%. "This is very important because it could expedite clinical trials, allowing them to be based on a smaller sample size," Dr. Chalian said.

By the time there is structural damage to the cartilage, treatment choices are very limited. We cannot treat the damaged cartilage, and we cannot prevent osteoarthritis because the cartilage is not going to regrow."

Majid Chalian, M.D., paper coauthor, assistant professor of radiology and section head of musculoskeletal imaging and intervention, Department of Radiology, University of Washington, Seattle

The committee also determined that a measured increase/decrease in T1rho and T2 value of 14% or more indicates a minimum detectable change, which can be used for defining response/progression criteria for quantitative cartilage imaging. If only an increase in T1rho and T2 is expected, as is the case with progressive cartilage degeneration, then an increase of 12% represents a minimum detectable change.

"There was no generally acceptable cut-off for T1rho and T2 values for research and clinical use," Dr. Chalian said. "Now we can say that if you image one knee and then do follow-up imaging in two years using the same technique, and you have a 14% change in T1rho and T2 value of the cartilage, that's actually a meaningful change."

The new profile is an important step toward early detection of cartilage abnormalities when treatment is effective. Through lifestyle modification and therapeutic drugs, patients with knee pain and athletes recovering from injury could avoid structural damage and osteoarthritis.

"Based on these numbers, we can say whether the cartilage is abnormal and prone to degeneration," Dr. Chalian said.

Now that the profile has been generated, the researchers hope to facilitate clinical applications by promoting a move from manual segmentation of the MRI sequences to a much faster and more efficient automated approach. There are several machine learning applications for automatic cartilage segmentation that are promising, according to Dr. Chalian.

"We are hoping that a machine learning approach can segment out the cartilage, and then we can apply this profile on the segmented cartilage so that we can make things go fast in busy clinical settings," he said.

Launched by RSNA in 2007, QIBA aims to improve the value and practicality of quantitative imaging biomarkers by reducing variability across devices, sites, patients, and time and to unite researchers, health care professionals and industry to advance quantitative imaging and the use of imaging biomarkers in clinical trials and clinical practice.

Source: Radiological Society of North America. Journal reference: Chalian, M., et al. (2021) The QIBA Profile for MRI-based Compositional Imaging of Knee Cartilage. Radiology. doi.org/10.1148/radiol.2021204587. Article taken from https://www.news-medical.net/news/20210907/Researchers-create-a-QIBA-profile-for-cartilage-compositional-imaging.aspx

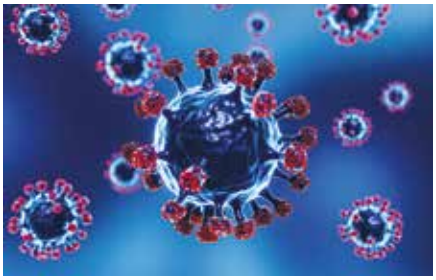
Hospitals Use Artificial Intelligence To Predict Covid Patients' Oxygen Needs

Addenbrooke's Hospital in Cambridge along with 20 other hospitals from across the world and healthcare technology leader, NVIDIA, have used artificial intelligence (AI) to predict Covid patients' oxygen needs on a global scale.

The research was sparked by the pandemic and set out to build an AI tool to predict how much extra oxygen a Covid-19 patient may need in the first days of hospital care, using data from across four continents.

The technique, known as federated learning, used an algorithm to analyse chest x-rays and electronic health data from hospital patients with Covid symptoms. To maintain strict patient confidentiality, the patient data was fully anonymised and an algorithm was sent to each hospital so no data was shared or left its location.

Once the algorithm had 'learned' from the data,



the analysis was brought together to build an AI tool which could predict the oxygen needs of hospital Covid patients anywhere in the world.

Published today in *Nature Medicine*, the study dubbed EXAM (for EMR CXR AI Model), is one of the largest, most diverse clinical federated learning studies to date.

To check the accuracy of EXAM, it was tested out in a number of hospitals across five continents, including Addenbrooke's Hospital. The results showed it predicted the oxygen needed within 24 hours of a patient's arrival in the emergency department, with a sensitivity of 95 per cent and a specificity of over 88 per cent.

"Federated learning has transformative power to bring AI innovation to the clinical workflow," said Professor Fiona Gilbert, who led the study

in Cambridge and is honorary consultant radiologist at Addenbrooke's Hospital and chair of radiology at the University of Cambridge School of Clinical Medicine.

"Our continued work with EXAM demonstrates that these kinds of global collaborations are repeatable and more efficient, so that we can meet clinicians' needs to tackle complex health challenges and future epidemics."

First author on the study, Dr Ittai Dayan, from Mass General Bingham in the US, where the EXAM algorithm was developed, said: "Usually in AI development, when you create an algorithm on one hospital's data, it doesn't work well at any other hospital. By developing the EXAM model using federated learning and objective, multimodal data from different continents, we were able to build a generalizable model that can help frontline physicians worldwide."

Bringing together collaborators across North and South America, Europe and Asia, the EXAM study took just two weeks of AI 'learning' to achieve high-quality predictions.

The outcomes of around 10,000 COVID patients from across the world were analysed in the study, including 250 who came to Addenbrooke's Hospital in the first wave of the pandemic in March/April 2020.

The research was supported by the National Institute for Health Research (NIHR) Cambridge Biomedical Research Centre (BRC).

Work on the EXAM model has continued. Mass General Brigham and the NIHR Cambridge BRC are working with NVIDIA Inception startup Rhino Health, cofounded by Dr Dayan, to run prospective studies using EXAM.

Professor Gilbert added: "Creating software to match the performance of our best radiologists is complex, but a truly transformative aspiration. The more we can securely integrate data from different sources using federated learning and collaboration, and have the space needed to innovate, the faster academics can make those transformative goals a reality."

> Federated Learning allowed researchers to collaborate and set a new standard for what we can do globally, using the power of AI. This will advance AI not just for healthcare but across all industries looking to build robust models without sacrificing privacy."
>
> *Dr Mona G Flores, Global Head for Medical AI at NVIDIA*

Source: University of Cambridge Journal reference: Dayan, I., et al. (2021) Federated learning for predicting clinical outcomes in patients with COVID-19. Nature Medicine. doi.org/10.1038/s41591-021-01506-3.
Taken from https://www.news-medical.net/news/20210915/Hospitals-use-artificial-intelligence-to-predict-Covid-patientse28099-oxygen-needs.aspx

HOT TOPIC

An Ever-Increasing Virtual Experience

Interview by
Luca Maria Pipitone
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Side by side or at a distance, with increased customer interaction, an extraordinary experience thanks to the virtual reality project developed by Cefla. A virtuous example of the pandemic, that we have discussed together with Massimo Mantecchini, Cefla Communication Manager.

Can you give us a brief overview of the company?
Cefla is based in Imola, Italy. There are four business units in the group, one of them being Cefla ***Medical***. The other three are the ***Engineering*** division, which deals with design, construction, and maintenance of complex buildings as well as the energy sector, the ***Finishing*** division, focused on the production of surface finishing equipment for material substrates such as wood, plastic, concrete and glass and, lastly, the ***Lighting*** division, active in the industrial and civil lighting sector (internal/external). The latter can also count on a subdivision specialized in interior design lighting, called ***Lucifero's***. The Medical division is made up of 6 different brands working on 3 different types of products: ***Treatment*** (for dental units and chairs), ***Imaging*** (light and heavy radiology) and ***Sterilization***, specific for disinfection cycles and for sterilization (such as autoclaves, thermo-disinfectors, ultrasonic washers, sealers, etc.).

How did the virtual reality project come about and what were the different development stages ?
The project arose from the idea of offering our end customer, dentist or radiologist, a new way of demonstrating our products, by letting them stay comfortably in their own offices. Normally, physical tools such as catalogues, videos or other types of digital tools are used for product presentations. We started from here, with the idea of experimenting, domestically, with two Italian dealers, a more advanced and interactive digitization that would allow our dealers to interactively, and accurately, show to the professional, in person and with a tablet, how the equipment worked on a 1:1 scale. The entire digitization process was also enriched by additional documentation such as pdf catalogs, videos, and other content.

Massimo Mantecchini, Cefla Communication Manager

We started the project at the end of 2019 with the intent of launching the apps, in Italy, during the Expodental 2020 trade show in May. The pandemic, unfortunately, messed up all our plans. Rather than being discouraged, we wondered what we could do differently. So, we thought of using the same content, designed for tablets, on a PC, so as to be able to share the screen remotely with dealers or end customers. The project was released in summer of 2020 and by December of the same year we launched the virtual reality on our websites. To date, of the 6 brands we have, including the medical line, each has a dedicated area of the site called *virtual interactive tour*, where visitors can autonomously access, watch and interact with our machines in 3D.

How did the idea of the smaller model come about?
A bit like all things, critical issues always arise when you put them into practice. The idea is to offer the same 1:1 model, with contents, to our end customers, being side by side with them, perhaps by using the desk as a surface for the model. In this way, the visualization of a product becomes easier and more versatile. Of course, the 1:1 model allows you to have a realistic perception of the device and also to view specific details as if you were in front of the real model. So, we can say that the small model, due to its ergonomics, represents a plus to the 1:1 model. Simply, after viewing the 1:1 model, you can sit down, think, and better evaluate the details by observing the smaller model.

How is the printed catalogue linked to virtual reality?
All our printed catalogues contain invisible tags that the tablet recognises and links to the multimedia content related to the product being viewed. According to the type of catalogue, there is a section that, when focused on, immediately refers to a reduced version of the 3D model. Taking dental units as an example, information regarding the different types of arms or modules comes up as soon as you approach the part of interest. In this way the customer can immediately understand the kind of economic and operational return the investment would have, without any sort of commitment.

So, how can the dealer take advantage of the project? Why is it important as a business tool?
We are convinced that the PC version, available for both Windows and iOS, can be useful in all those situations in which it is difficult, or too expensive, to reach the final customer. It is also useful for those who do not have much time to spend to evaluate the purchase of the equipment. In this case, for example, you could make a remote presentation, at the customer's convenience, to illustrate the most important points, to later invite the customer to the office to physically test the product. A very useful function, to keep the focus on the item of interest being presented is that, regardless of whether you are using the app, the desktop, or the web version, by activating the *tag* related to a specific part, or function, it automatically opens the pdf catalogue on the page related to that content.

An extraordinary customer experience. Are there any others of this kind?
To be honest, I don't think so, at least not so complex, but the web is so vast that I might have missed them. We can certainly say that, to date, having 6 brands with all the most important products digitized, in 3D and interactive is a remarkable achievement.

From virtual to reality. Can you tell us about the showroom project?
At the end of 2020, the new 3,600 m2 *showroom & training* centre was handed over to the management of ***BU Medical***. Of these, 1,700 m2 are dedicated to the showrooms, for all our brands, and to a 100-seat conference room, while a 1,900 m2 floor, with 8 different classrooms, is dedicated to the training of dentists and technicians.

Can you anticipate any future development, virtual or real?
We are working to further implement the concept of virtual reality! We have already surprised everyone at Expodental 2021, last September, with another step forward, by enabling, those who were interested, to enjoy an immersive experience of our products. We do not stop, we move forward, because we are also working on other projects! Digitization will allow us to develop very useful and interactive projects. The goal is to constantly give new tools to our dealers, the core of our distribution chain.
Alongside our distributors, we want to offer all our end customers, those who cannot come and visit us in person, at our headquarters in Imola, no matter where in the world, the opportunity to enjoy our content and experience.

We are working to further implement the concept of virtual reality! We have already surprised everyone at Expodental 2021, last September, with another step forward, by enabling, those who were interested, to enjoy an immersive experience of our products.

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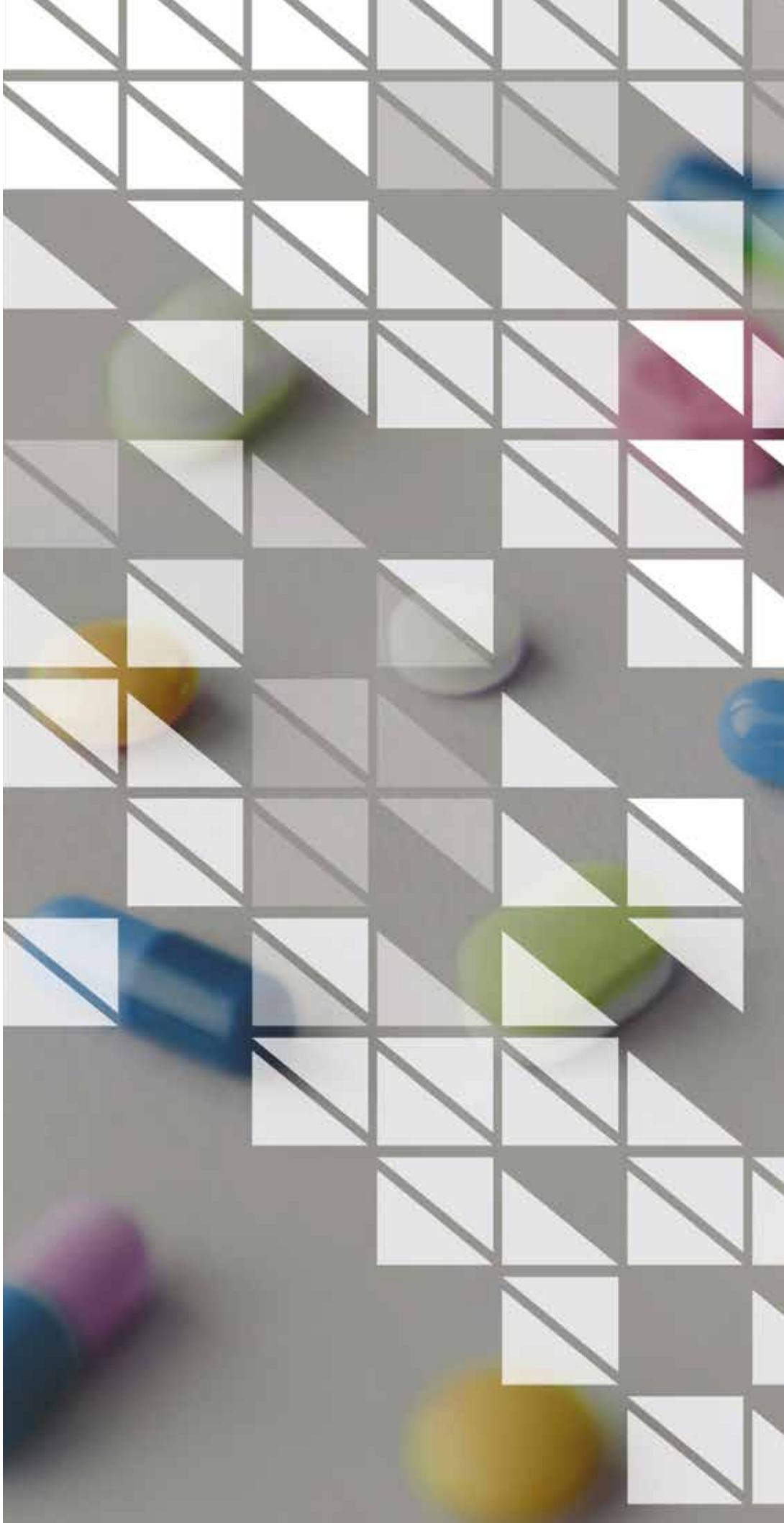

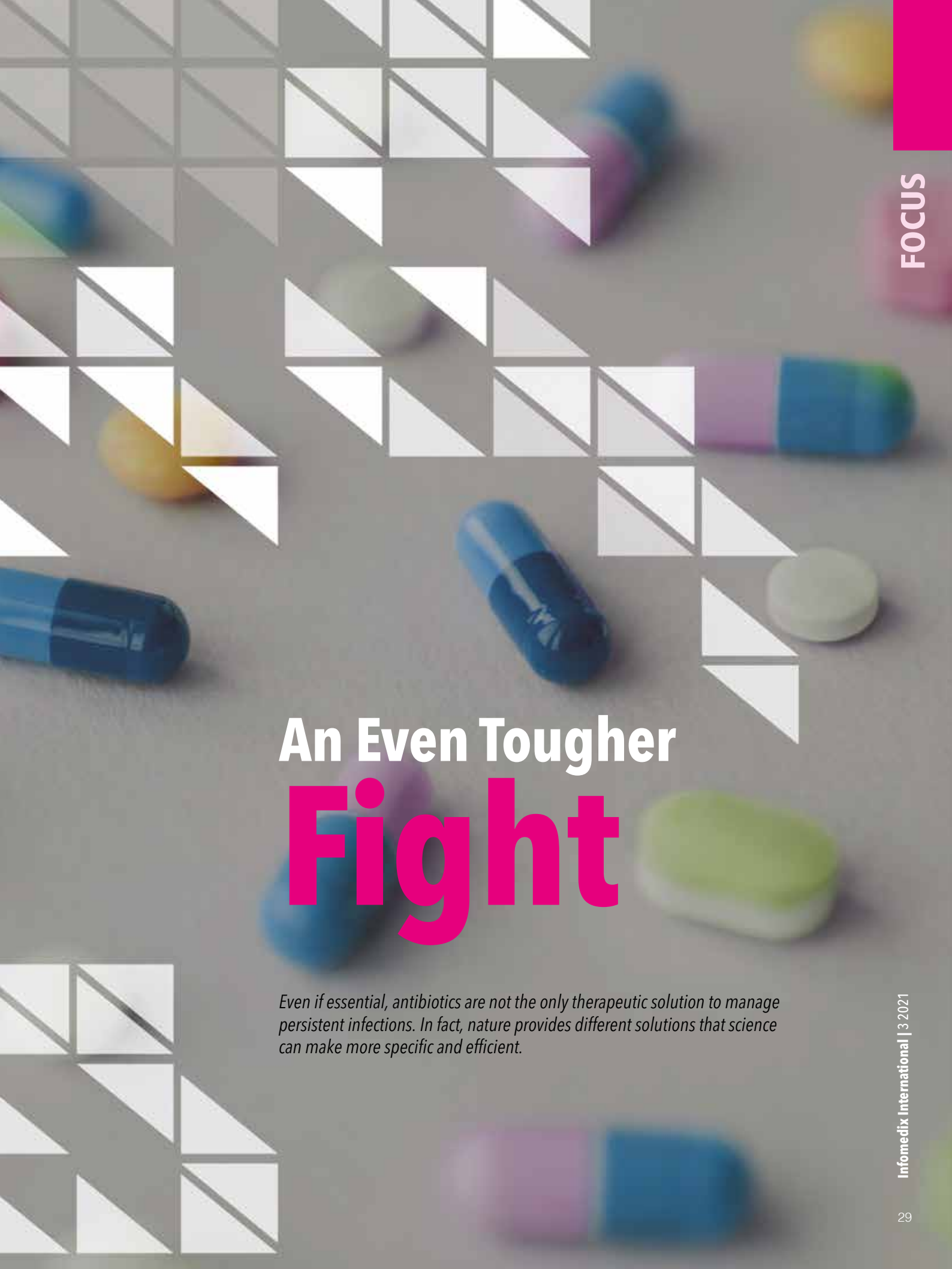

An Even Tougher Fight

Even if essential, antibiotics are not the only therapeutic solution to manage persistent infections. In fact, nature provides different solutions that science can make more specific and efficient.

About 3.7 billion years ago, when the earth was uninhabited and devoid of oxygen, there they were. They were there to lay the biochemical foundations of life, tirelessly adapting to the extreme conditions of a planet that had no interest in their survival. Bacteria have always stood out, they have fought with the world around them, and despite the hostile environment, they went beyond simple survival, and created another life. They have produced the oxygen in the atmosphere, making the planet and the life it hosts as it is today.

Human beings, as well as almost all living organisms, are strictly dependent on bacteria and their constant work and, in some way, it can be said that it is all thanks to them, thanks to their adaptive plasticity but, above all, thanks to their ability of having, for billions of years, both protected and passed on their DNA, thus allowing this molecule to express its full biological potential. In short, terrestrial life started through them, continued with them and is, today, dependent on them, so as to guarantee the correct functioning of a planet that is in fact their planet.
However, although bacteria as a whole are noble life forms, not all members of this kingdom work for the common good, or at least not from a human point of view. In fact, some of them are opportunistic species that see man as a source of food, nourishment for their own growth and for their own propagation in the environment, sometimes having the best over the human immune system.

It is only a matter of time before a bacterial species develops resistance to a drug and, once it happens, it is spread to the microbial community through one of the most effective natural gene sharing mechanisms: horizontal gene transfer.

And today, nearly a century after the discovery of penicillin, this problem has not been solved. **For sure, antibiotics have saved millions of lives and represent one of the greatest advances that medical science has ever made but bacteria, as already mentioned, have an adaptability that is out of control of science and, above all, out of control of man. For this reason, even the most effective and specific antibiotics are short-lived.**
It is only a matter of time before a bacterial species develops resistance to a drug and, once it happens, it is spread to the microbial community through one of the most effective natural gene sharing mechanisms: horizontal gene transfer.
Thanks to this genetic sharing system, it is sufficient for a bacterial cell to become resistant to a drug for the new gene to be spread and acquired both inside and outside the bacterial community, giving rise to resistance phenomena even in different microbial species.
In short, it's in their DNA. But it is also in their community. Thousands of individuals communicating with each other, exchanging genetic material, and reacting to all kinds of selective pressure by adapting. **Much of the problem lies right here; today's society abuses antibiotics; from livestock farms to health facilities, these molecules are used daily in various sectors, creating a selective pressure that effectively stimulates the adaptation of microbial species to this important class of drugs.**

SOME NUMBERS

Today, in the United States, there are about 35,000 deaths a year due to infections caused by antibiotic-resistant bacteria which, as statistics collected by the *European Antimicrobial Resistance Surveillance Network* also show, are on the rise. In fact, in 8 years (2007-2015) the number of deaths associated with *Klebsiella pneumoniae* resistant to carbapenems and *Escherichia coli* resistant to third generation cephalosporins has increased by 6 and 4 times, respectively.
Overall, the phenomenon of infections associated with antibiotic-resistant bacteria constitutes, in Europe, a health problem comparable to the contribution of influenza, tuberculosis and AIDS. In short, a rather cumbersome burden that owes its weight mainly to 6 bacterial species which are overall responsible for about 93% of deaths associated with antibiotic-resistant bacteria.

Among these, the microorganism that, at least according to the *Centers for Disease Control and Prevention (CDC)* data for the year 2017, has re-

corded most deaths is MRSA: methicillin-resistant Staphylococcus aureus. This bacterium is quite common both at hospital level and in normal social activities to the point that in hospitals around the world there were (in 2017) over 300,000 infections associated with it, with about 11,000 deaths. Methicillin, for its part, is a beta-lactam used as a last-line drug in the management of strains of *S. aureus* that had previously developed resistance to penicillin and is, therefore, an antibiotic resistant to the action of lactamases - enzymes produced by some bacterial species to become resistant to a whole range of antibiotics.
The fact that *S. aureus*, just as other bacteria, has developed resistance to a last-line drug, greatly restricts the therapeutic options to adopt in the event of infection, reducing the chances of a patient's survival, and aggravating the burden on the health system.

Another microbial species that, to date, represents a major problem for public health is represented by the *Enterobacteriaceae family,* more specifically the ***ESBL-producing Enterobacteriaceae***.
These bacteria, as the acronym summarizes, can produce broad-spectrum lactamases, giving them considerable drug resistance, making it necessary, at times, to use the latest antibiotics such as carbapenems. However, the ever-increasing use of the latter class of antibiotics has led to the development of *Enterobacteriaceae* resistant to them, called: ***Carbapenem Resistant Enterobacteriaceae (CRE)***. In the USA about 200,000 infections associated with ESBL *Enterobacteria* are recorded while, to a lesser extent, only 13,100 are attributed to CRE with a number of deaths of 9,100 and 1,100 respectively (relative to 2017) but with a constant growing trend.
In fact, in the 5 years between 2012 and 2017 the number of registered infections relating to ESBL Enterobacteria and CRE has undergone an increase of 50% and 11%, respectively.
A third class of microorganisms of considerable importance in the medical field is represented by the ***Enterococci***, bacteria which are usually not particularly virulent but intrinsically resistant to many antibiotics. Given their resilience to the microbicidal action of various molecules, it is quite common for this bacterial species to develop resistance to even the most effective antibiotics, and among them, vancomycin is no exception.
Vancomycin Resistant Enterococci (VRE) are a type of enterococci that are particularly virulent and difficult to treat with antibiotic therapies which, in the USA, infect 55,000 people, registering 5,400 deaths.

To conclude this list, two other bacterial species of great health importance should be mentioned: the multidrug-resistant ***Pseudomonas aeruginosa*** and the drug-resistant ***Streptococcus pneumoniae***. Like the microbial species mentioned above, these bacteria develop resistance to antibiotics quite frequently and

In short, the list is long and, overall, the situation is moving towards a direction that sees current antibiotic therapies in increasing difficulty and, metaphorically, increasingly up against a wall.

quickly, making infections of this type increasingly difficult to manage.
If, on one hand, there are almost 33,000 multi-resistant *Pseudomonas cases* in the world, with about 2,700 deaths; the drug-resistant *Streptococcus pneumoniae*, on the other hand, recorded about 900,000 infections in 2014, making it the most widespread bacterium among those resistant to antibiotics reported by the CDC. It is also the only bacterium on this list for which a vaccine exists, allowing a drastic spread of this pathogen among children between the ages of 0 and 4.

EXPERIMENTAL ALTERNATIVE THERAPIES

In short, the list is long and, overall, the situation is moving towards a direction that sees current antibiotic therapies in increasing difficulty and, metaphorically, increasingly up against a wall. **But, antibiotics, as essential as they may be, are not the only therapeutic solution to manage persistent infections. In fact, nature provides different solutions that science can make more specific and efficient.**
Among the possible options, bacteriocins stand out. They are, generally, protein molecules produced and released into the environment, by almost all bacteria, to inhibit growth and limit nutrients competition from other microbial species. These molecules can very often create stable pores on the target cells membrane leading to the collapse of the cell and, more generally, to a greater permeability of the bacterium towards antibiotics, thus making the action of these molecules more efficient.
Some studies have demonstrated that bacteriocins, both alone and in synergistic therapies with antibiotics, such as vancomycin and ruterin, have shown to be effective against difficult pathogens such as MRSA and VRE. In addition, these molecules have high stability, low toxicity and a spectrum of action ranging from wide to narrow; in short, on the whole, they are very versatile and promising molecules in the current healthcare context.
Similarly to bacteriocins, **essential oils** of some medicinal plants also represent an interesting solution. In fact, even in this case, efficacy was observed against bacterial species resistant to antibiotics, such as MRSA, MDR *P. aeruginosa*, VRE, *E. coli* carbapenemases producers and more. As with bacteriocins, the microbicidal action of essential oils has also been studied both individually and in conjunction with various antibiotics, laying the foundations for possible synergistic therapies capable of increasing the sensitivity of bacteria to specific active ingredients.
Two other strategies proposed to solve the problem of antibiotic resistance are based on the direct collaboration between the drug and the host's immune system. The first exploits **antibodies**, both monoclonal and polyclonal, specific for molecular structures exposed on the bacterial wall (such as lipopolysaccharide (LPS)) with the ultimate aim of increasing the phagocytosis activity operated by the human immune system, thus favoring a positive course of infection.
The second strategy, on the other hand, is based on ***Quorum-sensing inhibitors (QSI)***, a communication mechanism that allows the bacterial community to activate some transcriptional profiles associated with the expression of genes responsible for antibiotic resistance and, more generally, to greater virulence of the microbial species. In this too, the QSI, by inhibiting bacterial communication and their virulence abilities, collaborate with the patient's immune system to facilitate healing.

To complete the picture of possible alternative therapies to antibiotics, there is one based on the use of bacteria's natural predators: bacteriophages. These phages can infect and quickly kill different types of microorganisms and, due to this ability, they were proposed and used for the first time as possible therapy for bacterial infections in the 1930s. Almost a century later, the research went on and, today, it has been observed how *phage therapy* can be effective against bacterial strains such as MRSA, VRE and *K. Pneumoniae*.

In short, in this continuous fight against bacteria, antibiotics are gradually losing ground, but reinforcements are there, and they are also good. Nonetheless, more research is needed to refine techniques and to build therapeutic protocols for a synergistic action of the different antimicrobials, thus leading to the application of low selective pressure strategies. Because, as molecular ecology teaches, the greater the selective pressure of a system, the more the formation of a resistant organism will be favored.

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Pictures taken from "Antibiotic Resistance Threats in the United States" Centers for Disease Control and Prevention, CDC.

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A Bright Future into Brunei Darussalam's Healthcare

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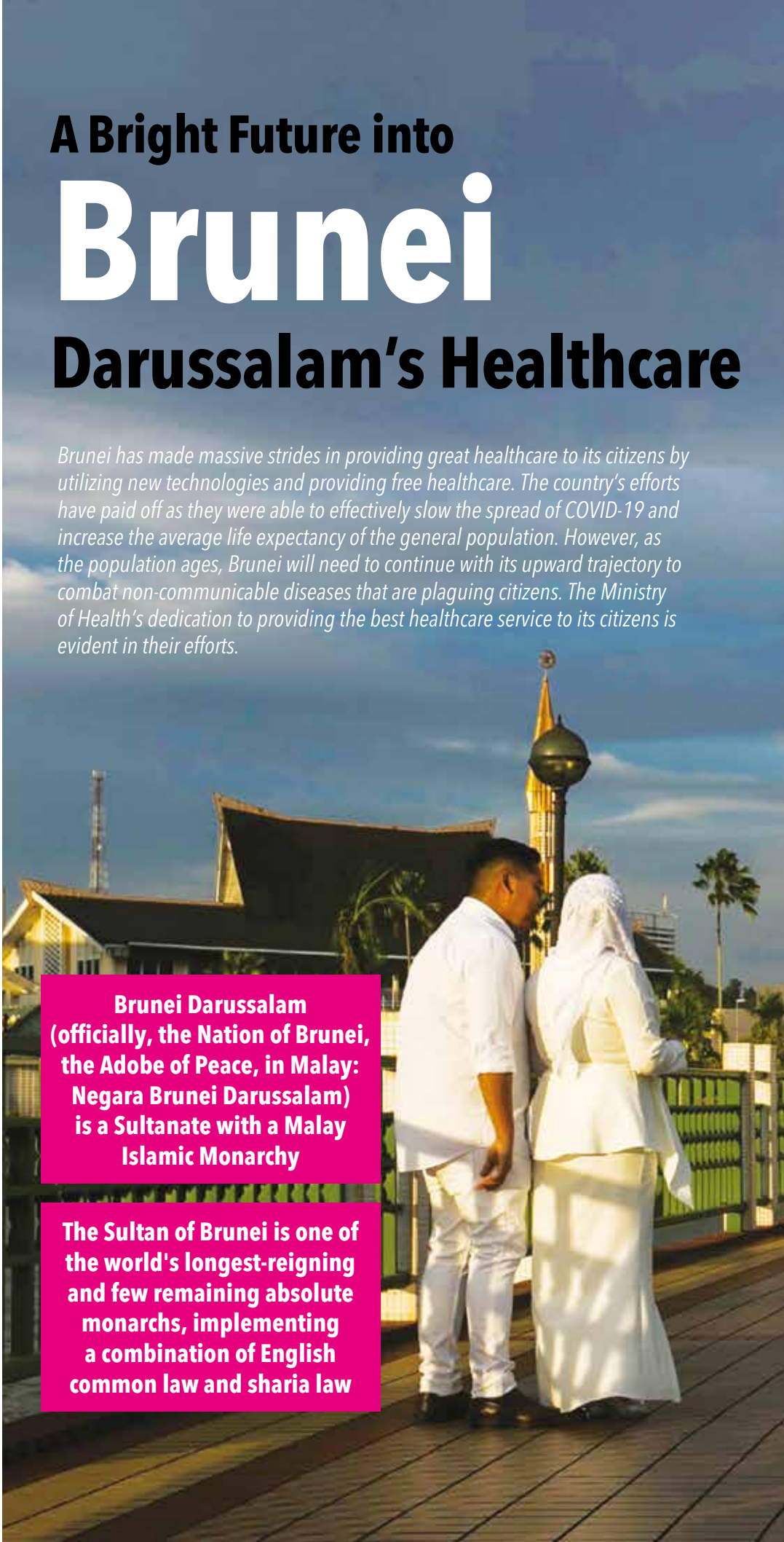
Brunei has made massive strides in providing great healthcare to its citizens by utilizing new technologies and providing free healthcare. The country's efforts have paid off as they were able to effectively slow the spread of COVID-19 and increase the average life expectancy of the general population. However, as the population ages, Brunei will need to continue with its upward trajectory to combat non-communicable diseases that are plaguing citizens. The Ministry of Health's dedication to providing the best healthcare service to its citizens is evident in their efforts.



Brunei Darussalam (officially, the Nation of Brunei, the Adobe of Peace, in Malay: Negara Brunei Darussalam) is a Sultanate with a Malay Islamic Monarchy

The Sultan of Brunei is one of the world's longest-reigning and few remaining absolute monarchs, implementing a combination of English common law and sharia law

Apart from its coastline with the South China Sea, the country is completely surrounded by the Malaysian state of Sarawak, and separated into two parts by the Sarawak district of Limbang

Brunei has the second-highest Human Development Index among the Southeast Asian nations, after Singapore

Total health expenditure as share of GDP (2017), 2.42%

Total health expenditure per capita (2014), current US$ 957.61 (In PPP 1777.8)

More than 80% of the population, including the majority of Bruneian Malays and Kedayans identify as Muslim

Total Pharmaceutical Expenditure per capita (PPP) USD 369.9

The population consists mainly of Malay (67%) and Chinese (15%) people with some Indian and other indigenous groups

Pharmaceutical expenditure as a share of Total Health Expenditure per capita 20.8%

COUNTRY OVERVIEW

Brunei Darussalam is a Sultanate located on the northern coast of the island of Borneo, in Southeast Asia. Its population of approximately 437,500 people is largely clustered around the capital Bandar Seri Begawan, with other population centers connected by a well-maintained highway system. The country gained its independence from the United Kingdom in 1984. **Thanks to its plentiful reserves of oil and natural gas, Brunei's citizens enjoy one of the world's highest standards of living, boasting one of the highest per capita GDP in the world, including high standard healthcare and medical services provided by the government.** Crude oil and natural gas production account for over 50% of the country's GDP and almost all its exports, thus Brunei has suffered the brunt of the drop in the price of hydrocarbons in recent years. Owing to the well-entrenched autocracy there is a stable political environment; the Sultan of Brunei, Hassanal Bolkiah Mu'izzaddin, has been reigning since 1968. One of the world's richest individuals, the Sultan appears to enjoy genuine popularity amongst his people, however, most recently, he has faced international criticism over the introduction of Islamic Sharia law into its penal code. Islamic banks are growing rapidly in the country and the State is now supporting small and micro businesses as well as the training of the population to achieve economic growth. There have also been significant investments in the field of education.

Crude oil and natural gas production account for over 50% of the country's GDP and almost all its exports, thus Brunei has suffered the brunt of the drop in the price of hydrocarbons in recent years.

Given that energy reserves are becoming depleted, the Government has been pursuing a policy of economic diversification, speeding up investments in the manufacturing and the service sectors, further marketing itself as a financial center and opening numerous tourist facilities. To stimulate growth, the Government has also increased development expenditure, by launching a high-voltage transmission line project between Malaysia and Brunei and developing an international airport. Citizens pay no income taxes, and the Government guarantees free medical services and education up to university level and gives housing and rice subsidies. Over the past two decades there has been an influx of foreign workers to Brunei, which has contributed to its diverse population. Foreign workers primarily come to Brunei from Indonesia, Malaysia, Philippines, and Thailand to work in the oil and gas industry and service sector, making up around 40% of the country's population. The country has no official measurement of a poverty line, but UN reports indicate that around 5% of the population is impoverished.

BRUNEIANS'S HEALTH STATUS

Compared to other countries in the Western Pacific Region, Brunei has high coverage of essential services. The country instituted single-payer universal healthcare for its citizens in 1958. Given its good population health indicators, it is reasonable to assume that universal coverage has positively impacted health outcomes, also considering Brunei Darussalam's profile, with its high GDP, that has accelerated its success.

Thanks to its highly developed infrastructure, that provides accessible healthcare to all Bruneians, maternal and child mortality have decreased significantly over the years. Brunei, like many developed nations, has made significant strides in eliminating infectious diseases such

Life expectancy at birth (in years)	77.4 years	
Maternal mortality ratio (per 100 000 live births), 2015	23.0	
Infant mortality rate (per 1,000 live births)	8.8	
Births attendance by skilled health professionals	100%	
Neonatal mortality rate (per 1000 live births), 2016	4.4	
Immunization coverage	97.8%	WHO target: above 95%
Probability of dying from any cardiovascular disease, cancer, diabetes, chronic respiratory disease between age 30 and exact age 70, 2015	12.6	17.1 (Western Pacific Region Average)
Suicide mortality rate (per 100 000 population), 2015	1.3	10.8 (Western Pacific Region Average)

Source: WHO- World Health Organization / Ministry of Health of Brunei

a malaria (in 1987), poliomyelitis (2000) and measles in 2015. The overall life expectancy for Bruneians is 77 years, a 20-year increase from 1961. Nonetheless, as the population ages, the country is experiencing an epidemiologic transition toward chronic disease that must be addressed through health system planning and resource allocation. Non-communicable diseases (NCDs) such as diabetes, obesity, heart disease, and cancers are occurring at higher rates among adults and children and changes in lifestyle factors, including higher caloric intake, sedentary lifestyle, and smoking, suggest that the trend will continue to increase. **Brunei is taking great effort to tackle NCDs by making preventative care accessible however, their increased associated average treatment costs are causing fiscal pressures on a predominantly government funded healthcare system.**

Building on its solid foundations, the Ministry of Health of Brunei (MoH) has also been able to contain the spread of COVID-19 disease by implementing strict regulations diligent surveillance, rigorous contact tracing and by mass testing the country.

THE HEALTHCARE SYSTEM

Brunei's healthcare system is funded through government tax revenue and the government employs all medical personnel and determines reimbursement rates. **Thus, Brunei's health system is classified as a Beveridge Model, although funding comes from alternative government revenue sources and not citizen taxation. Public healthcare services in Brunei are either free or offered by the government at highly subsidized rates, including medicines for inpatients and outpatients.** The country's public healthcare network, overseen by Ministry of Health (MoH), is comprised of 4 government hospitals , 15 health centers, 10 health clinics, and 22 maternal and child health clinics. Brunei also has two private hospitals, Jerudong Park Medical Centre, and Gleneagles JPMC, located in the capital district of Brunei Maura and one private healthcare center, Panaga Health Centre, located in the Belait district. Jerudong Park Medical Centre and Gleneagles JPMC are specialty hospitals specializing in rehabilitation and cancer, and cardiac care, respectively. **Care at both private hospitals is covered under the national health system for Brunei citizens if they are referred to the private hospital through a public healthcare facility.** Most healthcare facilities are located along the coastal region. Brunei's healthcare services are classified into two major categories: Directorate of Medical Services and the Directorate of Health Services. While the Directorate of Medical Services looks into areas such as nursing, hospital, laboratory, dental, renal, and pharmaceutical services, the Directorate of Health Services monitors environmental health, community health, and scientific devices. Although most public hospitals are more affordable, they are also overcrowded and have a much longer waiting period.

For the private sector, private insurance is available, and payment is mainly out-of-pocket; most organizations in the private sector provide medical allowances or insurance for their employees. Furthermore, Bruneians with the means to seek advanced medical services outside of the country will travel to nearby countries like Singapore, Malaysia, and Thailand for private medical consultations. When the public hospitals are unable to provide specific services for more serious health problems to Brunei citizens locally, the government will then coordinate and pay for Brunei citizens to be sent overseas for treatment. Local doctors are also sent abroad to get specialized guidance and training. The MoH is working on long-term goals to induct healthcare professionals into different specializations via seminars and workshops, and through training courses organized locally and overseas.

Basic health services (primary care) are extended to rural areas through the health centers and health clinics network, as well as travelling clinics and flying medical services to access the most remote villages. Brunei's population is not equally distributed across the country's four districts, healthcare facilities are unevenly distributed as well. Citizens living in rural districts must travel long distances to be serviced. For example, the rural district of Temburong is an exclave, thus physically isolated from the rest of the nation, and is primarily serviced by the flying medical service and has only one hospital. Therefore, Bruneian citizens residing in this district may have unequal access to healthcare services, as they must travel through Malaysia or via the Brunei Bay to mainland Brunei, when compared to citizens residing in the capital district where numerous healthcare facilities are located. Although the Flying Medical Services are available in these areas, it is often not enough.

Despite slight budget increases over the years, Brunei spends a significantly lower percentage of its national income on healthcare compared to other nations in the world. Private healthcare expenditures are also low compared to other nations. **Relatively low out-of-pocket spending suggests a low risk of financial hardship. However, as health services are predominantly government subsidized, further efforts to support sustainable financing are required.**

HEALTHCARE FACILITIES IN BRUNEI'S FOUR GEOGRAPHICAL DISTRICTS: BELAIT, BRUNEI-MAURA, TEMBURONG, AND TUTONG

BRUNEI MUARA	TUTONG	BELAIT	TEMBURONG
Hospitals Raja Isteri Pengiran Anak Saleha Hospital	**Hospitals** Pengiran Muda Mahkota Pengiran Muda Haji Al-Muhtadee Billah Hospital	**Hospitals** Suri Seri Begawan Hospital	**Hospitals** Pengiran Isteri Hajjah Mariam Hospital
Health Centres Pengkalan Batu Health Centre Jubli Perak Sengkurong Health Centre Jubli Emas Kg Perpindahan Bunut Health Centre Pengiran Anak Puteri Hajah Rashidah Sa'adatul Bolkiah Health Centre Pengiran Anak Puteri Hajah Muta-Wakillah Hayatul Bolkiah Health Centre Berakas Health Centre Muara Health Centre	**Health Centres** Telisai Health Centre Pekan Tutong Health Centre Sungai Kelugos Health Centre Lamunin Health Centre	**Health Centres** Kuala Belait Health Centre Seria Health Centre Sungai Liang Health Centre	**Health Centres** Bangar Health Clinic
Travelling Health Clinic KG Bolkiah SG Bunga	**Travelling Health Clinic**	**Travelling Health Clinic**	

Source: Ministry of Health of Brunei, http://www.moh.gov.bn/Pages/Home.aspx

Achieving a landmark in healthcare, the MoH has created a 'one-patient, one-record' e-health system, by implementing a comprehensive health-information management system containing the health records of every citizen in real-time, accessible from all healthcare facilities, public and private, within Brunei. The system, called Bru-HIMS (Brunei Health Information and Management System), running on DXC's Enterprise Management software, integrates with nearly a dozen preexisting MoH systems, including appointments, outpatient management and clinical care. The system allows healthcare professionals to provide patients with better care and service, including enhanced mobility solutions that empower clinicians to support their patients from outside hospitals or while traveling.A planned feature will let Brunei's "flying doctors" – physicians who serve the roughly 10 % of the population living in areas so remote that they can be accessed only by helicopter – provide telemedicine over the Internet. To improve its chances for a successful implementation, Bru-HIMS was introduced on a district-by-district basis, with 90% of the population registered for the system using an app on their mobile smartphones.

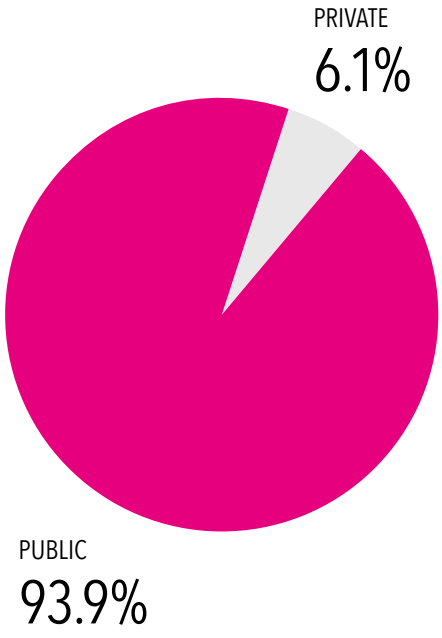
Therefore, Bruneian citizens residing in this district may have unequal access to healthcare services, as they must travel through Malaysia or via the Brunei Bay to mainland Brunei, when compared to citizens residing in the capital district where numerous healthcare facilities are located.

Among the strategies of government is to boost the quality of life and prevent disease through increased monitoring of the health of its citizens. The carefully monitored aspects include environmental health and occupational health. On this regard, according to the 2014 Health System Survey (HSS), the majority of respondents rated their health as good (43%), and few people reported excellent or poor health (9% and 1%, respectively). Among all respondents, those who reported fair health were significantly more likely to utilize public healthcare when compared to respondents in excellent health. Respondents in poor health did not demonstrate significantly higher rates of public healthcare utilization. Significant differences in healthcare utilization were observed among rural and Indigenous populations. Temburong district was associated with the lowest rates of healthcare utilization for both public and private services. It also contains the fewest healthcare facilities and the largest proportion of Indigenous groups compared to other districts. Although services such as the flying medical

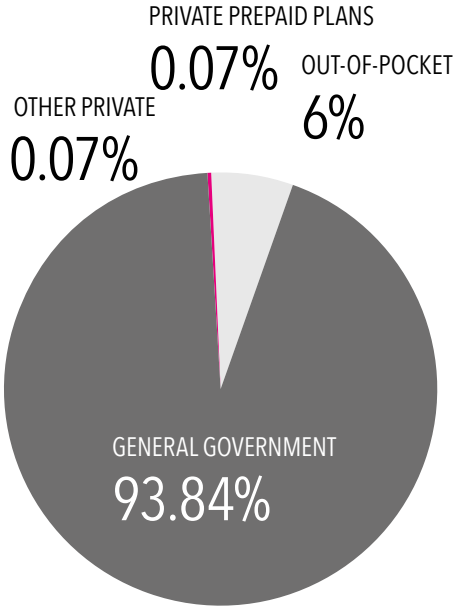
Number of hospital beds	1224 (2017-public)
… available beds per capita	2.7 per 1000 population (2015)
Number of surgical procedures	108,075 (2017)
Doctor Consultations/ capita	3.9
Health worker density/ 10 000 population	17.7 (2015)
Physicians	683 (2017)
Physicians' density/ 1000 population	1.5 (2015)
Psychiatrists' density/ 100 000 population	4.3 (2015)
Surgeons' density/ 100 000 population	22.5 (2015)
Pharmacists' density/ 1000 population	0.17
Dentists	106 (2017)

Sources: The U.S. Commercial Service
https://2016.export.gov/industry/health/healthcareresourceguide/eg_main_108568.asp
WHO - https://www.who.int/brunei/our-work

PUBLIC VS PRIVATE SHARE OF TOTAL HEALTH EXPENDITURE



COMPOSITION OF TOTAL HEALTH EXPENDITURE

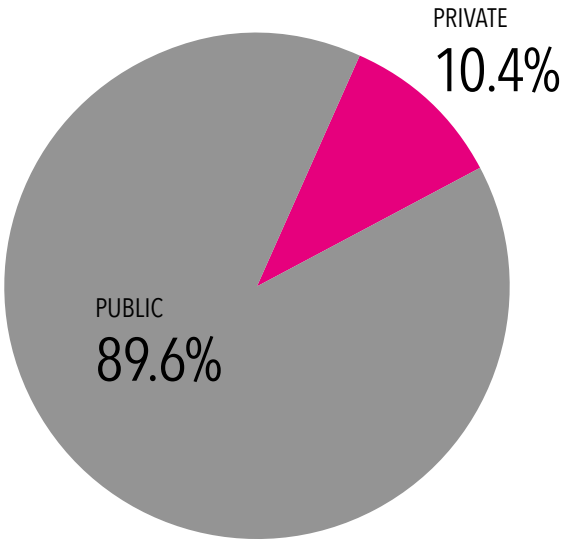


A planned feature will let Brunei's "flying doctors" – physicians who serve the roughly 10 % of the population living in areas so remote that they can be accessed only by helicopter – provide telemedicine over the Internet.

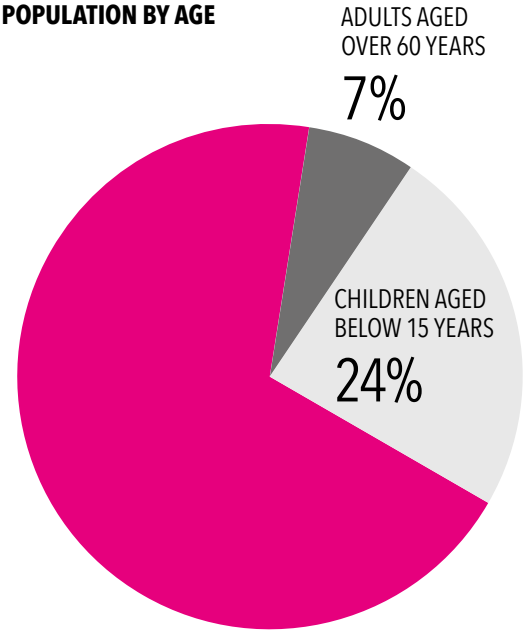
	Public Sector	Private Sector	Total	Density per 1,000,000 pop.
Magnetic Resonance Imaging	n/a	1	1	2.394
Computerized Tomography Scanner	2	1	3	7.181
Mammograph *	2	1	3	91.926

*Note: * Density per 1,000,000 females aged from 50-69 old.*
Source: WHO - https://www.who.int/medical_devices/countries/brn.pdf?ua=1

PUBLIC VS PRIVATE SHARE OF TOTAL PHARMACEUTICAL EXPENDITURE



POPULATION BY AGE



service have been established, HSS data suggest that these services are not widely utilized and that Temburong residents and Indigenous populations continue to utilize healthcare services less than other populations in Brunei. **Despite the country's substantial financial resources, rural populations are still less likely to utilize the healthcare system, demonstrating the challenges to ensuring equal access, especially when populations are geographically isolated from the mainland, common in many Southeast Asian nations.**

MARKET PERSPECTIVES

Although private spending is low compared to many other countries, private healthcare is a growing sector in Brunei's economy. The country has a small but growing medical industry. **Its private sector remains underdeveloped (3% of GDP); most companies are SMEs (in the textiles, furniture, food sectors). As a result, the country is a large importer, including of medical products.** As Brunei's young population ages and requires medical care, the medical industry will be an important long-term growth sector for Brunei's economy. In March 2019, Brunei's Ministry of Health identified five key goals: providing excellence in healthcare services, ensuring control and prevention of non-communicable diseases, protecting public health through effective implementation of policy and regulations, sustainability of healthcare services and systems through optimal use and innovation, and providing proactive and transparent governance. For the 2019-2020 fiscal year, the MoH received a budget of US$286.44 million (12 % higher than the previous fiscal year). An additional US$8.6 million was allocated under the country's 11th National Development Plan for five projects: the Pandan Kuala Belait Health Centre, Sengkurong Silver Jubilee Health Centre, Suri Seri Begawan Hospital, and the establishment of a Certified BSL3 Laboratory to support the establishment of the National TB Reference Laboratory and Virology services. Another US$10.8 million has been allocated for medical supplies and services and US$8 million for maintenance needs. **First world medical device manufacturers, from Germany, the U.S. are well established in Brunei's medical industry and, as part of the plan to consolidate and realign the government healthcare services, major upgrades are required for hospitals and health centers across the state.** In addition, Brunei is one of the first countries to issue guidelines for the manufacturing and handling of halal medicinal products, traditional medicine, and health supplements. When the guidelines were released in 2010, it was designed to pave the way for the establishment of halal pharmaceutical companies in the country, and for Brunei to become a hub for halal pharmaceutical exports.

Among main sources:
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EU Recovery Fund, to Reshape the

Italian Healthcare System

Italy's struggles to keep its population healthy with new treatments and care, while balancing its books, embody the challenges facing much of the rest of Europe. But the country's broader financial crisis has hit the health sector in some ways more than its peers: while health spending in rich countries recovered after the financial crisis, it has contracted in Italy for several years, resulting in finance cuts, privatization, and deprivation of human and technical resources. But the EU recovery plan could be a chance to play right; many are the expectations, both of healthcare personnel and citizens, who are hoping for a real revolution, in the near future, both in terms of primary and local care as well as in digitalization, and in the entire health system.

	Italy	EU
GDP per capita (EUR PPP)	28 900	30 000
Relative poverty rate (%)	20.3	16.8
Unemployment rate (%)	11.2	7.6
Median age	45.9	43.7
Share of population over age 65 (%)	22.3	19.4
Fertility rate	1.3	1.6
Health spending per capita, 2017	EUR 2483	EUR 2884

With a population of almost 61 million, Italy is the sixth most populous country in Europe. The country is made up of 20 regions, extremely varied, differing in size, population, and levels of economic development. The regions are subdivided into provinces, which are made up of municipalities (*comuni*). Italy has about 8,100 municipalities, which range in size from small villages to large cities such as Rome.

The majority of the Italian population has a high standard of living and quality of life resulting, in part, from well-established health policies and welfare measures. Life expectancy of Italians is among the highest in the world and second highest in Europe, after Spain, currently standing at 83.1 years for women and 79.9 years for men. In contrast, its fertility rate is one of the lowest in the world: 1.3 births per woman, far below the replacement level of 2.1, and immigration is the source of most of this growth. Estimates of avoidable mortality and care for chronic conditions compares well at an international level, although healthcare outcomes are inequitable across regions, genders, and socioeconomic groups.

Life expectancy of Italians is among the highest in the world and second highest in Europe, after Spain, currently standing at 83.1 years for women and 79.9 years for men.

The Italian National Health Service (NHS) was established in 1978 to grant universal access to a uniform level of care throughout Italy. In spite of this, there are considerable variations in coverage and service quality mainly, but not exclusively, between the richer and better covered regions of the north and the poorer ones in the south. The gaps between northern and southern regions mainly reflect socioeconomic and cultural factors that are far beyond the healthcare system. A strong role for central government to equalize the starting conditions between regions may be required, but regional fragmentation leaves the Italian government with weak strategic leadership. This pattern is also substantially echoed in the geographical distribution of satisfaction levels with the healthcare system and its performance. Generally, however, over the last few years there has been a general decrease in satisfaction levels.

Regionalization - The Italian Health Service makes the right to health accessible to all citizens, without discrimination based on income, gender, or age. **Since the early 1990s, considerable powers, particularly in healthcare financing and delivery, have been**

PRIVATE HEALTHCARE SPENDING

	2018 (Euros)				Variation (%) 2012-2018			
	Public	Voluntary Funding Schemes	Family Direct Spending	Total	Public	Voluntary Funding Schemes	Family Direct Spending	Total
Treatment and rehabilitation care (Hospital, Day Hospital, Outpatient, Homecare)	67952	1313	15592	84857	0.78	18.50	25.12	4.77
Long-term care	12430	145	3608	16183	10.48	81.25	13.71	11.58
Auxiliary services	9323	362	2931	12616	3.72	0.28	-5.30	1.37
Pharmaceuticals and other therapeutic devices	17770	228	13540	31538	16.85	-0.44	8.04	12.76
Preventive care	5811	721	70	6602	11.51	43.91	12.90	14.34
Health system and financing governance and administration	1654	1386	0	3040	-13.63	57.32		8.73
TOTAL	**114940**	**4155**	**35741**	**154836**	**4.49**	**31.49**	**14.10**	**7.16**

Source: Corte dei Conti processing on ISTAT data
http://www.quotidianosanita.it/studi-e-analisi/articolo.php?articolo_id=85877

devolved to the regional level of government. Italy's healthcare system is a regionally based national health service that provides universal coverage largely free of charge at the point of delivery. The system is organized into three levels: national, regional, and local. At national level, the Ministry of Health sets the fundamental principles and goals of the National Health System (*Servizio Sanitario Nazionale - SSN*), determines the core benefit package of health services guaranteed across the country, and allocates national funds to the regions. The regions, in full autonomy, plan and manage healthcare in the area, while the local health authorities (ASL – Aziende Sanitarie locali) provide the services.

The different regions have made different choices on how to use their increasing autonomy, with different organizational and funding models, resulting in great diversity. **Thus, a large vertical fragmentation exists in the extent and the quality of such strategies between regions or ASLs of excellence, which are mainly found in the center-northern part of the country, and areas where self-directed initiatives are scant.** The uncontrolled increase of regional healthcare spending since 2001 and the international financial and economic crisis that began in 2008 have led policymakers to reconsider full fiscal decentralization to regions. In fact, despite the country's federal structure, most regions cannot fund healthcare with their own resources, relying on the national transfers to compensate for the differences in regional incomes. The resulting financing system has an unevenly distributed tax base, and a need for poorer regions to increase tax rates more than high-income regions, with consequent disincentives for business location, for example. In recent years there have been attempts to place stricter controls over regions' health spending after a few incurred considerable deficits. Moreover, tighter cost-containment measures on public health expenditure have been proposed and are being slowly implemented (e.g., caps on specific spending areas). **At the same time, higher and more extensive co-payments for outpatient (ambulatory care), diagnostics and drugs have been introduced by the regions, from late 2011, increasing the amount of additional private spending for services provided by the NHS.**

The resulting financing system has an unevenly distributed tax base, and a need for poorer regions to increase tax rates more than high-income regions, with consequent disincentives for business location, for example.

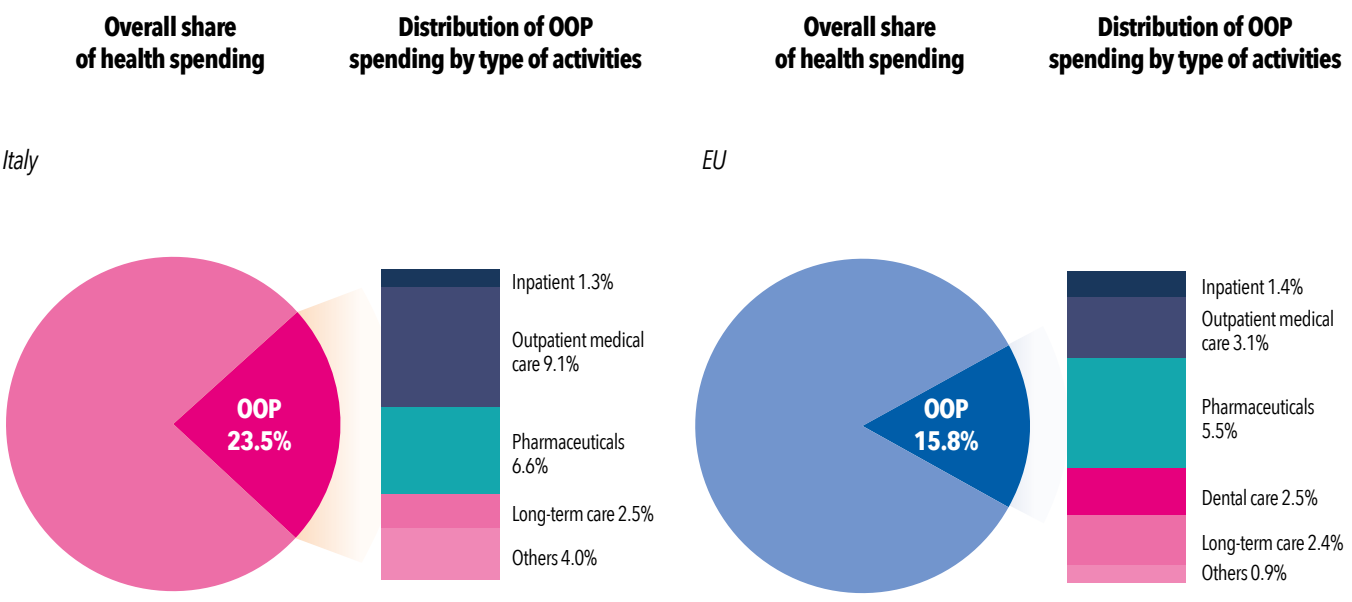
Coverage and provision of services – Healthcare in Italy is provided to all citizens in a mixed Public and Private system. **The State, through the National Health Plan, establishes the Essential Health Services, so-called LEA (*Livelli Essenziali di Assistenza*), that must be guaranteed throughout the country, to all residents (including immigrants, documented or not), free or with cost sharing, using the resources collected through general taxation.** Immunization and screening programs are considered to be priorities. Healthcare services (i.e., the LEA) provided within the NHS are identified by positive and negative lists using criteria related to medical necessity, effectiveness, human dignity, appropriateness, and efficiency in delivery. Primary and inpatient care are totally free at the point of use for everyone. So, consultations with public primary general practitioner (GP) and pediatricians are free. They are also responsible for prescribing medication and, after diagnosing a health problem, referring patients to specialist consultations or further levels of care if needed (except for dental care, obstetric and gynecological services, and pediatric care, which are services that can be directly accessed). Hospital admission is free if admitted for necessary procedures but would not be free for elective procedures (for example a preventive check-up). Only some specialist consultations, lab analyses, and diagnostic procedures are free and only if prescribed by the public primary GP/pediatrician, most services demand a cost-sharing, and many are provided at the patient's full expense, although fees are usually quite reasonable. Some medicines are also free (usually the ones related to serious illness or life-threatening conditions) while others are discounted with a prescription from the public primary GP. Negative lists include ineffective services; services that are covered only on a case-by-case basis, such as orthodontics and laser eye surgery; and inpatient services for which ordinary hospital admissions are likely to be potentially inappropriate (e.g., cataract surgery and carpal tunnel release).

Specialized outpatient care experiences long waiting lists – a common phenomenon in Italy that is often related to unsatisfactory quality of care. Overall, however, given the existence of such waiting lists, people often seek care within the private sector and significant inter-regional mobility of patients takes place, especially from southern to northern regions in order to access care faster.

Increasing role of the private sector - The NHS is largely funded through national and regional taxes, supplemented by co-payments (ticket) for pharmaceuticals and outpatient care. **Given the containment measure adopted by the Italian government over the past years, according to OECD data, in 2019, total health expenditure accounted for 8.7% of GDP (from 9.2% in 2012), well below the EU average of 9.6%; to make a comparison, France and Germany employ more than 11% of their GDP.**

The private sector is having an increasing role in public health. In 2018, total health expenditure amounted to 154.8 billion euros, of these, public sources made up 74.2% of total healthcare spending (down from 78.2% in 2012), and private spending 23.1% (up from 21.8% in 2012), mainly in the form of out-of-pocket (OOP) payments (23.5%, among Europe's highest rates) – these OOP payments are mainly for diagnostic procedures (laboratory tests and imaging), pharmaceuticals, specialists visits (including dental services) - putting a further burden on Italian families, where, on average, each Italian spends 612 euros per year. Only about 2.7% of total healthcare expenditure is funded by insurance funds. **For specialist (outpatient) visits, the most recent estimate using the national ISTAT survey reports that 56.8% of total specialist visits are paid fully by**

OOP PAYMENTS MAKE UP A HIGHER PROPORTION OF HEALTH SPENDING THAN THE EU AVERAGE



Note: OOP (out-of-Pocket) payments for dental care in Italy are included in outpatient medical care.
Source: ŒCD/European Observatory on Health Systems and Policies (2019)

patients, 27.8% applied a co-payment and the remaining 15% were free of charge. Dentist and gynecology outpatient visits are the most common privately paid visits outside the NHS.
Only a few private hospitals in Italy are not accredited by the NHS and thus work only with private patients. To be accredited, private providers must meet safety and quality standards. **According to the Italian Private Hospital Association, of the 520 private health facilities they represent, 93% (490) are accredited (*Privato convenzionato*) with the NHS, for a total of 52,000 beds.** One million people are hospitalized in these institutions every year. Costs are incurred by the NHS and citizen using private accredited providers do not incur any additional expenses compared to public providers.

Healthcare services that are not covered by the NHS may be offered, privately, either by public or private facilities. In a public facility, services outside NHS coverage can be offered within the *intramoenia* framework i.e., where NHS professionals, mainly specialists, can also offer their services to privately paying patients using NHS facilities as part of their (part-time) private practice.
It is not possible to opt out of the public system, thus full substitutive voluntary health insurance (VHI) does not exist. With over 11 million Italians with VHI, it is steadily increasing and estimated to reach 21 million by 2025. Concentrated among higher socio-economic groups, those taking it up mainly do so for faster access to services, to choose a doctor and get reimbursements even for services not covered by the NHS, such as dentist (although partially), glasses, or a single room in the event of hospitalization. In contrast to EU countries, such as Belgium, Germany and France, Italy's private insurance sector is very loosely integrated to the public sector. Moreover, as an incentive to increase private sector utilization, as well as to help families bear the burden of co-payments, private health expenditure is eligible for tax credit, also in the attempt to lighten the burden on the NHS and to better assist those who cannot afford to go elsewhere. With over 60 days national average waiting time to access NHS facilities, many people often resort to specialist visits in private settings. On this regard, healthcare federalism has favored increasingly marked territorial inequalities. In some regions, for example, the average waiting time for some diagnostic tests and specialist consultations is over 7.5 months.

PRIVATE HEALTH EXPENDITURE (% GDP), BY COUNTRY

Italy	**2.3%**
Germany	1.7%
France	1.9%
Spain	2.6%
Portugal	3.1%

Healthcare infrastructures and Human resources **-** Due to policies aimed at controlling health expenditure, increasing hospital efficiency, and reducing waste, there has been a consistent reduction in hospital bed numbers, further implemented by a reduction in the number of healthcare facilities, particularly via the closure of small hospitals or the transformation of acute care facilities into other types of services to meet changing needs (for chronic diseases, ambulatory care or care for the frail and elderly). Italy has a disproportionately high number of small hospitals. The median size of Italian hospitals is one-third less than that of Germany, France, and Austria, and around half that of UK hospitals. This could be due to small hospitals compensating for poor community health services such as home care and long-term care, especially in non-urban areas.
Italy has 3.4 hospital beds per 1000 people; 80% dedicated to acute care (higher than the EU average of 69%) and a bed occupancy rate that has been increasing steadily and is higher than the EU average. The NHS counts on about 191,000 beds for ordinary hospital admissions, 23.3% in accredited private facilities. In 2017, one thousand medical institutions provided hospital care, 51.8% public (dropping from 54% in 2010) and 48.2% private accredited (rising from 46% in 2010).
In general, doctors employed by the National Health Service are salaried and have civil servant status, although general practitioners (GPs) and pediatricians (primary care level) are self-employed and independent professionals, running solo practices, even if national contracts and regional agreements encourage group practices by offering supplements to capitation, extra resources for the practice, including nursing and staff support. The average level of medical care is quite high compared to international standards and Italian doctors are usually highly qualified. With 3.9 practicing doctors per 1000 people, Italy is above the EU average of 3.6 – though, conversely, the number of nurses (not including midwives) is relatively low, at 5.7 per 1000 people, and the ratio of nurses to doctors (roughly 1:1) is among the lowest in the EU – the average is 2.5 nurses to every doctor.
Italy is predominantly a destination country as far as worker mobility, with low reliance on foreign medical doctors – less than 5%, when compared to UK, Ireland, and Switzerland (ranging between 22.5% and 36.8%) - with higher levels of inflows for nurses and care assistants (*badanti*), both legal and illegal, for the elderly care and home-care sectors, who are mainly undocumented workers working in the grey economy. The demand for informal care assistants is estimated to be three times higher than the demand for nurses.
EU Recovery Fund - Amid increasing political instability and faced with the current economic constraints, the largest challenge facing the Italian health system is to achieve budgetary goals without reducing the provision of health services to patients. As matter of facts over the period 2010–2019, the NHS suffered financial cuts of more than €37 billion and a progressive privatization of healthcare services, resulting in a public health system under much pressure. **In the years, government interventions in the NHS have taken the form of either urgent decrees or entries in the annual state budget law, rather than systematic reforms, and have mostly consisted of cuts to public expenditure.**
The Covid-19 pandemic is putting a further burden on the already strained health system but, unexpectedly, it is also shedding a light. The National Investment Program, that Italy is presenting to the European Commission as part of the Next generation EU plan to get out of the pandemic, allocates a total of 20.2 billion euro to strengthen and innovate public health. **A unique opportunity that, if managed well, will reshape the Italian NHS. Primary care and community services are cornerstones of the recovery plan for health, together with technological modernization and the digitalization of the entire health sys-**

HEALTHCARE PERSONNEL, 2018

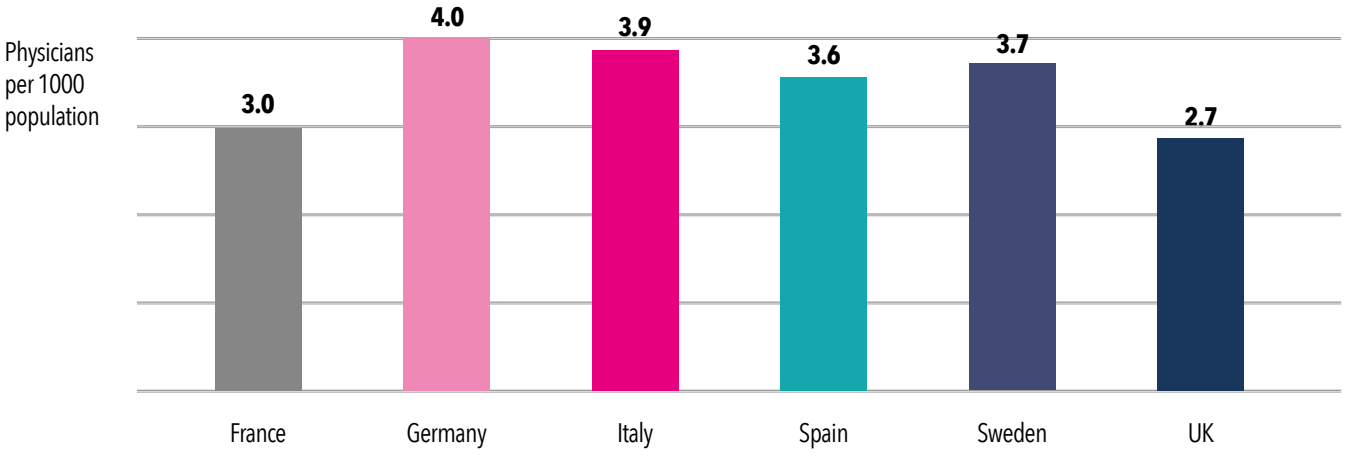
	Healthcare Personnel	Healthcare Personnel per 1,000 population
Specialized doctors	187179	3.1
Anesthetists	12966	0.21
Cardiologists	13358	0.22
Surgeons	8553	0.14
Gastroenterologists	3549	0.06
Geriatricians	4220	0.07
Neurologist	6535	0.11
Oncologists	4637	0.08
Orthopedics	9046	0.15
Otolaryngologists	4500	0.07
Urologists	4084	0.07
Other specializations	115731	1.92
General Practitioners	53109	0.88
TOTAL (General and specialized doctors)	**240288**	**3.98**
Dentists	49552	0.82
Midwives	16807	0.28
Nurses	346949	5.74
Pharmacists	71953	1.19

Source: Istat data, 2018

tem. Of these, 9 billion euros are intended to strengthen homecare and the local health network (primary care), together with development of telemedicine and more effective integration with social services. The Ministry of Health is betting on two organizational models that have already been tested in the past but have never really taken off, namely, community houses, and community hospitals. In community houses, citizens will find all basic social and health services offered by the NHS, provided by a multidisciplinary team made up of family doctors, pediatricians, medical specialists, community nurses and social workers. **The scope is to have the over 53,000 GPs operate in a more structured system, together with specialized personnel and technologies to ensure the most effective treatments and the best assistance to patients' needs, abandoning the logic of solo or associated GPs practices.** Community hospitals are intermediate level between home and hospital care, structures for short-term hospitalization of fragile but not serious patients who basically need nursing care, to avoid improper hospitalizations. **The goal is to completely abandon the hospital-centered logic, which generates diagnostic waste, wards overloaded with non-complex cases, at the same time diverting energy and resources for local care and assistance.**

Among Main Sources:
-Ferré F, de Belvis AG, Valerio L, Longhi S, Lazzari A, Fattore G, Ricciardi W, Maresso A. Italy: Health System Review. Health Systems in Transition, 2014, 16(4):1–168.
-"I privati hanno un ruolo sempre maggiore nella sanità pubblica", by Laura Melissari, https://www.internazionale.it/notizie/laura-melissari/2020/12/09/italia-sanita-privata
- "Boom spesa sanitaria privata: dal 2012 quella diretta cresce del 14% e quella intermediata del 31,5%. Nel 2018 raggiunti quasi 40 miliardi in totale e in media ogni italiano spende 612 euro" by Luciano Fassari, http://www.quotidianosanita.it/studi-e-analisi/articolo.php?articolo_id=85877
-"Sanità- 11 milioni di assicurazioni private, ma la spesa pubblica aumenta, Perché?" by Milena Gabanelli e Simona Ravizza, https://www.corriere.it/dataroom-milena-gab-

Moreover, as an incentive to increase private sector utilization, as well as to help families bear the burden of co-payments, private health expenditure is eligible for tax credit, also in the attempt to lighten the burden on the NHS and to better assist those who cannot afford to go elsewhere.



Source: OECD - Notes: Data refer to professionally active physicians, which include practicing physicians plus other physicians working in the health sector as managers, educators, researchers, etc. (adding another 5–10% of doctors); data refer to practicing physicians, which are defined as those providing care directly to patients.

anelli/sanita-11-milioni-assicurazioni-private-ma-spesa-pubblica-aumenta-perche/47c85c9c-5ab7-11e8-be88-f6b7fbf45ecc-va.shtml
-"Recovery, alla sanità 20,2 miliardi per cure sul territorio e digitale. Ma il nuovo piano dimezza case della salute e ospedali di comunità", https://www.ilfattoquotidiano.it/2021/04/28/recovery-alla-sanita-202-miliardi-per-cure-sul-territorio-e-digitale-ma-il-nuovo-piano-dimezza-case-della-salute-e-ospedali-di-comunita/6179602/
- RECOVERY FUND, PIOGGIA DI MILIARDI PER LA SANITÀ MA I MEDICI NON SONO STATI INTERPELLATI NELLA BOZZA DEL PIANO CHE CAMBIERÀ IL VOLTO DEL SISTEMA SANITARIO ITALIANO, https://www.motoresanita.it/recovery-fund-pioggia-di-miliardi-per-la-sanita-ma-i-medici-non-sono-stati-interpellati-nella-bozza-del-piano-che-cambiera-il-volto-del-sistema-sanitario-italiano/
-WHO - https://www.euro.who.int/en/countries/italy
- Italy's Healthcare System in Transition, https://health-management.org/c/it/issuearticle/italy-s-healthcare-system-in-transition
-Istat data, 2018
-The Italian health system and the COVID-19 challenge, The Lancet, https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(20)30074-8/fulltext
- ŒCD/European Observatory on Health Systems and Policies (2019), Italy: Country Health Profile 2019, State of Health in the EU, ŒCD Publishing, Paris/European Observatory on Health Systems and Policies, Brussels, https://doi.org/10.1787/cef1e5cb-en

AT A GLANCE

MEDICA
www.medica.de

COMPAMED
www.compamed.de

INFOMEDIX INT'L
HALL 16 BOOTH A34

HALLS 1, 3
Laboratory Equipment/
Diagnostic Tests

HALL 4
Physiotherapy/
Orthopaedic Technology

HALLS 5, 6, 7A, 7.0
Commodities and Consumer Goods

HALLS 15,16
Imaging and Diagnostics/
Medical Equipment and Devices/
National and International Joint
Participants

HALLS 9, 10, 11, 17
Imaging and Diagnostics/
Medical Equipment and Devices

HALL 12
IT systems and IT solutions

HALLS 13, 14
COMPAMED - High-tech Solutions
for Medical Technology

Halls plan as of: September 29, 2021

15-18 NOVEMBER 2021

ENTRANCE TIME
Monday – Thursday 10.00 a.m. – 6.00 p.m.

Organizer
Messe Düsseldorf GmbH
Messeplatz
40474 Düsseldorf
Tel: +49 211 4560-01
Fax: +49 211 4560-668
Web: www.messe-duesseldorf.de

Entrances:
North A (downstairs),
North B (upstairs 1st floor)
North D, East, South

MEDICA 2021 + COMPAMED 2021: For The Restart As An In-person Event, Participations Reflect The Optimism Of The Medical Technology Industry

Düsseldorf 2 Sept., 2021 - The medical technology industry and its suppliers are looking forward to heading to the world's leading industry platforms, MEDICA 2021 and COMPAMED 2021, with optimism. The booking figures for both events confirm this. Almost all of the halls at the Düsseldorf Trade Fair Centre will be occupied from 15 to 18 November, when the trade fairs will be held on-site once more. "Despite the planning time frame for companies becoming far shorter due to the pandemic, a total of over 2,500 exhibitors from 68 nations was attained three months before the trade fair started. In particular, bookings from co-exhibitors on the big joint stands are still being snapped up like hotcakes", reports Christian Grosser, the Director for Health & Medical Technology at Messe Düsseldorf. He believes that this is proof of MEDICA and COMPAMED's internationally prestigious position, despite the tough conditions in which they are taking place.

Due to their high level of global attraction, both events are also on the list of the selected trade fairs that the German Federal Ministry for Economic Affairs and Energy (BMWi) in conjunction with AUMA (The Association of the German Trade Fair Industry) are supporting. These bodies have recently jointly set up an assistance programme to support innovative small and medium-sized companies (headquartered in Germany) in participating in trade fairs. This assistance comprises a grant of up to 12,500 Euro to cover costs for stand rental and stand construction. Objective: To reinforce export marketing in order to gain new customers and tap into new markets.

Innovations, trends and topics dedicated to the pandemic

The corona pandemic has pushed the healthcare sector firmly into the spotlight and has shown up weak points in our care system. Hospitals, outpatient service providers and care institutions have an increased need for medical and laboratory technology, a wide variety of medical products and personal protective equipment, and in particular new digital healthcare solutions or point-of-care telemedical applications, due to the pandemic. The exhibitors will present many innovations focused on these themes, and the specialist forums and accompanying conferences on these will amplify the expert dialogue and transfer of knowledge, the content of both of which will be perfectly tailored to the needs of the important target groups in the healthcare industry.

Once again, CompuGroup Medical (CGM) will be one of the biggest exhibitors at MEDICA. They are an international provider of medical software solutions that is addressing trending topics. Michael Franz, Head of Brand Communication at CGM SE & Co. KGaA, is excited about the upcoming trade fair: "CGM is delighted to be able to take part in MEDICA once again, at long last. From our point of view, this new hybrid concept helps to fulfil our high expectations for trade fairs, even during a pandemic. Trade fairs should stimulate interactive exchange between all participants, across all

sectors. We will be able to demonstrate this to our customers and interested parties with aplomb at the biggest healthcare trade fair in the world. All of the current digital themes are shown using hands-on use cases, covering the patient's entire journey."
The theme segments of MEDICA are oriented towards the complete needs of outpatient and inpatient care. An overview of their allocation to the trade fair halls is available online (link: https://www.medica.de/sitemap2021).
The MEDICA segments are: Lab technology & diagnostics, electrotherapy and medical technology, disposables and consumables, information and communication technology (digital health) and physiotherapy and orthopaedic technology. Fittingly, the exhibitors at COMPAMED (approx. 400 exhibitors) will showcase the entire range of products and services that the supplier market provides for medical technology: from individual components and parts to high-tech solutions, innovative materials and packaging to complete contract manufacturing.

The digital services launch was a success!

The profiles of all exhibitors admitted to date can be looked up online on the "Companies & Products" database, and can be filtered using a variety of criteria, on the industry portals MEDICA.de and COMPAMED.de. The interactive hall plans provide information on the exact stand locations of the exhibitors in the individual halls (www.medica.de/de/interaktiver_hallenplan). The ticket shop has also been launched. In line with the hybrid event concept of MEDICA and COMPAMED, tickets can now be purchased either as a hybrid ticket for a one-day visit on site and parallel use of the extensive digital services (45 euros) or as a pure digital ticket (without a visit on site/ 30 euros).

All of the specialist forums which are integrated into the themed segments of the trade fair, such as the MEDICA CONNECTED HEALTHCARE FORUM (including the MEDICA Start-up COMPETITION and the Healthcare Innovation World Cup), the MEDICA HEALTH IT FORUM and the MEDICA LABMED FORUM, are some of the programme items that are offered both on-site and online, which can be accessed with the appropriate ticket. The COMPAMED HIGH-TECH FORUM by IVAM (the International Microtechnology Business Network) and the COMPAMED SUPPLIERS' FORUM by DeviceMed are special COMPAMED highlights.

In addition to these highlights, there will also be a programme of on-stage events at the epicentre of the trade fair. In parallel, speeches, discussions and even the award ceremonies can be viewed via live stream on the industry portals MEDICA.de and COMPAMED.de with the right ticket (link to overview of all forums and their themes for 2021: https://www.medica-tradefair.com/forums).

Further highlights of MEDICA 2021's programme include the 44th German Hospital Conference (as a live stream) and the English language conferences DiMiMED and MEDICA MEDICINE + SPORTS CONFERENCE. They bring together the best of the best from the fields of international military and disaster medicine, and sports medicine and sports science, in Düsseldorf and can be followed with one of two tickets: either live in-person, or as a live stream.

The trade fair halls are open from 10 a.m. to 6 p.m. on all days of the trade fair. All visitors and exhibitors must comply with the the 3G rule (they must be vaccinated, recovered, or tested: this is what the three Gs stand for in German) in order to enter the trade fair premises. Tickets can be purchased exclusively online.

All information, for example current news on the hygiene and infection protection concept at MEDICA 2021 and COMPAMED 2021, can be viewed online at:
www.medica-tradefair.com
www.compamed-tradefair.com

Press Contact:
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Tel: (+49) 211-4560-444 / 549
E-Mail: KochM@messe-duesseldorf.de
BrowaL@messe-duesseldorf.de

VISITOR PROFILE DATA

Results of the visitor survey

MEDICA 2019

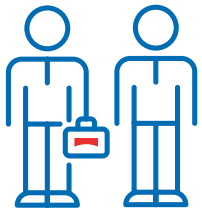
WORLD FORUM FOR MEDICINE

www.medica.de

Member of MEDICAlliance

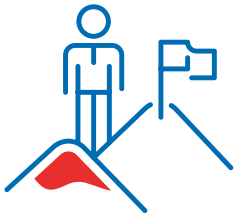
No. of visitors

121.369



Origin of visitors

Germany	31%
Abroad	69%



Visitors attendance statistics

Trade visitors	98%
First time visitors	35%
Days spent Ø	1,8 Tage

Visitors interests

Electromedicine/ medical technology	55 %
Information and communication technology	34 %
Diagnostic tests	34 %
Disposables, commodities and consumer goods for practices and hospitals	26 %
Physiotherapy/ orthopaedic technology	23 %
Laboratory technology	19 %
Operating tables, medical support units, medical furnitur	17 %
First aid/emergency devices and equipment	11 %
Publications	1 %

Germany

West	47 %
South	20 %
North	15 %
South West	13 %
East	5 %

Abroad

Europe	**67 %**
EU	79 %
Non-EU	21 %
Non Europe	**33 %**
Asia	60 %
North America	17 %
Africa	13 %
South- and Central America	9 %
Australia	1 %

Sector/occupation

Industry	27 %
Trade	17 %
Hospital/clinic	15 %
Medical laboratory/ institute	7 %
Medical Care Centre	6 %
Purchasing group	6 %
Medical practise	6 %
Physiotherapist practice	5 %
Science and research	4 %
Services	3 %
Care	3 %
Others	1 %

Competence about decisions

Decisive authority	48 %
Co-decisive authority	41 %
Consultative capacity	10 %
Not involved in decision-making	1 %

General assessment

Satisfactory	97 %
Less satisfactory	3 %

Compiled by: Messe Düsseldorf, as at 12/2019
Subject to change without notice

Messe Düsseldorf

Calendar

Here our trade shows selection.
Discover all worldwide exhibitions at
www.infomedix.it/calendars/tradeshow

01/01-31/12/2021

SMART MEDICAL FAIR 2021

The International Virtual Medical Trade Fair
Italy

Organized by:
Infodent&Infomedix International

www.smartmedicalfair.com

Smart Medical Fair is an international virtual exhibition open all year round organized by categories.

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www.smartmedicalfair.com/stand/h5p1b0z1217

NOVEMBER

09-11/11/2021

CPhI Worldwide 2021

Milan - Italy

***** 25 Oct - 19 Nov 2021**
Online Conference & Networking
Organizer: Informa Markets
Phone: +31 20 245 5355
www.cphi.com

www.cphi.com/europe

MEDICA

15-18/11/2021

MEDICA and COMPAMED 2021

Infomedix International Booth:
Hall 16, Stand A34
Düsseldorf - Germany

Organised by Messe Duesseldorf GmbH
Messeplatz, Stockumer Kirchstrasse 61
D-40474 Duesseldorf
Germany

Postal Address: PO Box: 10 10 06
D-40001 Duesseldorf
Germany
Phone: +49 211 45 60 01
Infophone: +49 211 45 60 900
Fax: +49 211 45 60 668
Email: info@messe-duesseldorf.de
Website: www.messe-duesseldorf.de
Venue:
Duesseldorf Trade Fair Centre
Messeplatz
40474 Duesseldorf
Germany

www.medica-tradefair.com

16-18/11/2021

Health & Rehab Scandinavia 2021

Copenhagen - Denmark

Organized by:
Danish.Care

Project Manager:
Helle Pedersen, T. +45 6122 5756
Project Assistant:
Mette Prip Lundegaard, T. +45 2327 4795
E-mail: info@health-rehab.com
Venue: Bella Center
Copenhagen, Center Boulevard 5, DK-2300
Copenhagen S
Denmark

www.health-rehab.dk/gb

21/11/2021

Health Wellness Fitness Expo - Sydney

Sydney – Australia

Contact details:
hello@healthandwellnessexpo.com.au

Website:
www.healthwellnessfitnessexpo.com.au

Venue: Sydney Showground
Sydney
Australia

www.healthwellnessfitnessexpo.com.au

NOVEMBER / DECEMBER

28/11-02/12/2021

EuroMedLab 2021 The 24th IFCC-EFLM European Congress of Clinical Chemistry and Laboratory Medicine

Munich – Germany

Organized by: MZ Congressi s.r.l.
Member of the MZ International Group
Via Carlo Farini 81
20159 Milano
Italy
Phone: +39 02 66802323
Fax: +39 02 6686699
Email: info@euromedlab2019barcelona.org

Venue: ICM Internationales Congress Center
Munich
Germany

www.euromedlab2021munich.org

02-05/12/2021

Taiwan Healthcare Expo 2021

Taipei – Taiwan

Venue: Taipei Nangang Exhibition Centre
Hall 1
Taipei
Taiwan

https://expo.taiwan-healthcare.org

03-05/12/2021

Abilities Expo Dallas 2021

Dallas, TX - USA

Abilities Expo
299 N. Euclid Ave., 2nd Floor
Pasadena, CA 91101
Phone: (323) 363-2099
Fax: (424) 238-6358
Email: info@abilities.com

Venue: Dallas Market Hall
Dallas, TX
USA

www.abilities.com/dallas

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06-10/12/2021

Zdravookhraneniye 2021
Russian Health Care Week - International Scientific and Practical Forum

Moscow – Russia

Expocentre
Krasnopresnenskaya nab., 14
Moscow, Russia, 123100
Phone: +7 499 795 3799 // 795 3946
E-mail: centr@expocentr.ru

Venue: Expocentre
Moscow
Russia

www.zdravo-expo.ru/en

JANUARY

Arab Health
By Informa Markets

24-27/01/2022

Arab Health 2022

Dubai - United Arab Emirates

Informa Markets- Middle East
20th Floor, Dubai World Trade Center Tower - Sheikh Zayed Rd
Dubai
United Arab Emirates

Email: arabhealth@informa.com
Website: www.arabhealthonline.com

Venue:
Dubai International Convention & Exhibition Centre
Dubai
United Arab Emirates

www.arabhealthonline.com

Given the current situation worldwide, we warmly invite you to check trade shows dates, venues and booths location listed in this magazine

27/01/2022

Neuropathic-Pain 2022

The 2nd International Conference on Controversies in Neuropathic Pain Virtual Event

Germany

Organized by: BioEvents Congress Secretariat
Tel UK: +44 203 051 4032 ext. 521
Tel US: +1 857 400 0035 ext. 521

Email: info@bioevents-congress.com

www.neuropathic-pain2022.com

FEBRUARY-MARCH

27/02-01/03/2022

Dubai Derma -

21st Dubai World Dermatology and Laser Conference & Exhibition
Dubai - United Arab Emirates

Organized by: Index Conferences & Exhibitions Organisation Est.
P.O.Box 13636, Dubai, United Arab Emirates
Phone: +971 4 3624 717

Email: derma@index.ae
www.dubaiderma.com // www.index.ae
General Enquiries: Vaneza Liaguno (Senior Project Manager)
Phone: +971 4 520 8888 Ext: 603
Direct: +971 4 520 8848
Mobile: +971 50 8939312
Email: vaneza.santos@index.ae
Venue: Dubai International Convention and Exhibition Centre - Dubai - UAE

www.dubaiderma.com

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MADAGASCAR: On The Frontline Of A Climate-driven Hunger Crisis The Devastating Effects Of The Climate Crisis

The effects of climate change are ravaging the southern districts of Madagascar, a country that produces just 0.01% of global emissions. The frequency and intensity of droughts have risen sharply in the last few years – having a devastating impact on the health of people living there.

21 July, 2021 - Climate change is happening today – and for the people of Madagascar its consequences are already deadly. The country is teetering on the brink of a famine it has played little or no part in creating. With the country now in the grip of the worst drought in 40 years, the UN is warning that half a million people are heading towards starvation.
The scale of this crisis is immense. In some communities, entire families are surviving on cactus leaves alone. In others, mothers are mixing tamarind with ashes from the fire – just to put something in their children's stomachs.

The kéré – which roughly translates as famine in Malagasy – has become frequent in the south, especially during prolonged dry seasons when agricultural production is low due to a lack of rain. The kéré arrived in certain areas as early as 2017 and has never left. Successive droughts and vicious sandstorms – known as tiomena – have destroyed crops and turned arable land to desert. The impact of Covid-19 has also increased food prices and reduced job opportunities.
A lack of rainfall and dry lands have made a bad situation worse. With temperatures reaching 35° during the hot season, families often have little choice but to consume whatever water they can find, leading to a spike in the number of waterborne diseases.

Not only do waterborne diseases, such as diarrhoea, pose their own health risks to children, they also increase the likelihood of a child becoming malnourished. Malnutrition remains the biggest killer of children under five around the world, contributing to almost half (45 per cent) of all infant deaths.
According to the UN, nearly 14,000 people are already experiencing famine conditions in Madagascar's Grand Sud region. Among children under five, 27,134 are

Action Against Hunger's teams specialise in treating child malnutrition and we're one of the few organisations working in Madagascar's southern districts.

suffering from severe acute malnutrition – the most life-threatening form of hunger. Madagascar is one of the poorest countries in the world.

Though the country's economy benefits from ecotourism, ecological research and a growing agricultural sector, the unequal distribution of wealth has left the vast majority of Malagasies living in poverty. The country is also extremely vulnerable to the effects of climate change, in particular droughts, floods and cyclones. The 2019/2020 rainy season was one of the lowest for years and led to smaller harvests than normal. Covid-19 restrictions have also disrupted supply chains and reduced household incomes – increasing the risk of malnutrition for many.

How Action Against Hunger is helping

Action Against Hunger's teams specialise in treating child malnutrition and we're one of the few organisations working in Madagascar's southern districts. Our staff provide treatment to communities who normally don't have access to health facilities.

But our teams are now helping more children than ever. Between October and March last year, our teams in the south of the country treated:

- 8,727 children under five with severe acute malnutrition
- 8,582 with moderate acute malnutrition
- 9,611 with other diseases.

Our programmes focus on fighting undernutrition through strengthening the local healthcare system. This includes:

- creating 14 mobile healthcare teams to fight child malnutrition in hard-to-reach areas affected by drought
- introducing a community-led water, sanitation and hygiene (WASH) programme aimed at improving hygiene behaviour in the Androy and Atsimo-Andrefana regions
- disaster risk reduction programmes to help the local community in the Tuléar region respond to extreme weather events caused by climate change
- participating in an urban cash transfer project to meet the growing needs of 15,000 households
- Our country office has also set up new projects to respond to Covid-19 – training over 300 health centre staff on how to stop the spread of the virus.

www.actionagainsthunger.org.uk
support@actionagainsthunger.org.uk

Source: article taken from https://www.actionagainsthunger.org.uk/our-impact/stories/madagascar-on-the-frontline-of-a-climate-driven-hunger-crisis

NON PROFIT

Save the Children

AFGHANISTAN: Save the Children Resumes Life-Saving Services for Children in Kandahar

Sept. 14, 2021 - Save the Children restarted its life-saving services in Afghanistan's southern city of Kandahar today. The agency said it had carried out thorough security checks to ensure that both male and female staff would safely be able to return to work delivering essential health and nutrition services for children.

The recent escalation in violence in Afghanistan forced Save the Children to suspend its programs in the country in mid-August. Years of conflict, natural disasters, and the fallout of COVID-19 have pushed Afghanistan to the brink of disaster. Even before the recent escalation in violence, 5.5 million children were projected to face crisis levels of hunger this year. In addition, half of all children under five were expected to suffer from acute malnutrition. This number is now expected to rise due to the combined effects of drought, COVID-19, and recent disruptions to aid efforts.

Chris Nyamandi, Country Director of Afghanistan for Save the Children, said: "With millions of Afghans on the brink of starvation, services like ours can mean the difference between life or death for many children. It is reassuring that we can get back to work providing children and their families in Kandahar with our life-saving health and nutrition services, and we hope to resume operations in other parts of the country as soon as we can.

The need cannot be overstated. As we speak, thousands of displaced families are sleeping outside in the open without food or medical care. Families are selling what little they have to buy scraps of food for their children. With the bitter winter just around the corner, millions of children could succumb to malnutrition and disease in the coming months. It's essential that we reach them as soon as possible."

Save the Children's mobile health team in Kandahar provides essential health and nutrition services for children and their families in rural areas, including treatment for malnutrition and vital immunization services to protect children from infection and disease. Since the start of the year, Save the Children has reached more than 146,000 people in Kandahar, including more than 35,600 children, with its life-saving services. Save the Children is an independent, impartial, and politically neutral organization that has worked in Afghanistan since 1976, providing health, education, child protection, nutrition, and livelihoods services. The organization reached over 1.6 million Afghans in 2020.

Save the Children believes every child deserves a future. Since our founding more than 100 years ago, we've changed the lives of more than 1 billion children. In the United States and around the world, we give children a healthy start in life, the opportunity to learn and protection from harm. We do whatever it takes for children – every day and in times of crisis – transforming their lives and the future we share. Follow us on Facebook, Instagram, Twitter and YouTube.
www.savethechildren.org

Source: article taken from https://www.savethechildren.org/us/about-us/media-and-news/2021-press-releases/save-the-children-resumes-life-saving-services-for-children-in-kandahar

Right now, the situation for children in Afghanistan is dire, with at least 75,000 having had to flee their homes in the last months amid escalating violence. Even before the Taliban takeover, Afghanistan was crippled by hunger and poverty; as COVID-19, conflict, and drought combined to create a food crisis of a scale not previously seen.

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