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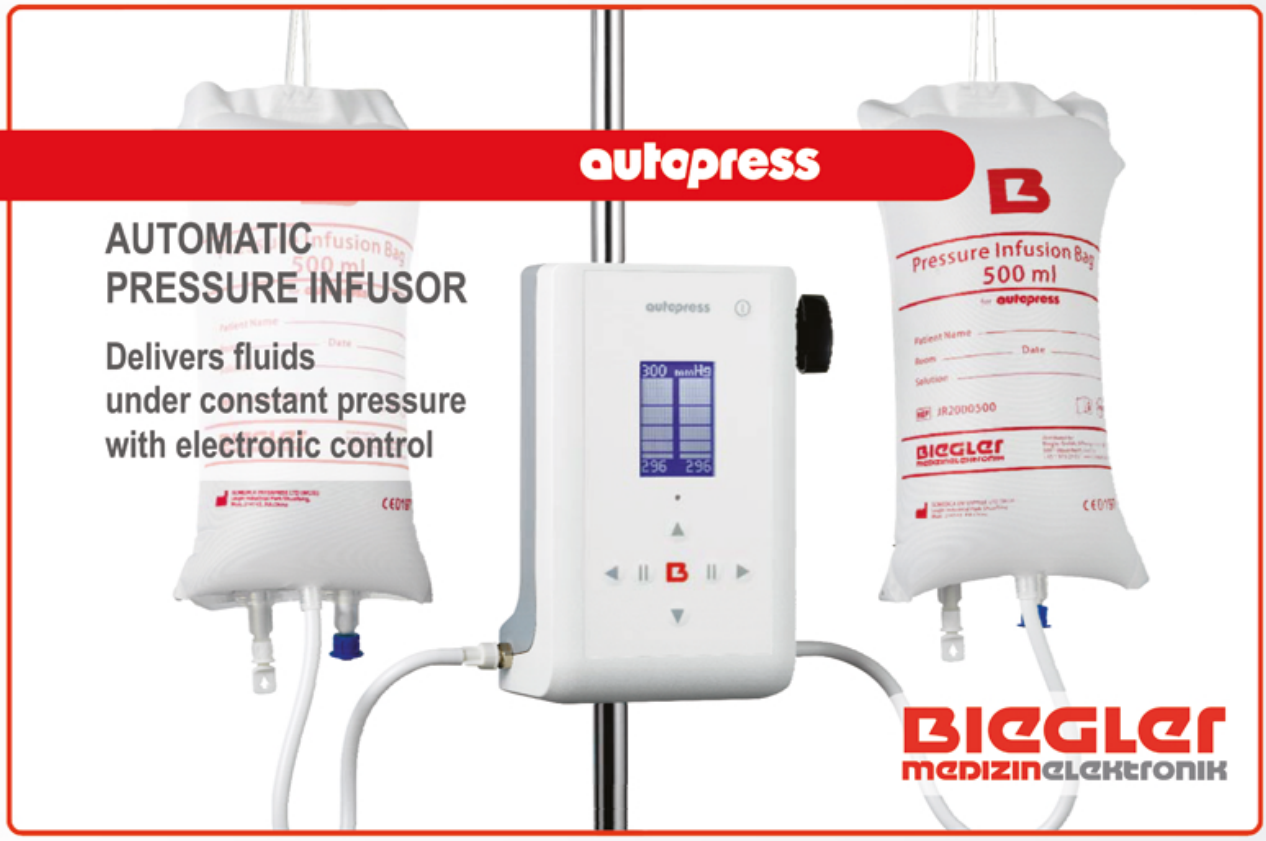

Automatic Pressure Infusor

BIEGLER GmbH develops and manufactures medical devices and disposables for over 40 years. Biegler serves their customers by offering them not only high quality products and services but comprehensive and personal support as well.

The company based in Austria / Europe introduced the AUTOPRESS device as an important part of its fluid warming philosophy. Autopress works directly with Biegler blood and infusion warmers to deliver blood and fluids at high flow rates or as a stand-alone unit to deliver fluids at constant pressure up to 300 mmHg wherever needed.

Pressure infusing bags are mainly used for irrigation purposes during arthroscopy, laparoscopy and hysteroscopy. The adjusted pressure is constantly maintained and therefore does not require manual compensation.

When connected to an electrical outlet, Biegler Pressure Infusor automatically maintains pressure on blood and IV fluid bags. Pressure range is zero to 300 mmHg.

Features at a glance:

- Pressure is adjustable and always maintained
- Precise pressure setting from zero to 300 mmHg with electronic control
- Accomodates pressure cuffs 2 x 500, 2 x 1000 or 2 x 3000 cc
- Small and lightweight
- Mains operated
- Pressure cuffs can be emptied rapidly and easily
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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

The Age of the Customer

The most important part of constructing effective marketing communications is being able to adapt, and marketers must be ready to change their approach when old strategies start to look obsolete.

With the introduction of new technologies, cultural shifts, and the evolution of customer expectations, the digital age never pauses. With the advent of Big Data, the most revolutionary change was the shift from the Age of the Seller, which meant pushing the next "big thing" that could better satisfy needs, like comfort, luxury, or convenience of customers, towards the Age of the Customer where consumers, more connected than ever, actively started to demand tailored, personalized experiences, rejecting brands that they considered irrelevant to their needs. The balance of power has shifted from businesses to customers.

But how did we get to the Age of the Customer? At the beginning of the 1900s, Europe and the United States were coming to the end of the Industrial Revolution, and companies with massive manufacturing operations were dominating the market, dictating the entire buying process. Since mass-distribution wasn't available, they could only reach customers in their near-by areas, all they needed was to make sure these people were happy and willing to return to them.

In the 1960s, modern transportation made it possible to deliver products all over the world: the *"Age of Distribution"*. Businesses started to think globally in terms of distribution, focusing on revenues and customer acquisition. As they could reach more customers, they could also afford to make more mistakes. After all, there was no internet for customers to complain.

The industry started to retrace its steps once we entered the *"Age of Information"*, where consumers had access to the internet and could voice their opinions about different products and companies. At this point though, the power between businesses and customers was still not even. The information customers could share was not in real-time nor was it organized enough to make a real impact on the business.

Some analysts mark the *"Age of the Customer"* as 2013, but we really entered this era in 2008 with the rise in popularity of social media platforms like Facebook, Twitter, and more. They suddenly created a world where consumers from all over the globe could chat with one another about their experiences. They could reply to marketing messages in real-time and post their own content on a brand's social media page. If a customer has a poor experience, they do not just tell the business. They tweet about it to their friends who reply and retweet until hundreds of people know about it, putting brands in a delicate balance where, if the post starts to go viral, that hundreds of followers can quickly turn into a few thousand or even a million. Content is no longer only created and controlled by a brand. Customers can churn out their own content that runs parallel. And, if a product fails to impress, contrary to that of a brand, it can generate as much, if not more, publicity.

So, in the Age of the Customer, it is imperative to commit to your customers' specific needs, to listen and build a true relationship with them. It is no longer the time to treat the customer with one-size-fits-all marketing promotions. Earning your customers' trust and loyalty comes from putting your customers' needs first, providing constant and excellent customer service, even if, sometimes, that might come at the expense of your own business.

Infomedix International has dedicated its entire existence in customized marketing solutions and services, acquiring all the tools and knowledge to help companies find new business partners around the world. You might be wondering what comes after the Age of the Customer and, although it is hard to predict the future, we passionately believe that we will continue to put the customer first. For sure we will not go wrong!

Baldo Pipitone
CEO Infodent S.r.l.
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DR systems: a wide range of solutions for the most accurate clinical investigations

The DR range offered by GMM stretches from simple, particularly compact and rational configurations to more advanced systems with built-in programmable positioning, safely ensuring a large patient flow and delivering high-quality examinations. Kalos system provides unique features, such as the non-floating tabletop, considered as a real asset in the trauma room: indeed, any uncontrolled movement of the table while a fracture or a dislocation is being manipulated and aligned is out of the question. On the other side, Calypso series satisfies any possible clinical request: in the context of overhead tube suspended and floor-based radiography systems, Calypso can be fully motorized with auto-positioning, motorized with auto-tracking, or manual. The integration of all systems with an acquisition workstation and digital flat panel detectors guarantees the instantaneous visualization of high-quality digital images, which can be optimised thanks to the sophisticated image processing features.

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Giotto Class S - Productivity combining innovation and quality in the breast care

Giotto Class S is a versatile system that can be configured for 2D or/ and 3D breast tomosynthesis imaging choosing between different options, accessories and advanced interventional applications like high-precision tomo-guided biopsy or contrast enhanced spectral mammography, including an integrated biopsy specimen checker. It features a unique, particularly ergonomic design which ensures patient comfort and user-friendliness for the operator. The C-arm stand enables a wide freedom of inclination: it can be tilted downwards and upwards to maximize patient comfort and breast positioning.
The system is easy to use and fits small places offering high throughput thanks to the increased speed of gantry's movement and positioning.
IMS Giotto is a company of GMM Group.

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JET DR: Our motorized digital radiographic unit

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Biegler

Biegler GmbH based in Austria/Europe extends its product line of blood and infusion warmers with the device **BW 410**.

At a glance:
- Adjustable temperature
- Consumable inserted through the side
- Easy to open and cleanable design
- Mounting on infusion stand or normed rail
- Consumable available with integrated bubble trap
- Continuously operating safety and alarm systems

You are invited to learn more about Biegler at www.biegler.com

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Spectra Medical Devices

In 2020 Spectra Medical Devices is celebrating its 25th anniversary as one of the largest procedural needle manufacturers in the world, with substantial market share in over 40 countries. Spectra utilizes the latest state-of-the-art manufacturing, measuring and inspection systems, along with over 225 years of senior staff needle-manufacturing experience. Spectra has been awarded several U.S. patents

for special needle processing and products, as well as U.S. FDA medical device clearances and drug approvals for lidocaine and sodium chloride. In the future we will be offering several more similar drugs as well.
Our primary focus is on patient safety and achieving substantial growth through quality and innovation. Spectra has five manufacturing plants worldwide, employing over 300 personnel. Our corporate headquarters is located in Wilmington, Massachusetts.

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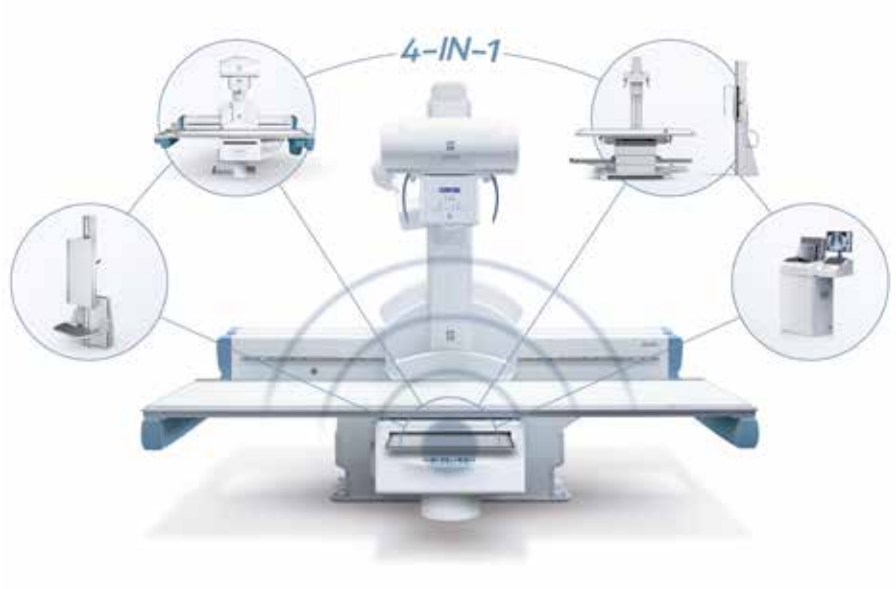
Villa Sistemi Medicali presents the R/F hybrid system Apollo DR-Wi

The innovative DR-Wi version of Apollo and Apollo EZ is designed to get the most out of the combined use of the wireless Flat Panel and the analogue remote controlled table with appropriately optimised functions. The focus-detector distance variable up to 180 cm and the flexible positioning of the X-ray source allow to do chest projections on the table, direct contact and off-table exposures with the Wi-Fi detector. The workflow is simplified even more by the *Multi-Grid* system, which automatically selects the most suitable anti-scatter grid based on the focus-detector distance set or leaves it parked when it's not required.

Particular importance has been given to the integration of the *automatic Stitching procedure* to allow the full-leg and full-spine examinations. All this makes the Apollo DR-Wi a *truly multifunctional system*, as it combines in a single device all of the applications usually performed with analogue remote controlled tables, conventional radiographic rooms, large format chest stands and CR systems.



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Use the same software and database for both 2D and Ceph examinations

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NewTom has yeat again pushed back the boundaries of medical imaging

A global benchmark in the field of diagnostic imaging technologies, NewTom was the first company to introduce Cone Beam technology into the dental sector with a pioneering range of CBCT units.
Today, NewTom is a vast array of clinical solutions for both medical, dental and veterinary diagnostics. A trusted brand delivering state-of-the-art equipment and providing professional support and service around the globe.
NewTom has extended the boundaries of medical imaging, introducing the most advanced diagnostic devices capable of micrometric, ultra-high-resolution detail of bone structure, covering all anatomical areas, from Head & Neck examinations to ENT, MSK for orthopaedics as well as dental maxillofacial radiology. In each area NewTom has led the field, innovating through technology and, as a benchmark within the market, driving scientific trends. Patented algorithms, advanced functions for imaging, as well as a host of features devoted to reducing the effective dose, thereby safeguarding the health of operators and patients alike, are just a part of the innovations achieved through NewTom's constant commitment to technological excellence.
All devices are supported by powerful DICOM 3.0 compatible NNT software which can interface with third party systems and software to store and exchange medical data. Discover the NewTom 7G, the first ever Multi-Scan Body CBCT, available today!

NewTom

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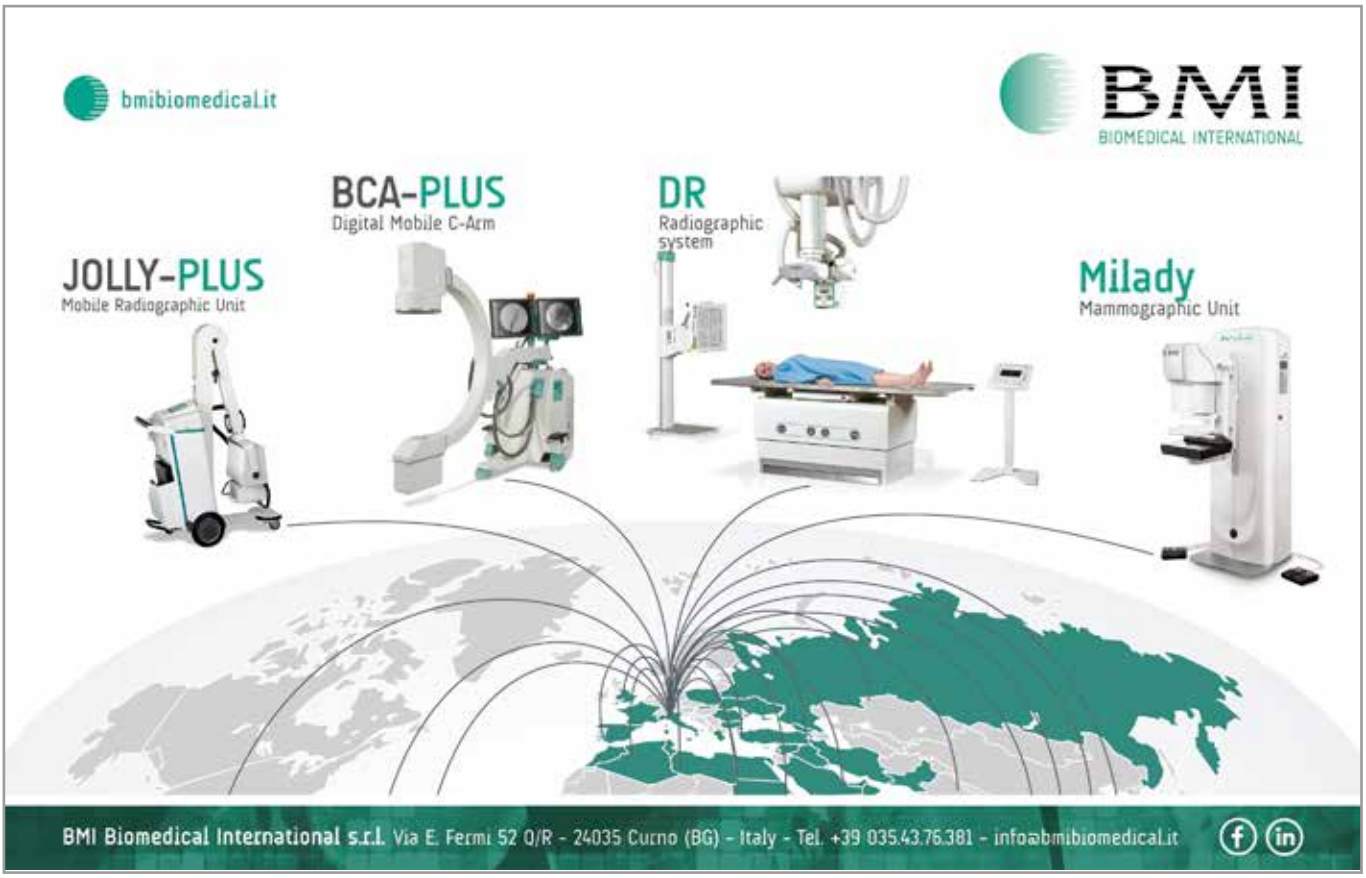


A world first from Silfradent research team:

Regenerative medicine

The CGF (Concentrated Growth Factors) initial popularity grew from its promise as a safe and natural alternative to surgery. The CGF promoters supported the procedure as an organism-based therapy that allowed healing thanks to its own natural growth factors.

Doctor Paola Pederzoli
specialist in dentistry, dental prosthetics and aesthetic medicine.
She organizes courses in aesthetic medicine by Silfradent Academy company
pederzoli.paola@gmail.com

In recent years, scientific research and technology provided a new perspective on platelets. Studies suggest that platelets contain abundance of growth factors and cytokines which can affect the inflammation, the post-operative blood loss, the infection, the osseogenesis, the wound, the muscle laceration and the soft tissue healing.
Research now shows that platelets release also numerous bioactive proteins responsible for the attraction of macrophages, mesenchymal stem cells and osteoblasts that not only promote the removal of degenerated and necrotic tissues, but also improve tissues regeneration and healing.
In regenerative medicine, three factors are important to optimize the regenerative process: the scaffold (biological, natural or synthetic), growth factors and autologous cells. All the above is present in CGF. CGF is obtained following a process of blood separation collected in vacuum tubes, using a special medical device (Medifuge, Silfradent Srl, Italy). The CGF technology has an interesting characteristic: the centrifugation simplicity and speed, allow a more elastic matrix of fibrin glue rich in growth factors. Using SEM analysis (Electron Scanning Electron Microscopy), Rodella and associates (University of Brescia) showed the presence of a fibrin network formed by thin and thick elements with numerous platelets trapped in the network itself, representing an optimal autologous scaffold. In addition to the growth factors released after the platelets activation and degranulation, we also count the vascular endothelial growth factor (VEGF), the insulin growth factor (IGF), the transforming growth factor (TGF), the tumour necrosis factor (TNF), the brain-derived neurotrophic factor (BDNF) and the presence of TGF-β1 and VEGF.

In recent years, scientific research and technology provided a new perspective on platelets.

"APAG" DENATURATION DEVICE
- A.P.A.G. Activated Plasma Albumin Gel
- I.C.F. Induces Collagen Formation
Built with anti-static and anti-magnetic materials.
Operations with heating pulse and thermal equilibrium temperature

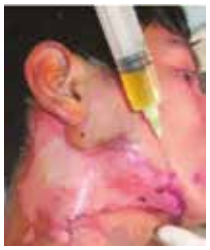
The presence of autologous cells like platelets and leukocytes, including CD34+ cells, have been described in the CGF. The histochemical evidences indicate the role of CD34+ cells, circulating on vascular level: neovascularization and angiogenesis. The presence of these cells in the PRP benefit the tissue re-growth. The CGF has a good regenerative capacity and various fields of application. The use of Platelet-rich Plasma (PRP) has already been for years a reality and a scientific evidence verified by the international medical community for plastic surgery in the treatment of severe burned cases. Plastic surgeons and their patients benefit greatly from tissue regeneration through PRP, obtaining a clearly superior recovery both in tissue quality and healing speed.
In Maxillary facial surgery and Implantology, the potentialities of CGF Concentrated growth factors have been known for years. Its application helps and stimulates the bone regeneration both in managing endosseous implants and in the healing of difficult fractures.

This is a well-documented and effective procedure. Already in 1970, using PRP it was proven a 20% increase in the trabecular bone density, a 40% reduction in healing times and an 80% decrease in pain levels.
Researcher have investigated this effect also in periodontal problems. Conclusions reported that PRP technique represents a rich source of growth factors able to bring significant changes in periodontal damages and it is capable to suppress the cytokines release, limit inflammation and promote in such way the tissue regeneration.
Orthopaedic surgeons know well how the speed of healing processes for tendons and articular surfaces traumas improves thanks to the use of PRP platelets Growth Factors.
The CGF is now used in musculoskeletal medicine with increasing frequency and effectiveness. Soft tissues injuries, such as tendinopathies and tendinitis, have been treated with PRP since the early '90s.
The PRP has also been used for the treatment of muscle fibrosis, ligament distortions, joint

"MEDIFUGE MF 200"
Blood Separator
- Differentiated acceleration
- Speed and fractional - alternating RCF
(dœs not allow the platelet degranulation)
- Anti-static and anti-magnetic rotor
- Constant temperature maintained by
self ventilation / self decontamination

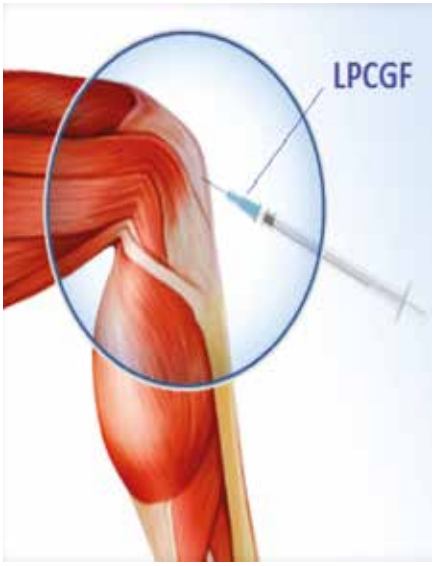
capsular laxity and in intra-articular injuries like arthritis, arthrofibrosis, injuries of the articular cartilage, meniscus injuries, chronic synovitis or joints inflammation.
Retrospective assessment in patients treated with a single injection of PRP for chronic tendinopathy, revealed that 78% had a clear clinical improvement within 6 months, avoiding surgical intervention.
"Excellent results were found also in the healing of skin sores in diabetic subjects."
In short, a valid technique that optimizes the healing processes of every tissue where it is applied. With the CGF technique instead, all that is necessary for our regeneration is autologous therefore already within us and we make it work for us. In the dermatological field CGF is used for alopecia (bulbar implants and mesotherapy). It's

In Maxillary facial surgery and Implantology, the potentialities of CGF concentrated growth factors have been known for years.



clear that it opens a new and exciting chapter, a true revolution in the field of aesthetic medicine: the application of the Platelet Growth Factor for skin rejuvenation through the stimulation of skin regeneration.
The growth factors contained in the platelets are able to stimulate various cellular mechanisms like the proliferation and migration of fibroblasts (dermis functional units!) and the synthesis of collagen, recalling and reactivating the stem cells present in the area we are treating, improving the skin condition. It is important to point out that the Platelet Growth Factor CGF Treatment is not a mere aesthetic treatment, but a biological method that tends to restore the best vital conditions of our skin with an excellent improvement of the skin's aesthetic and an optimization of the cutaneous physiological parameters. The number of platelets, concentration and release of the growth factors, strongly depend on the type of kit used, on how the platelets are activated and on the centrifuge used.

Could modern Aesthetic Medicine not benefit of this miraculous solution?
Aging is not only made of wrinkles. Flattened cheekbones add various years to the ID as well. Luckily, today we can earn back fullness and

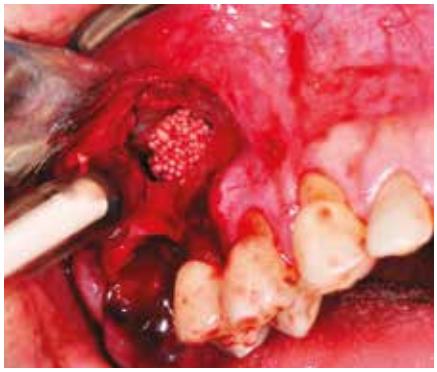


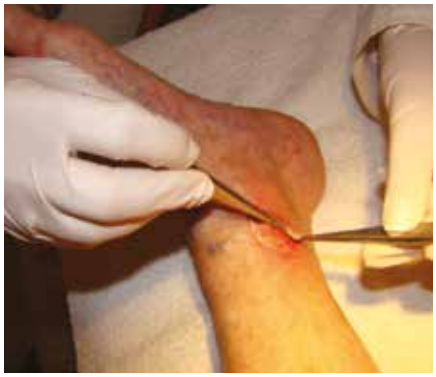
turgidity typical of youth without falling into the unpleasant "pillow face" effect, showed by many stars.
The technique is ESSENTIAL!
We can create a volumizing filler (A.P.A.G.) using a component (PPP) to reach, with thermal impulses, a high temperature (75°) to obtain a gel that, once cooled down will be mixed with CD34+.
Or we can obtain a filler that creates an aged collagen reconstruction bringing the PRP to 44°, again with thermal impulses. Therefore, with a simple peripheral venous blood sample we can create:

- L.P.C.G.F. for cutaneous BIOSTIMULATION
- I.C.F. for collagen RECONSTRUCTION
- A.P.A.G. to create a filling effect

At the end of the first session, all patients are given a kit containing mask, cream and lotion, with the addition of growth factors to prolong the treatment effect, for home care maintenance. It is recommended to respect the protocol: three treatments over a two months period, the fourth after six months, the fifth at the end of the year and a maintenance treatment every year.
The whole treatment is relatively painless; a topic anaesthetic can be applied, twenty minutes before the injection.

www.silfradent.com
info@silfradent.com





FOCUS

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PPE

A Never-Ending Market

The anti-Covid vaccine is finally a reality. Effective, safe, and projected to save our next winter, the SARS CoV-2 virus has nonetheless led us to a complete re-modulation of our basic behaviors. In the future? Other viruses, unknown today, could become dangerous again but science and the whole community may be better prepared in preventing and fighting them; for this, personal protective equipment play a vital role and the market is poised to a never-ending rise.

A clear and optimistic scientific message to take home as Christmas gift is that a safe and effective anti-Covid vaccine has finally arrived. The Pfizer vaccine, developed by the American pharmaceutical company, in collaboration with the German BioNTech, will certainly contribute, together with other vaccines arriving on international markets, to contain, and we all hope, to block forever, the Sars-CoV-2 pandemic. If all goes well, it could guarantee protection before the feared return of the SARS-CoV-2 in the autumn-winter period of 2021. All the scientific studies produced, in an unprecedented international collaboration, extraordinary and unimaginable just a few months ago, will surely become Nobel Prize material. For now, however, it remains essential to "resist" with the prevention measures that even our small kids have learnt by heart: safety distance, mask, and hand hygiene.

The upsetting news is that if we do not keep our guard up on environmental protection and prevention, and if we do not change our direction with greater awareness of the danger, if not Sars-CoV-2, but various other coronaviruses, in the not so far future, may represent another pandemic threat. Man is, paradoxically, the real enemy of humanity. Man, who undoubtedly dominates the ecosystem, has upset the environment we live in with deforestation, intensive farming, heavily contaminating it, favoring climate change, and increasingly creating fertile ground for emerging zoonotic infections that favor the leap of animal virus species into man. From the leap of species to the pandemic, worldwide spread is very rapid, as we have well seen with Sars-CoV-2, hitting 216 countries in just a few months, also thanks to the increasingly widespread network of international transportation.

As a matter of facts, in these past months, we are witnessing a worrying scenario on animal coronaviruses still potentially dangerous for humans. These viruses have been able, with minimal mutations of their genetic code, to operate species leaps between animals, even infecting pets such as dogs and cats. In the future, theoretically, humans can also become targets, as recently happened for Sars Cov 2 transmitted by humans to minks, then re-infected with a modified virus.

Despite scientific and social considerations, one thing is for sure, the COVID-19 pandemic has put personal protective equipment in the spotlight and has made "PPE" a common term among the public: we are well aware that their use is vital to prevent the spread of any virus. Designed to minimize exposure to a biological agent, basic components of personal protective equipment (PPE) are googles, face-shield, mask, gloves, coverall/gowns (with or without aprons), head cover, and shoe cover. These special equipment create a barrier between the person and germs, blocking the transmission of contaminants from blood, body fluids, or respiratory secretions.

But COVID-19 pandemic has also unearthed lack of coordination and equal access to PPE around the world, especially those needed to protect frontline health workers, causing shortages and price rises. **By some distance, the world's largest manufacturer of PPE is China. Before this pandemic, China produced approximately half the world's surgical masks and was the only place capable of mass-producing clinical gowns.** So, the severe shortages that characterized the early stages of the pandemic were probably unavoidable. Supply was already disrupted by the Chinese New Year, which typically interrupts production for 10–14 days. The festivities coincided with an explosion of cases of COVID-19 within China. Public health policies introduced in response to the emergency prevented a lot of workers from returning to their factory jobs. Alongside the constricted supply came a surge in domestic demand for PPE. China imposed export restrictions. Other countries, including several in Europe, would subsequently enact similar measures. International travel restrictions compounded the problem.

Countries issued contingency plans for stock-outs as market manipulation was widespread and supplies could take months to be delivered, with stocks frequently sold to the highest bidder.

Countries issued contingency plans for stock-outs as market manipulation was widespread and supplies could take months to be delivered, with stocks frequently sold to the highest bidder.

Nations such as the UK and the USA reported dangerously low supplies of PPE. In Italy, the shortages contributed to the high burden of infection and death among hospital staff. As prices continued to rise, countries competed for PPE on the open market, also putting low-income countries at a disadvantage. In early March 2020, the World Health Organization (WHO) warned that severe and mounting disruption to the global supply of PPE – caused by rising demand, panic buying, hoarding and misuse –was putting lives at risk from both the new coronavirus and other infectious diseases, and urged industry to raise its production by 40%.

To address cumulative demand across the world, manufacturers have ramped up their production capacities, also, with some new manufacturers that have come online, the surge in demand has somewhat subsided but there are still constraints and a lot of uncertainty on the market. PPE will remain a sellers' market for the foreseeable future where buyers will have to offer a firm financial commitment in advance of the sale and, if unable to do so, or if they act too slowly, chances are that the vendor will look elsewhere.

Since the start of the pandemic, surgical masks have in fact seen a sixfold increase in price, N95 respirators have trebled and the price of surgical gowns has doubled. China at present produces at least 110 million surgical masks every day; before the pandemic hit, production stood at 20 million masks, per day. Although the market did respond over time, the pandemic has completely upset all trends and future predictions by creating unprecedented demand, both in the healthcare community as well as among the general public. UNICEF estimated that by end of 2020, demand for surgical masks could reach 2.2 billion, demand for gloves could reach 1.1 billion, and demand for face shields could

reach 8.8 million, far outstripping supply, causing many PPE manufacturers' inventories on certain PPE products to be depleted.

Even if the situation appears to have stabilized now, PPE market forecasts and trends seem to be difficult to assess; during a pandemic, the epidemiology changes from week to week and the COVID-19 pandemic saw demand for some protective items surge by several thousand percent, becoming difficult, in the longer-term, to figure out what will happen if there are large waves of cases, or indeed a different pandemic. **Nonetheless, in 2019 it was the manufacturing segment that led the PPE market, accounting for 17.4% of the global revenue share, followed by the construction sector and the healthcare sector, which is now estimated to progress at the fastest CAGR of 21.3% from 2020 to 2027 on account of the rising demand for respiratory protection, protective clothing, and hand protection to ensure safety during the COVID-19 infection.**
In 2019 the global PPE market size (all industries, including healthcare) was estimated at USD 59 billion with the hand protection segment leading the market, accounting for almost 29% of the global revenue share, together with the respiratory protection segment which

China at present produces at least 110 million surgical masks every day; before the pandemic hit, production stood at 20 million masks, per day.

is expected to witness the fastest growth from 2020 to 2027. Europe led the market accounting for 33.6% of the global revenue share on account of increasing demand for high-utility protective equipment across several core industries. The Middle East and the Asia Pacific markets are expected to grow at a significant rate, owing to government regulations and rise in construction activities, due to economic growth. Governments, workers, and employers are increasing their efforts to prevent industrial accidents at workplaces, common in Asia Pacific, where safety regulations are often poorly enforced. Also, Government authorities all over the world are growing inclination and concerns towards safety and health of workforces, issuing multiple safety guidelines and standards, also forcing the end-use sectors to employ protective equipment for employees in particular sort of work setting. North America and Europe are mature markets for PPE and stringent regulations regarding their use in various industries are also increasingly contributing to the growth of the market. At present, augmented demand for PPE comprising protective face and eye protection, clothing, masks are directly associated to the COVID-19 pandemic. **Escalating investment from private and public participants in the creation of PPE kits to cater the growing requirement is flourishing the market growth, together with rising awareness and changing consumer preference for protective equipment that is a combination of safety and fashion.**

Within the healthcare sector, according to a report from Allied Market Research, the mar-

Many of the key players have adopted sustainable solutions, including taking into consideration the social and environmental impacts of their operations, to ease the availability of raw materials, and reap long-term benefits.

ket value for 2019 was estimated at $12.9 billion, and is expected to almost triple its revenues by 2027 due to COVID-19 pandemic high demand, reaching $33.4 billion globally, corresponding to around 98.3 million units in 2019, and expected to reach 196.3 million units by 2026-2027. **The hospital segment accounts for the largest share, holding more than two-fifths of the global healthcare PPE market share, and is expected to maintain the largest share throughout the forecast.**

Rapid pandemic spread, rapid technological innovation, stringent regulatory framework, and construction of new healthcare projects are expected to impact the demand positively. Countries around the world are further increasing their share of GDP on the healthcare expenditure to provide better facilities to their citizens. Both public and private players are investing in new hospitals (towards universal coverage for an international standardization of healthcare systems), in-home healthcare services, and primary healthcare centers. **The Asia-Pacific region is anticipated to propagate noticeably in the overall market on account of progresses and growth in the smart hospitals, home care, and medical tourism, among others. Moreover, upsurge in population, rising elderly populace across the world and growing proliferation of chronic ailments and accidents are underlining the need of sophisticated healthcare services across the globe.** A general increase of health insurances with more extensive ranges of services and lower premiums may represent another factor expected to drive the global healthcare PPE market growth. People with health insurance are more likely to visit hospitals for diagnosis or treatment. Particularly, respiratory protection PPE is projected to grow at a highest CAGR of 14%, owing to rise in the usage of face masks by the general public. Among them, N95 masks are driving much of the projected growth as more effective than other face coverings in preventing the spread of the coronavirus. Goggles, gowns, and coveralls are all factors in the projected growth as well.

But market growth is poised to a never-ending rise. Manufacturers are investing in R&D for developing advanced technology-based products. **Due to the continuing shortages of specific raw materials, there is growing demand for sustainable raw materials for PPE manufacturing, along with product innovation.** Several mergers and acquisitions, along with partnerships, have been undertaken by prominent players to facilitate costumers with hi-tech and innovative products, adopting business expansions and product launches as a medium to expand their market presence. Many of the key players have adopted sustainable solutions, including taking into consideration the social and environmental impacts of their operations, to ease the availability of raw materials, and reap long-term benefits. **The development of healthcare PPE kits based on biomaterials is expected to usher in many business opportunities in the near future, mitigating any negative impact of PPE on the environment, which is a current restraint on market growth.** Among recent PPE trends observed safety is top of mind, as this pandemic has brought the topic of "infections" to the forefront for employers, reinforced by the increased need of PPE for use in public spaces. More progressive sanitation efforts and ready access to face protection will become major focuses for most companies as they work to better protect their workers. Some innovations include applying an antimicrobial coating to kill bacteria and attaching sensors to detect if employees are wearing the PPE correctly. These sensors provide a notification like a car's seat belt detector when employees are wearing the PPE incorrectly. This notification can be wirelessly sent to a centralized database for monitoring by safety managers, who can then use this data to improve PPE compliance, reduce risk, and ensure worker safety.

The COVID-19 pandemic is changing the landscape of what our lives will be looking like both at work and outside, moving into the future: convenience, comfort, and PPE expertise. Customers are requesting differentiated solutions that keep them safe and comfortable when wearing PPE for extended periods of time, 365 days a year.

Opportunities for innovations and rising awareness on the importance of PPE for our heath, despite any pandemic, have definitely re-modulated our basic behaviors . Hopefully, we have learnt the lesson. Such knowledge should teach us to prevent, as well as to counteract future pandemics, through concrete actions, and not by just trusting the "good luck", hoping that episodic events do not become pandemic, as happened, indeed fortunately, for Ebola, Sars or Mers, viruses that are too aggressive and deadly to be able to spread successfully and "silently" in humans and throughout the planet. Maybe, next time, we will all be better prepared.

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FOCUS

A Concentrate of Blue Technology

Once worn, surgical masks can filter out particles the size of viruses and bacteria with a 98% efficiency and, at the same time, be light, inexpensive, and rather comfortable to wear.

Since the Sars-CoV-2 pandemic began to spread almost a year ago, one specific item has become part of everyone's daily life: the surgical mask. A medical device that has become essential to contain viral(and microbial) particles in infected people, thus limiting the spread of the virus. This apparently simple device contains a highly regarded technology that exploits one of the most versatile materials existing on earth: non-woven fabric. Thanks to this material, surgical masks can filter out particles the size of viruses and bacteria with a 98% efficiency and, at the same time, be light, inexpensive, and rather comfortable to wear.

This is a remarkable achievement if we consider that microbial particles, and specifically viruses, have a nanometer size (millionth of a millimeter) and the coronavirus, with measurements between 80 and 160 nm, is among the smallest. Filtering such tiny particles is not at all easy. In fact, having a fabric capable of sieving microbes is not sufficient, the fabric must also be highly breathable, otherwise the breath emitted would come out from the sides of the mask, nullifying its protective action. Expecting from a fabric such breathability and at the same time a nanometric filtering capacity is not at all an easy task.

The only real drawback of surgical masks is that, due to poor adherence to the face, the person wearing it is only 20% protected from microbes.

This is made possible by a non-woven polypropylene (or polyester) generated by a particular spinning technology called "*Meltblown*" which, thanks to the blowing of melted polymer fibers on a rotating support, allows to obtain a fabric with a very dense texture.

Nonetheless, hoping in a fabric with a nanometric pore size is unthinkable, or at least not without giving up much of the fabric's breathability but this, as mentioned, would nullify the filtering capacity of the mask. It is only thanks to the plastic material of which the mask is made of that the problem can be solved. In fact, polypropylene fibers, despite having a larger weave than viral particles, have an electrostatic charge that attracts and absorbs microbes, preventing them from reaching the wearer's respiratory tract.

However, *Meltblown* non-woven fabric has a poor mechanical resistance which prevents it from being used individually and needs, for this, to be reinforced by other layers of fabric. This is where a second non-woven plastic spinning technology comes in: "*Spunbond*". This technique consists in the spinning on belt, followed by hot melting of the fibers (or resin), resulting in fibers of a greater diameter and with a less dense texture than *Meltblown* but more robust and inexpensive.

These two types of non-woven fabrics, coupled in a sandwich structure (with the *Meltblown* filter fabric in the center and the *Spunbond* fabric on the sides), give rise to the finished product that we have all worn at least once.

The only real drawback of surgical masks is that, due to poor adherence to the face, the person wearing it is only 20% protected from microbes. This is what prevents these devices from actually being classified as PPE (Personal Protective Equipment) and from ensuring personal safety in contexts where several individuals are without masks.

To cover this function, however, there are other types of masks, called PPE, known to all for the acronyms characterizing them: FFP1, FFP2 and FFP3. These PPE, mainly used in the industrial field to protect against fumes and dust, have been successfully used in the medical field, especially in infectious disease departments. Such masks, produced in a similar way to surgical masks, are characterized by greater

TYPES OF FACE MASKS

MEDICAL DEVICES
Surgical mask

Used to protect others
disposable

PERSONAL PROTECTIVE EQUIPMENT (PPE)
FFP1, FFP, (OR N95*), FFP3 (OR N99 AND N100*)

with valve
protects the wearer

without valve
protects the wearer and others

Protective masks are divided into two categories: surgical masks, designed to protect the patient from contamination by operators (doctors, nurses) in the operating room (or by the dentist), and FFP1, FFP2 and FFP3 *(or N95, N99 and N100 in the American standard), designed to protect operators from external contamination and for this reason called Dpi (Personal Protective Equipment).

HOW IT IS MADE

Outer layer: "Spun bond" type material (non-woven fabric) gives resistance and hydrophobic properties

Middle layer: non-woven fabric produced with "melt blown" technology and consisting of 1-3 micron diameter microfibers; performs the filter function

Inner layer: "spun bond" is in contact with the face and protects the skin from the filtering layer

Source: www.corriere.it/dataroom-milena-gabanelli/mascherine-come-sono-fatte-che-cosa-servono-cosa-filtrano-come-riutilizzarle/e7db0f72-78f1-11ea-ab65-4f14b5300fbb-va.shtml

On the other hand, masks without valve, have similar outward and inward filtering capacity both equal to 72% for FFP1, 92% for FFP2 and 98% for FFP3.

adherence to the face and by higher rigidity, which generally gives these devices a greater inward filtering capacity.
More specifically, there are two types of PPE: with or without valve. The former ones are designed only to protect the operator (exactly the opposite of surgical masks) and are characterized by a 20% outward filtering capacity, regardless of their code (FFP ...), while towards the operator they have a filtering capacity of 72% (FFP1), 92% (FFP2) and 98% (FFP3).
On the other hand, masks without valve, have similar outward and inward filtering capacity both equal to 72% for FFP1, 92% for FFP2 and 98% for FFP3. Obviously, because of their superior technical features, the cost per unit is higher, making this kind of PPE not affordable to everyone for daily use.
Thus, regardless of whether they are personal protective equipment or surgical masks, behind these devices there is a highly regarded technology which, in any case, cannot be separated from their proper use and from adequate social distancing, as always.

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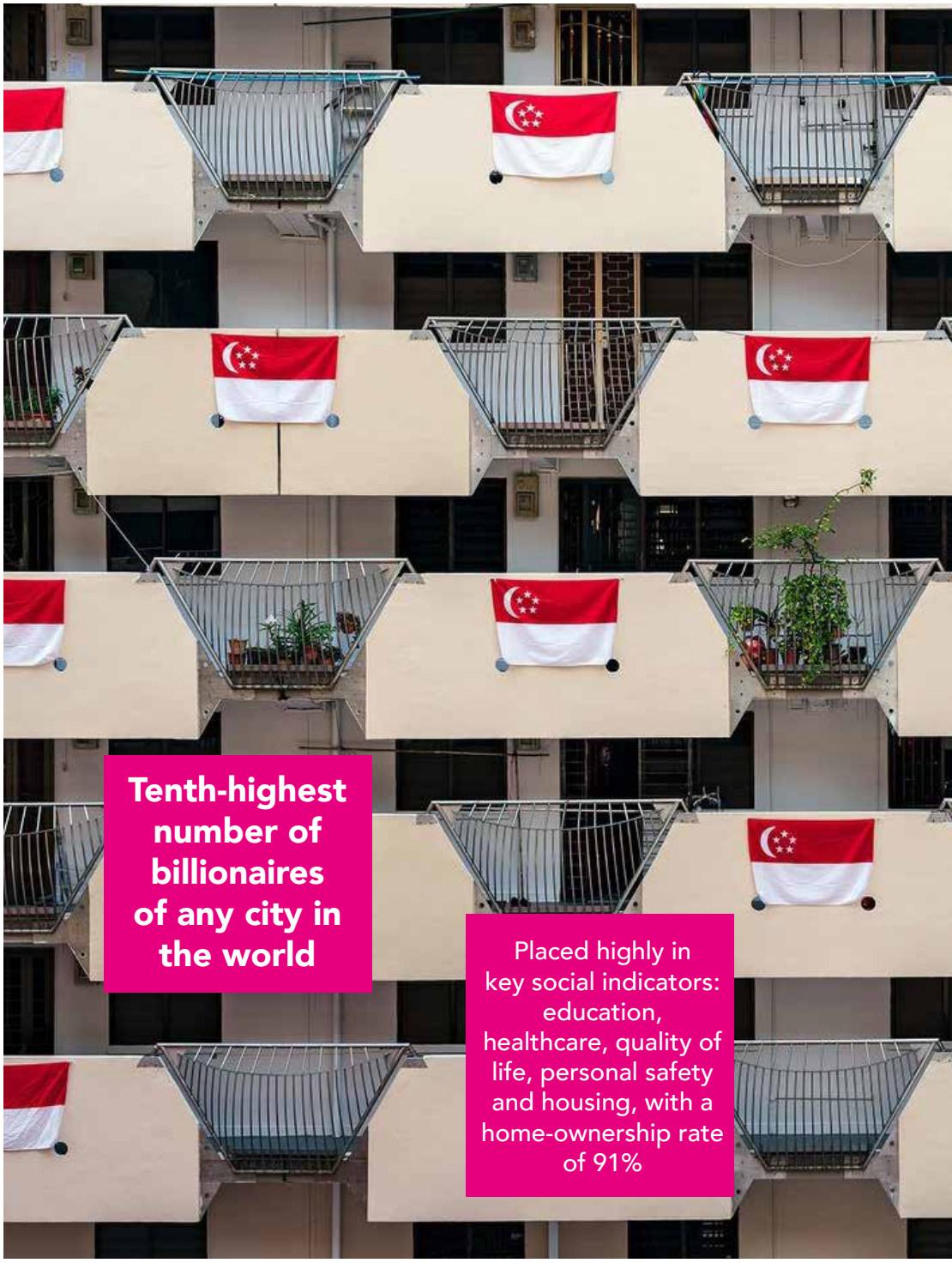
MARKET OUTLOOK

Achieving More with Less,

Singapore's

Unique Healthcare System



Seventh-highest GDP per capita in the world

Widely regarded to have an incorrupt and meritocratic government, with a fair judiciary and strong rule of law, the government has significant control over politics and society

Singapore's economy is expected to shrink by between 4.0% and 7.0% in 2020, the third official downgrade in economic forecasts by the Ministry of Trade and Industry due to the Covid-19 outbreak

Tenth-highest number of billionaires of any city in the world

Placed highly in key social indicators: education, healthcare, quality of life, personal safety and housing, with a home-ownership rate of 91%

With its functional and unique healthcare system, Singapore adopts a modified national insurance scheme, achieving similar outcomes to most developed countries, with less spending, less over consumption and less over-servicing.

The government of Singapore regulates both public and private health insurance in the country. **It offers universal healthcare coverage to citizens, with a financing system anchored in the twin philosophies of individual responsibility and affordable healthcare for all.** Coverage is funded through a combination of government subsidies (from general tax revenue), multilayered healthcare financing schemes, and private individual savings, all administered at the national level. The first tier of protection comprises government subsidies of up to 80% of the total cost of care provided in public hospitals and primary care polyclinics. This is supported by a group of savings and insurance programs known as the "3Ms" system–for *Medisave, MediShield,* and *Medifund*–which plays a critical role in maintaining the public's health and welfare.

The first tier of protection comprises government subsidies of up to 80% of the total cost of care provided in public hospitals and primary care polyclinics. This is supported by a group of savings and insurance programs known as the "3Ms" system

Medisave **- is a mandatory national medical savings program that requires workers to contribute a percentage of their wages to a personal account, with a matching contribution from employers.** Funds in the account are used, under strict guidelines, to pay for health services such as hospitalization, day surgery and certain outpatient expenses, and health insurance for the account holder, as well as for family members.

MediShield **- is a low-cost catastrophic health insurance scheme to help policyholders meet the medical expenses from major or prolonged illnesses that their Medisave balance would not be sufficient to cover.** MediShield operates on a co-payment and deductible system. The premiums for MediShield are payable by the insured through Medisave. Singaporeans are automatically enrolled in the program. As a catastrophic insurance program, MediShield generally does not cover primary care, prescription drugs, preventive servic-

	Total Population 2018, millions	GNI per capita, 2018 (current USD)	Current Health Expenditure, 2017 (% of GDP)
Singapore	5.63	58,770	4.44 %
Indonesia	267.66	3,840	2.99 %
Malaysia	31.52	10,590	3.86 %
Thailand	69.42	6,610	3.75 %
Philippines	106.65	3,830	4.45 %
Vietnam	95.540	2,360	5.53 %
Cambodia	16.24	1,390	5.92 %
Laos	7.06	2,450	2.53 %
Myanmar	53.70	1,310	4.66 %

GNI= Gross National Income / GDP = Gross Domestic Product
Source: World Bank

es, mental healthcare, dental care, or optometry.

Medifund **- is the government endowment fund set up to aid the indigent. The fund covers citizens who have received treatment from a Medifund-approved institution and have difficulties affording their medical expenses despite government subsidies, Medisave, and MediShield coverage**. In 2013, the government set up Medifund Junior for needy children and extended Medifund to primary care, dental services, prenatal care, and delivery services. The ElderCare fund subsidizes care for low- and middle-income patients in intermediate and long-term care facilities.

Private health insurance - A range of private insurance plans are available from for-profit insurers to supplement MediShield coverage. Called Integrated Shield Plans, they are funded from individuals' Medisave accounts. Singaporeans also have the option of purchasing other types of private insurance, although premiums for these cannot be paid for with Medisave funds. Employers may also provide insurance to employees as a benefit.

Differently from most countries, Singapore adopts a modified national insurance scheme, in which healthcare is funded jointly by insurance through MediShield, plus revenue from taxes, plus savings from Medisave, a system unique in the world, nonetheless achieving similar, or even better, outcomes to most developed countries with less spending. Singapore spends on average about 4.7% of its GDP annually on healthcare (compared to around 9% of GDP in the UK or 17% in the USA), providing universal coverage with multiple layers of care. Increasingly acknowledged for having achieved excellent healthcare outcomes at modest costs, Singapore's system seems to be functional compared to a pure national insurance scheme where healthcare is provided for free but creates over consumption and over-servicing. A confirmation comes from Singapore's second ranking in the Bloomberg Healthcare Efficiency Index 2016. Among its ASEAN peers, Singapore spends the most annually in healthcare on a per capita basis (USD 2,752, 2014 data) and this is expected to rise faster than GDP given the aging population and changes in demographics.

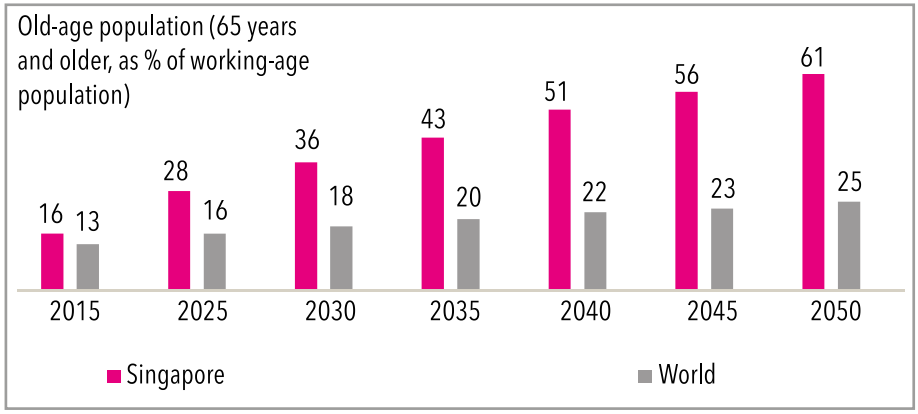
Increasingly acknowledged for having achieved excellent healthcare outcomes at modest costs, Singapore's system seems to be functional compared to a pure national insurance scheme where healthcare is provided for free but creates over consumption and over-servicing.

The government has numerous ways of keeping the healthcare "demand" in check, including co-payments, deductibles, and restrictions on the uses of Medisave and MediShield for consultations, treatments, and procedures. These controls discourage unnecessary doctor visits, tests, and treatments.

Costs are controlled first and foremost by fostering and controlling market competition: the government directly regulates the market when it fails to keep costs down. It can also regulate prices for services provided in the public hospitals, as well as the number of public hospitals and beds. Within this environment, private-sector providers must be careful not to price themselves out of the market. At the same time, the government sets cost-recovery targets for each hospital ward class, thereby indirectly keeping public-sector hospitals from producing "excess profits."

The *Central Provident Fund* is the umbrella account under which Singaporeans save for retirement, housing costs, and medical care (through the "3Ms"). There have been pe-

Fast-growing Burden of an Ageing Population



Source: U.N. Population Division, International Labour Organization, World Bank, International Monetary Fund, 2017

Public Dental Clinics, 2019	**Total 246**
Polyclinic Dental Clinics	10
Hospital/Institution Dental Clinics	8
School Dental Clinics	228
Private Dental Clinics, 2019	**Total 851**

Source: Ministry of Health Singapore

riodic increases in both employee and employer matching contribution rates in recent years, including an increase in the Medisave employer contribution rate in 2015. Increases are intended to encourage low-wage workers to save more for their retirement and medical needs and to have better access to care, in addition to the government's additional contributions to Medisave accounts; the latter are also provided to the elderlies.

The government is highly committed to Singapore's healthcare needs, installing a long-term plan to raise GDP spending on healthcare to 8% (up from the current 4.7%) and while medical spending was around 9m SGD in 2015, it is expected to reach 13 bln SGD in 2020. Singapore has strong fundamentals in healthcare excellence, providing strong infrastructure and universal health coverage. This emphasis on quality care has enabled the country to achieve high life expectancies, fourth in the world, and the lowest infant mortality in the world. The challenge is that it has one of the fastest aging populations in Asia, which will translate to a greater demand for specialized elderly care amid rising costs.

The private sector consists of private healthcare and private insurance. The increasingly large private sector provides care to those who are privately insured, foreign patients, or public patients who can afford what often amounts to high out-of-pocket payments above the levels provided by government subsidies. In 2013, private spending accounted for 69% of total health expenditures, of which 88% represented out-of-pocket spending, including that covered and reimbursed by employer health insurance benefits. Furthermore, the government uses the capacity of the private sector to reduce waiting times in the public sector.

Government hospitals account for 80% of all hospital beds in Singapore while the private sector accounts for 20%. Under Healthcare 2020, over 4,000 new public hospital and community hospital beds will be added. Currently, there are an estimated 12,000 hospital beds, equal to a rate of 2.2 beds per thousand people. Three quarters will come from the public sector with the private sector accounting for the rest.

Primary care is administered mostly by private providers. Twenty public polyclinics (multidoc-

Primary care facilities:	
Public-Polyclinics	20
Private – General Practitioner Clinics	2,304

Acute Hospitals*	**Total 19**
public	10
not-for-profit	1
private	8

Note: *Comprises both general hospitals and specialty centers (excluding Psychiatric Hospitals) with acute care inpatient facilities.

Community Hospitals*	**Total 9**
public	5
not-for-profit	4
private	0

Note: * In Singapore, community hospitals are a class of hospitals that provide continuation of care after discharge from acute hospitals, including rehabilitation and therapy.
Source: Ministry of Health Singapore

	2017	**2019**
Total no of doctors	**13,386**	**14,279**
Public	8,573	9,030
Non-Public	4,107	4,439
Not in Active Practice	706	810
No. of Specialists	**5,338**	**5,881**
No. of Non-Specialists	**8,048**	**8,398**
Doctor to population ratio	1:419	1:399
Doctor per 1,000 population	2.4	2.5

	2017	**2019**
Total No. of Nurses/Midwives	**41,440**	**42,777**
Public	25,388	26,079
Non-Public	10,344	11,180
Not in Active Practice	5,708	5,518
Nurse to Population Ratio	1:135	1:133
Nurse per 1,000 population	7.4	7.5

Source: Ministry of Health Singapore

tor primary care clinics) provide subsidized outpatient care, immunizations, health screenings, pharmacy services, and sometimes dental care. **Although accessible to all Singaporeans, these clinics generally serve the lower-income population; the bulk of primary care is delivered by private general practitioner (GP) clinics.** The Singaporean healthcare system is strengthening its ties to private GP networks. The Community Health Assist Scheme, introduced in 2012, provides portable subsidies to Singaporeans from lower- to middle-income households to obtain treatment at private primary care providers. The scheme subsidizes visits to participating private clinics for acute conditions, specified chronic illnesses, specified dental procedures, and recommended health screening.

Medical devices are regulated under the Health Products Act and Health Products (Medical Devices) regulations. The *Health Sciences Authority* regulates the manufacture, import, supply, presentation, and advertisement of health products–including conventional drugs, complementary medicines, cosmetic products, medical devices, tobacco products, and medicinal products for clinical trials. Its mission is to ensure that all meet internationally benchmarked standards of safety, quality, and efficacy. Almost all medical devices are regulated. Class A medical devices supplied in a non-sterile state are exempted, however, Class A sterile, Class B, C, and D medical devices are subject to product registration requirements. Classification rules are adopted from the guidance developed by the Global Harmonization Task Force.

The *Group Purchasing Office* consolidates drug purchases at the national level. One goal of this system is to keep drug prices affordable by containing the costs of pharmaceutical-related expenditure. The Group Purchasing Office also purchases medical supplies, equipment, and informational technology services for the healthcare system.

The high level of population well-being and efficient medical system make Singapore one of the most attractive countries for the medical device sector. **Singapore is also renowned for its role as a healthcare hub for the region, offering Asia's best healthcare system, and treating patients from neighboring Malaysia, Brunei, Indonesia, Thailand, Philippines, and more recently, from the Americas, Europe, and the Asia Pacific.** The device market in Singapore is expected to have reached a value

The National Centre for Infectious Disease opened in April 2019 a new 330-bed hospital for infectious disease to address the reality of increasing infectious disease threats due to more global travel and increased connectivity.

of SGD 1,038.5 million, an important figure, especially in consideration of the limited size of the island and the number of inhabitants. The strong local demand for a better health service has created an excellent market for foreign companies, which supply around 85% of health equipment in Singapore. Market leaders are the United States, Germany, and Japan. In 2018, imports of medical equipment and supplies to Singapore increased by 8% over the previous year due to an increased spending associated with the establishment of new hospitals and healthcare facilities. **Demand for medical equipment comes from public and private hospitals and clinics. The Health Ministry is the largest consumer, accounting for nearly 70% of local demand.** At present, more than 75% of products imported into Singapore are subsequently re-exported.

As a matter of facts, according to Frost and Sullivan, Asia Pacific's healthcare market is estimated to contribute close to 33% of the global healthcare market and estimated to be valued at $521 billion, with trends in the medical device industry in Asia mainly centered on imaging, cardiovascular, blood pressure monitoring and healthcare IT. In addition, **ASEAN has been developing a uniform system for registering and assessing medical devices across the ten-member countries. Various ASEAN economies have started adoption of the ASEAN Medical Device Directive (AMDD). This requires ASEAN countries to adopt uniform classification criteria for medical devices.** Although adherence to the basic principles of the AMDD in ASEAN will likely only take place in the next few years, this will allow manufacturers to easily access a common medical device market with market size of more than 600 million people.

Healthcare demand and spending is thus forecasted to increase in Singapore due to an aging population, heavier chronic disease burdens, advances in technology and rising expectations. A US$5.6 billion budget was allocated to address infrastructure concerns in the short and long term, as well as healthcare provision and subsidies for the poor. Over the medium term, five new public hospitals and up to twelve more polyclinics will be built by 2030 to ensure that Singapore has adequate healthcare coverage. The National Centre for Infectious Disease opened in April 2019 a new 330-bed hospital for infectious disease to address the reality of increasing infectious disease threats due to more global travel and increased connectivity. A key feature is its high-level isolation unit for treating high-risk pathogens and bio-threat agents. In addition, a new 12-story, US$135 million National Heart Center building, three times larger than the size of the existing one, is currently being built at the Singapore General Hospital and is scheduled for completion in 2020. Other infrastructure projects are scheduled to progressively come on stream between 2022 and 2036.

Among main sources:
- Extracts from the Commonwealth Fund, for full report - www.commonwealthfund.org/international-health-policy-center/countries/singapore
http://international.commonwealthfund.org/features/delivery/
-Extracts from: The U.S. Department of Commerce, "Singapore Medical Devices" for full outlook: www.trade.gov/knowledge-product/singapore-medical-devices
- Ministry of health Singapore -https://www.moh.gov.sg/resources-statistics/singapore-health-facts/health-facilities www.moh.gov.sg/resources-statistics
-World Health Statistics, WHO
-World Bank https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS
- NUHS – National University Health System - www.nuhs.edu.sg/research/Research-Programmes/Pages/National-University-Centre-for-Oral-Health-Research.aspx
- Ministry of Trade and Industry-Singapore
-"Singapore cuts 2020 economic forecasts for the third time on coronavirus concerns" Published Mon, May 25 20208:17 PM EDTUpdated Tue, May 26 202012:59 AM EDT, Yen Nee Lee@YenNee_Lee www.cnbc.com/2020/05/26/singapore-reports-first-quarter-gdp-cuts-2020-forecast-on-coronavirus.html

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Assistive Device for Safe and Precision Percutaneous Access for PCNL

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  Support standard triangulation techniques, providing surgeons with flexibility based on needs and preference
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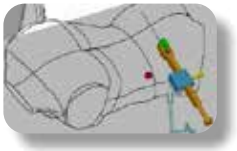
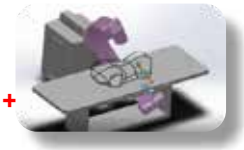
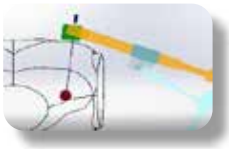


Step 2 – Establish Target Plane



Step 3 – Triangulation



Step 4 – Depth View & Align

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MARKET OUTLOOK

Thailand's Lesson on Universal Healthcare

The country's official language is Thai. Buddhism is the main religion (93%)

With its 513 115 km2, Thailand is the world's 51st-largest country in terms of total area, slightly smaller than Yemen and slightly larger than Spain

Third-largest country in South-East Asia, after Indonesia and Myanmar. Bangkok or "Krung Thep" is the capital city

Based on official national estimates, poverty declined substantially over the last 30 years from 65.2% in 1988 to 9.85% in 2018

One of the five founding members of the Association of Southeast Asian Nations (ASEAN) in August 1967, contributing to the development of the ASEAN Free Trade Area (AFTA), which entered into force on 1 January 2010, eliminating import duties on products manufactured in ASEAN countries

While moving towards universal healthcare coverage is still a goal for many countries, Thailand is internationally recognized for its successful implementation, where, a well-designed system, a dedicated leadership and sweeping healthcare reform have contributed to efficiency, cost containment, and equity in healthcare

As of 2017, the current health expenditure per capita was USD 247, primarily funded by general income tax

Siam was renamed Thailand in 1949; and the absolute monarchy was transformed into a constitutional monarchy after the 1932 democracy Revolution. The prime minister is head of government and the monarch is head of state

Gross National Income per capita, 2018, current US$ 6,600

Thailand is gaining worldwide recognition for the quality of its healthcare services, after the US magazine CEOWORLD placed Thailand sixth in its 2019 list of countries with the best healthcare systems

With its 69.6 million people, just behind Indonesia, the Philippines and Vietnam, Thailand has the 4th largest population amongst South East Asian nations. Over the last four decades, Thailand has made remarkable progress in social and economic development, moving from a low-income to an upper-income country in less than a generation. As such, Thailand has been a widely cited development success story, with sustained strong growth and impressive poverty reduction. Lauded globally as among the most prepared to deal with an epidemic, Thailand has been successful in stemming the tide of COVID-19 infections, performing better than much of the sub-region, but the economic impact has been severe and has led to widespread job losses, affecting middle-class households and the poor alike and threatening hard-won gains in poverty reduction. According to the World Bank, 2020 is expected to close with a contraction of economic growth, which is among the sharpest projected declines in the East Asia and Pacific region, due to a decline in external demand affecting trade and tourism, supply chain disruptions and weakening domestic consumption.

Thailand has been successful in stemming the tide of COVID-19 infections, performing better than much of the sub-region, but the economic impact has been severe and has led to widespread job losses, affecting middle-class households and the poor alike and threatening hard-won gains in poverty reduction.

In 2001, Thailand introduced the Universal Coverage Scheme (UCS). Described as one of the most ambitious healthcare reforms ever undertaken in a developing country, the UCS, which spread to all provinces the following year, provides outpatient, inpatient and emergency care, available to all according to need. By 2011, the program covered 98% of the population. In 10 years, its plan reduced infant mortality, decreased worker sick days and lightened families' financial burdens, including robust healthcare access to rural people.

In 2000 the country was in fact going through a healthcare crisis; about one-quarter of people in Thailand were uninsured, and many other people had policies that granted incomplete protection. As a result, more than 17,000 children younger than five died that year, about two-thirds of them from easily preventable infectious diseases and about 20% of the poorest Thai homes fell into poverty from out-of-pocket healthcare spending. By January 2002, due to huge political pressure, Thailand's UCS was implemented in every province, but this level of comprehensive care, of course, had taken decades to develop.

Since the 1970s, high level of continued political commitment, as well as significant and strategic investment in health infrastructure – in particular primary healthcare, district and provincial referral hospitals– and the functioning of the health system through increasing the healthcare workforce, resulted in full geographical coverage in all sub-districts, districts and provinces, contributing to favorable pro-poor outcomes in terms of healthcare utilization, benefit incidence and financial risk protection against catastrophic healthcare expenditure and medical impoverishment. Before, patients paid a fee to their doctors when they visited the hospital. After 2001, the government paid hospitals, including salaries for staff, and financially incentivized medical professionals to serve unpopular rural areas. **With a comprehensive benefit package free at point of service, every Thai citizen is now entitled to essential health services at all life stages, proving that a well-researched system with dedicated leadership can improve health, and in an affordable way.**

The Ministry of Public Health (MoPH) is the national health authority responsible for formulating, implementing, monitoring and evaluation of health policy. Such role has changed in the years as several autonomous health agencies were established through legislation. **Among them, the advent of National Health Security Office (NHSO), in 2002, has had a major impact in transforming the integrated model where MoPH played purchaser and service provision role, to NHSO as purchaser and MoPH as a major service provider.**

By 2002, the entire population was covered by National Health Insurance, overseen by three different schemes: (i) the Civil Servants' Medical Benefit Scheme (CSMBS), which receives funds from the yearly fiscal budget of the Ministry of Finance, covering civil servants, pensioners and their dependents (5.7 million people); (ii) the Social Health Insurance Scheme (SHI), covering private sector employees which gets its budget from employer and employee contributions plus subsidy from the labor ministry (12.3 million people); and (iii) the Universal Coverage Scheme (UCS), under the public health ministry, covering the rest of the population (48.3 million people). All of Thai citizens in the three health coverage schemes get free healthcare cost on conditions and criteria set by the NHSO.

The Thai government allocates around 15-17% of its total budget on public health services, accounting for 4.3-4.6% of its GDP, the highest among ASEAN countries. With the achievement of universal coverage, public expenditure on health significantly increased from 63% in 2002 to approximately 80% of total health expenditure today, with curative expenditure dominating total health spending, about 70% of total. While out-of-pocket (OOP) expenditure reduced from 27.2% to less than 12% of total health spending. **Health insurance schemes cover all essential services in preventive, curative and palliative care for all age groups, with a few exceptions such as cosmetic surgeries, and services of unproven effectiveness.** Extension of coverage to high-cost services, such as renal replacement therapy, cancer therapy, antiretroviral treatment, and stem-cell transplants, has improved financial protection for patients. Well-coordinated district health systems enable individuals to seek care or referral at health units close to home. **The resultant increase in service utilization has contributed to a low prevalence of unmet needs for outpatient and inpatient services.**

The eligibilities of the three benefit packages are however linked to employment status. Furthermore, they differ from one another because of different paces of historical evolution of the schemes. Although non-competing, each insurance scheme operates under its own legal framework with the inevitable disparities that not all groups of the population have equal access to

Characteristics of Public and Private Health Insurance Schemes

Insurance Scheme	Population Coverage	Population Coverage	Financing Source	Mode of provider payment	Access to service
Civil Servant Medical Benefit Scheme (CSMBS)	Government employees plus dependants (parents, spouse and up to two children age <20 years)	7%-9%	General tax, noncontributory scheme	Fee for service, direct disbursement to mostly public providers and DRG for inpatient care	Free choice of public providers, no registration required
Social Health Insurance (SHI)	Private sector employees, excluding dependants	16%-18%	Tripartite contribution, equally shared by employer, employee and the government	Inclusive capitation for outpatient and inpatient services plus additional adjusted payments for accident and emergency and high-cost care, utilization percentile and high-risk adjustment	Registered public and private competing contractors
Universal Coverage Scheme (UCS)	The rest of the population not covered by SHI and CSMBS	73%-75%	General tax	Capitation for outpatients and global budget plus DRG for inpatients plus additional payments for accident and emergency and high-cost care	Registered contractor provider, notably district health system
Private health insurance	Additional health insurance scheme for those who can afford premiums	2.2% (additional insurance)	Health insurance premiums paid by individuals or households	Retrospective reimbursement	Free choice of healthcare providers, either public or private

DRG: diagnosis-related group.
Source: The Kingdom of Thailand, Health System Review (Health System in Transition, Vol. 5 No. 5 2015) / National Health Security Office

similar packages of healthcare.

Despite its low gross national income per capita a bold decision was made to use general taxation as the most equitable and efficient way to finance the Universal Health Coverage Scheme without relying on contributions from members. Thus, while direct payment by households has consistently declined, the Government significantly increased spending from tax revenues. The cost of the policy (US$ 14 809 million; 17% of the total US$ 89 415 million government expenditure in 2017) is one of the highest among low-and middle-income countries, with the limitation that non-contributory financing via general taxation offers the welfare policy little flexibility to accommodate rising demands in the face of continuing rises in healthcare costs. Furthermore, heavy reliance on general tax runs the risk of incurring shortfalls especially during the cyclical economic crunch. **Even if affordability is not currently an issue, though the cost of the program as a proportion of general income tax is rising yearly.** Still, the UCS continues to have wide support from the country's government, health workers and wider population.

The extensive geographical coverage of Ministry of Public Health primary healthcare (PHC) and public hospital services are the foundation for successful implementation of universal health coverage, especially pro-poor health service utilization

Benefit Packages of the Three Public Health Insurance Schemes

	UCS	SHI	CSMBS
Health service utilization	At contracting unit of primary care (CUP) both public and private	At registered main contractor hospital (>100 beds), public or private	At any public hospital for outpatient services; or private hospital, except accident and emergency. Only public hospitals for admission services
Health services	Ambulatory and inpatient care including accident and emergency and rehabilitation services, and preventive and health promotion services Note: prevention and health promotion for beneficiaries in all three schemes	Both ambulatory and inpatient care, including accident and emergency and rehabilitation services. No preventive services are provided, but NHSO manages prevention and health promotion for beneficiaries in all three schemes	Both ambulatory and inpatient care, including accident and emergency and rehabilitation services. No preventive services are provided, but NHSO manages prevention and health promotion for beneficiaries in all three schemes
Medicines	Limited; only essential drugs (ED)	Limited; only ED	Limited; only ED, but the use of nonessential (NED) can be approved by 3 doctors in the hospitals
Maternity (Delivery)	Limited; only 2 deliveries	Limited; only 2 deliveries and payment in cash (lump sum 13000 Baht per delivery inclusive of ANC and PNC services)	No limit
Renal replacement therapy (RRT)	Covered and start with peritoneal dialysis, patient must pay if choose haemodialysis	Covered; both hæmodialysis and peritoneal dialysis, liable for copayment if beyond the ceiling	Covered; both hæmodialysis and peritoneal dialysis, liable for copayme nt if beyond the ceiling
Antiretroviral therapy for HIV/ AIDS	Included	Included	Included
Organ transplantation	Kidney and bone marrow covered for treatment of certain cancers	Kidney and bone marrow covered for cancer; corneal covered	No exclusion list
Dental care	Covered, both preventive and curative dental services	Reimburse no more than twice a year (max 300 Baht/treatment)	Covered, no limitation specified
Medical devices	Covers 270 items	Covers 88 items	Covers 387 items

Note: UCS = Universal Coverage Scheme; SHI = Social Health Insurance; CSMBS = Civil Servant Medical Benefit Scheme; ANC= antenatal care; PNC = postnatal care.
Source: The Kingdom of Thailand, Health System Review (Health System in Transition, Vol. 5 No. 5 2015)

and public subsidies. Health delivery systems are thus dominated by the public sector with over 1,000 public hospitals, accounting for 75% and 79% of total hospitals and beds. Most private hospitals, around 300, are small, with 69% having fewer than 100 beds. Large private hospitals include some hospital chains registered in the stock market, located in Bangkok, and offer services to mostly international patients. The market growth in the next few years will be driven by expansion of hospitals as well as new players entering the market to meet growing demand.

The Thai government considers the healthcare industry to be a priority sector for investment and further development, reiterated in the Ministry of Public Health's 2016-2025 Strategic Plan entitled "Thailand: A Hub of Wellness and Medical Services". Thanks to the government's supportive policies, Thailand has in fact become a medical hub not only for ASEAN, but also for Asia and beyond. Its medical devices sector is the 8th largest market in the Asia-Pacific region, and it is expected to grow 8-10% per year due to aging population, due to the increasing number of foreign patients who are both medical tourists and expatriates as well as hospital groups that have built new facilities and new players have entered the market. Thailand ranks as the world's 17th largest exporter of medical devices (mostly single-use devices) and the world's 32nd importer of medical devices. The Thai Medical Device Control Division of the FDA is responsible for regulating, controlling, and monitoring the use of medical devices in Thailand. There is neither a price ceiling nor a reference set for medical devices such as orthopedic instruments or services provided such as computed tomography (CT) scanners. Price is determined entirely by market demand and supply. There is no reimbursement list for medical devices. Their distribution is controlled implicitly by the suppliers. The coverage of use of medical devices varies greatly across the three public health insurance schemes. The CSMBS covers almost all medical devices using a fixed-rate fee-for-service payment, whereas the UCS and SHI schemes include use of medical devices as part of their basic healthcare packages and support based on prepaid capitation. **As a result, inequitable access to and use of expensive medical devices has been widely noted, for example, CT scans, magnetic resonance imaging (MRI) and mammography between CSMBS, UCS and SHI beneficiaries.**

> Before, patients paid a fee to their doctors when they visited the hospital. After 2001, the government paid hospitals, including salaries for staff, and financially incentivized medical professionals to serve unpopular rural areas.

There were an estimated 538 local medical device manufacturers in Thailand at the end of 2017. The market currently comprises of two different types of medical device i.e. consumable and diagnostic imaging devices such as basic medical products / patient aids, and the more sophisticated (and generally imported) devices. It is the latter whereby there is most potential for investment opportunities from foreign manufacturers.

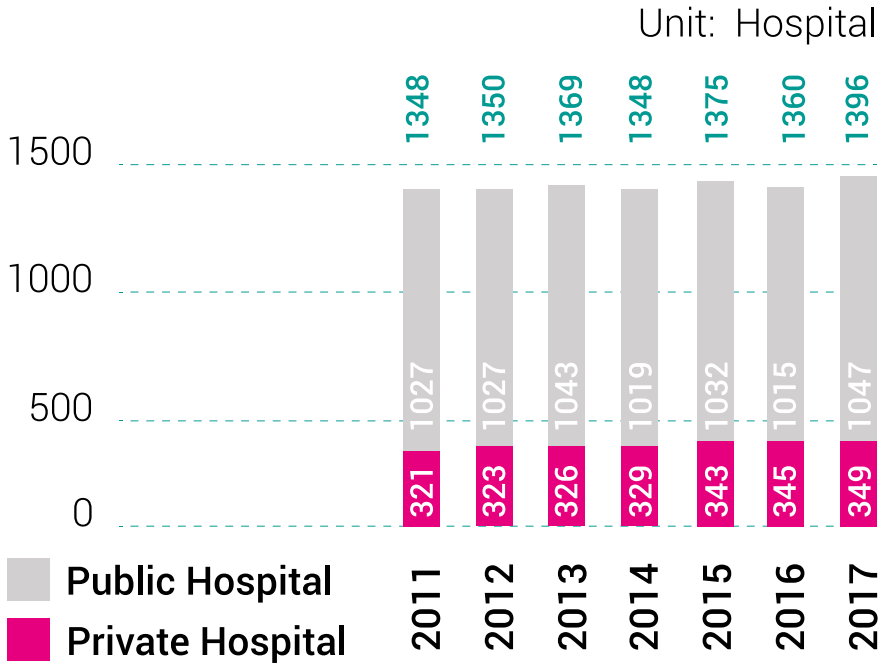
According to Thailand Board of Investment, Thailand's import value of medical devices grew from 735 million USD in 2015 to 962 million USD in 2018. Over the same period, the export value grew from 735 million USD to 843 million USD. This trend reflects a growing size of domestic market and the country's importance as an export base. 20.5% of imported medical devices comes from the USA, followed by China (13.2%), Germany (9.8%), Japan (8.8%), and Ireland (6.1%). Local manufacturers of medical devices make mostly single-use devices, such as disposable test kits and syringes, surgical gloves, and catheters. Over 80% of domestic production is exported.

Thailand is also one of the strongest-performing pharmaceutical markets in the Asia-Pacific region, accounting for almost 20% of all domestic health expenditures, with the majority of this being distributed through Thailand's public and private hospital system. Thailand's aging population, as well as its UCS and the continued growth of medical tourism has lead to an increase in demand for pharmaceuticals. Except for essential medicines sold to government bodies, prices are governed by market forces.

Thailand is self-reliant in healthcare workforce production with high quality standards. **There is however a geographical and public-private maldistribution of healthcare workforce, worsened by government policy on promoting Thailand as a regional medical hub. As it stands the health system seems to be overburdened and understaffed.** Furthermore, the 2015 emergence of ASEAN Economic Community, facilitates free flows of people, goods and services across ASEAN countries, including the risk of internal and external migration of healthcare professional in response to increased demands for health services by international patients within ASEAN.

Despite the already large healthcare sector, the rise of Thailand's aging population is driving further need for healthcare services in the years to come. Considered to be a middle-aged society, the highest proportion of the Thai population is made up of adults and senior adults, with each accounting for about 22% of the total population. People older than 60 account for about 17.14%

Number of Public and Private Hospitals



Source: Ministry of Public Health, Thailand Board of Investment www.boi.go.th

Top 5 Product Groups Exported and Imported by Thailand

	Export 2018	Import 2018
1st	Single-use Devices	Electro-Mechanical Medical Devices
2nd	Ophthalmic and Optical Devices	In Vitro Diagnostic Devices (IVD)
3rd	Electro- Mechanical Medical Devices	Single-use Devices
4th	Dental Devices	Ophthalmic and Optical Devices
5th	Hospital Hardware	Hospital Hardware

Source: Medical Devices Intelligence Unit, Office of Industrial Economics, Ministry of Industry, as of 2018

	2010	2019
Number of dentists	11,847	16,547
Number of Dental Prosthetic Technicians		5,375
Dental Assistants and Therapists		6,981

Note: number are approximate. Each source, even if reliable, has slightly different numbers
Main source: World Health Organization (WHO) https://apps.who.int/gho/data/node.main.HWF2 / world data Atlas

while only about 37.9% are below 30 years old. **In relation to other ASEAN countries, the proportion of citizens aged over 60 is one of the highest in the region. It is also forecasted that, by 2045, such proportion will exceed that of other regions such as Europe and the United States, further driving domestic healthcare demand in the decades ahead.** In terms of demographics, Thailand has evolved from the status of high fertility and high mortality to low fertility and low mortality, with the fertility level of 1.6 in 2010 being below the replacement level, and the crude mortality being 7.4 per 1000 population. This has had profound impacts on health- and social-service development and financing, which needed to respond to a rapidly greying society. Consequently, financing and service-provision policies for older people remain an issue.

Despite good health at low cost, adult mortality is however still high, compared to neighboring countries, given the socioeconomic and health systems development. Thailand has performed better in terms of maternal and child health as compared with other low- and middle-income countries. Its survival rate between ages 15-60 is lower than over half of the countries where such data is available. Over the past 15 years, Thailand's prevalence of diabetes and hypertension have tripled and quadrupled, respectively, and combined with high rates of road injuries, has negatively affected adult survival rate. Only 85% of 15-year-olds are expected to live past age 60. **While rural health services are well established with equitable access and financial risk protection, urban health systems are dominated by hospital-oriented care, private clinics and hospitals, and lack of effective primary healthcare systems catering chronic noncommunicable diseases.**

Thanks to its high reputation of quality medical treatment at reasonable costs, Thailand is a leading Asian country for medical tourism growing over 10% each year. In 2014 there were 2.35 million international patients including medical tourists, general tourists and foreigners working or living in Thailand or neighboring countries and an estimated 3.42 million in 2018. Medical tourists coming to Thailand accounted for 38% of such visitors to Asia.

This high-level of demand from patients from abroad has provided the impetus for a range

Number of Healthcare Providers (public and private healthcare, 2017)

Region	Medical Physician	Pharmacist	Registered Nurse	Technical Nurse
Total	35,388	13,728	160,932	5,929
Bangkok	8,865	2,544	32,497	3,264
Central Region (exclude Bangkok)	8,941	2,858	38,239	672
Northern Region	5,627	2,311	27,594	376
North-eastern Region	7,703	3,208	39,246	1,219
Southern Region	4,252	1,807	23,356	398

Source: Thailand Board of Investment www.boi.go.th

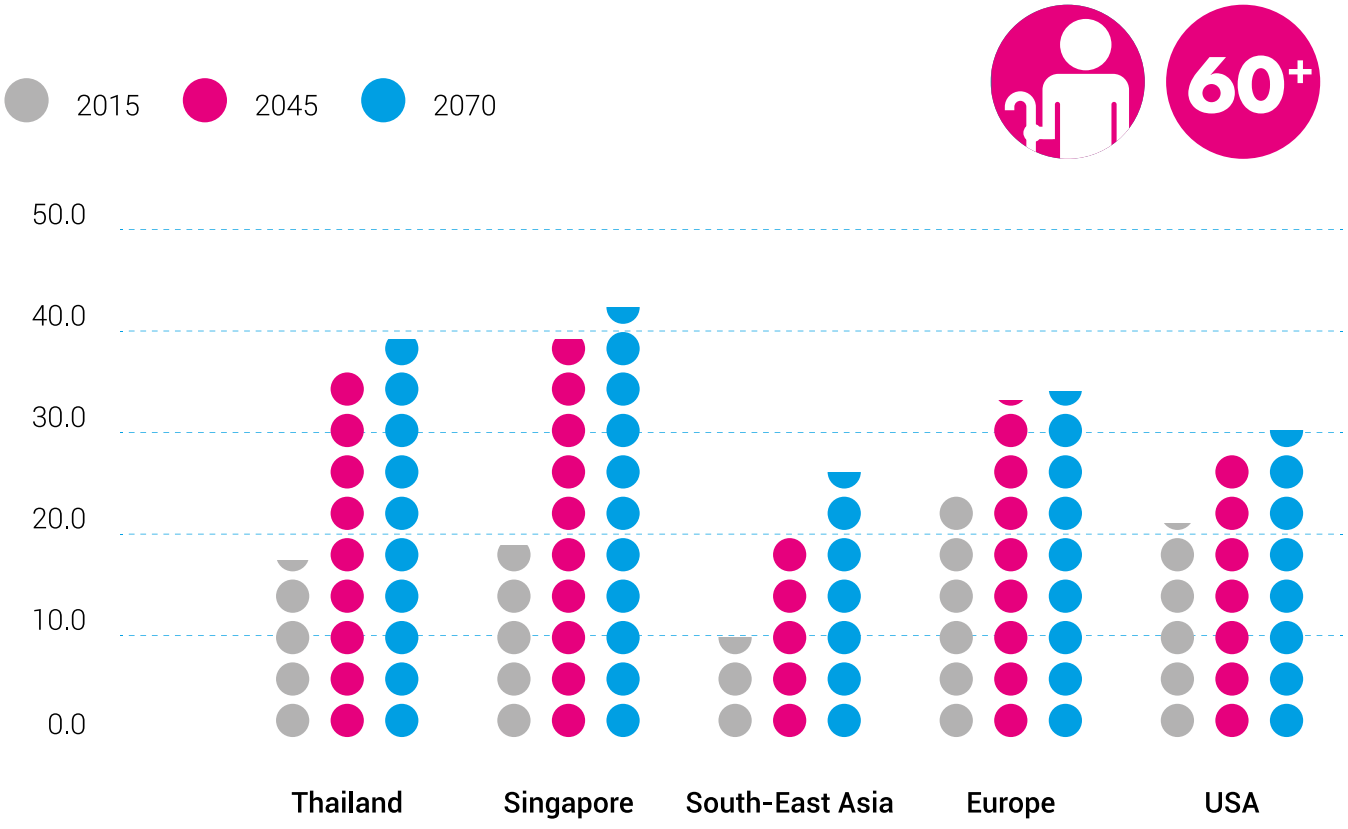
of technological advances, innovations, and clinical research studies, as well as business opportunities for new medical companies to enter the Thai market. The government actively promoted medical tourism for a decade, but it was implemented mainly by private hospitals with foreigners contributing 30% of private hospitals' revenues in 2017. Recently, many university hospitals have requested additional budget to invest in infrastructure to respond to medical tourists. Civil society groups have expressed concerns on the negative impact of this policy on access to care by Thai citizens, especially when Thailand still has a shortage of physicians. Patients from Japan, China and Myanmar are on the rise, while arrivals from the Middle East are decreasing. Private hospitals are equipped with the latest medical facilities and patients do not have to wait to obtain treatment. Doctors in the country are very well trained in the latest treatments and procedures, and hospitals are outfitted with the most cutting-edge medical technology. As of May 2019, Thailand has 66 hospitals and healthcare institutions certified by the Joint Commission International (JCI). Healthcare in Singapore costs three times and Malaysia costs two times more than Thailand.

Among main sources:
-Extracts from: The Kingdom of Thailand, Health System Review (Health System in Transition, Vol. 5 No. 5 2015). Asia World Health Organization 2015 (on behalf of the Asia Pacific Observatory on Health Systems and Policies).
- Extracts from: "What Thailand can teach the world about universal healthcare" https://www.theguardian.com/health-revolution/2016/may/24/thailand-universal-healthcare-ucs-patients-government-political
- Thailand Board of Investment www.boi.go.th
BOI - The Office of the Board of Investment is a government agency under the Office of the Prime Minister. Its core roles and responsibilities are to promote valuable investment, both investment into Thailand and Thai overseas investment.
-Extracts from "Thailand- Commercial Guide. Medical Equipment", taken from: International Trade Administration, U.S. Department of Commerce
www.trade.gov/knowledge-product/thailand-medical-equipment
https://www.trade.gov/knowledge-product/thailand-investment-climate-statement
- Will Thailand's universal health care system keep its reputation in the face of Covid-19?, By Susana Barria
https://publicservices.international/resources/news/will-thailands-universal-health-care-system-keep-its-reputation-in-the-face-of-covid-19?id=10717&lang=en
-https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(18)30198-3.pdf
-"Universal health coverage and primary care, Thailand" by Kanitsorn Sumriddetchkajorn a, Kenji Shimazaki b, Taichi Ono b, Tesshu Kusaba c, Kotaro Sato c & Naoyuki Kobayashi –WHO, World Health Organization website - www.who.int/bulletin/volumes/97/6/18-223693/en/
-World Bank, www.worldbank.org/en/country/thailand/overview

Government Initiatives

In late 2018, the Ministry of Science and Technology, in collaboration with the Ministry of Public Health and the Ministry of Education, has unveiled the 'Yothi Innovation District'. With an anticipated thirteen medical institutions and two universities offering medical courses, it is envisaged as an area that will soon make Thailand the centerpiece of medical innovations. The area will be able to treat approximately 8,000 patients per day and will have more than 7,000 beds available.
The Strategic Plan is expected to invite more than 100 private organizations to invest in innovation creation and in the improvement of public-private partnerships. In addition, there will also be a number of policies articulated to support new medical experiments, create startups, and build online databases.
Source: Thailand Board of Investment www.boi.go.th

Share of Population Aged Over 60



Source: The World Bank: Thailand Economic Monitor - June 2016: Aging Society and Economy. Taken from Thailand Board of Investment www.boi.go.th

INSIGHT

E-CIG and HTD:
2.0 Smoke That Could Increase Smokers' Life Expectations, or Just Their Hopes?

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Degree in Biotechnology
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It seems that technology today can help those who want to be helped, offering products that preserve the pleasure of smoking, limiting its harmful effects.

Nicotiana tabacum is a well-known plant that met our country when European colonizers, probably fascinated by the Native Americans habit to smoke tobacco leaf, decided to import this product, consequently kicking off a fast spread worldwide. In Europe, just a century after its appearance, smoking was criticized by King James I of England who published his "invective against smoke", describing item by item the presumed injuries caused by this habit. King James was not the only one standing against tobacco, simultaneously China established a death penalty for those who grew the plant and, in 1630, in Switzerland, its use was prohibited by law. Even Nazi Germany didn't like it, so an aggressive campaign against smoking was promoted, coming to define it as "pulmonary masturbation". **As such, smoke has always had many enemies, nevertheless the tobacco industry was able to thrive fast, probably helped by Hollywood stars smoking on screen, transmitting mystery and a charming picture, under payment, to the general public.** True is that seeing movie stars smoking exerts a remarkable influence, but the psychological addiction experienced by smokers is so strong that some believe it could be compared to cocaine and heroin. In addition to higher or lower intensity of physical addiction. As well known, these effects are due to nicotine, a powerful alkaloid produced by the tobacco plant that performs defensive functions, acting as neurotoxin, so as to dissuade insects from eating it. In humans, taken in small doses, it stimulates the release of a series of neurotransmitters including dopamine, leading to a feeling of pleasure, less anxiety and alert relaxation. In addition, it stimulates the adrenal glands to secrete adrenaline which in turn leads to an increase in blood glucose, blood pressure, heart rate and respiration, thus acting as an energizer. Depending on the dose, nicotine acts as a stimulant (low doses) or as an inhibitor of the cholinergic receptors; in the latter case it is capable of paralyzing the skeletal muscle, including the respiratory one, carrying out the defensive action designed by the plant. The addiction experienced by smokers is due to the brain's reaction which, as a result of prolonged exposure to this substance, increases the number of some receptors involved in the pleasure circuit. This only amplifies the feeling of needing to smoke, making withdrawal symptoms more intense. **As much as nicotine creates addiction in smokers, it's not this molecule that make people sick. As many studies have pointed out, at least 69 carcinogens are produced during the tobacco burning, responsible of the harmful effects of this addiction.** Among them: polycyclic aromatic hydrocarbons (PAHs), nitrosamines and some radiogenic compounds such as polonium-210. Nonetheless, smoking is very pleasant and, although awareness of the damage associated with it is high today, smokers find it difficult to leave this habit behind.

However, it seems that technology today can help those who want to be helped, offering products that preserve the pleasure of smoking, limiting its harmful effects. Today two types of

True is that seeing movie stars smoking exerts a remarkable influence, but the psychological addiction experienced by smokers is so strong that some believe it could be compared to cocaine and heroin.

products, based on different operating principles, have made their own way into the market: electronic cigarettes (e-cig) and "heated tobacco devices" (HTD).

Electronic Cigarettes (e-cig) are devices that, through an electrical resistance, vaporize a mixture of glycerin and propylene glycol, added with nicotine in various concentrations. The result is dense and fragrant smoke that mimics that of cigarettes both in terms of olfactory perception and shooting. The liquids on the market have different nicotine contents, so as to adapt to the needs of those who want to gradually get out of addiction or those who, more simply, are looking for a substitute for traditional cigarettes. **Since this product has appeared on the market, it has spread widely, especially among the young ones, thanks to its alleged lack of negative effects on airway tissues. However, this is not entirely true. Several studies have reported the presence of potentially harmful substances in the steam produced by these devices.** Propylene glycol has long been used in smoke bombs for the entertainment world, and is generally considered safe, although some studies indicate that prolonged inhalation can give rise to airway irritation, coughing and in very rare cases asthma and rhinitis. Among other things, the heating of propylene glycol and glycerin can produce formaldehyde and acetaldehyde, both potential carcinogens, even if the quantities associated with the consumption of these cigarettes appear modest. The first cases of lung diseases associated with the use of these devices have recently appeared, which in the USA have registered 39 deaths in a rather short period of time. This first alarm bell has quickly turned in hysterical alarmism spreading the idea that the electronic cigarette is more harmful than the traditional one. Subsequent analyzes of the lung tissues affected by these diseases have focused the spotlight on the alleged culprit: vitamin D acetate, an additive used as a thickener in some commercially available liquids. This places attention on the difficulty in establishing the real danger of these devices which, more than residing in the basic compounds, could come from additives, flavorings or from any by-products of the vaporization itself.

Heated Tobacco Devices (HTD) are devices that use an electrical resistance to heat a cigarette-like tobacco cartridge to about 350 ° C. The difference between the two lies in the fact that the traditional one uses tobacco combustion (around 900 ° C) while the former only heats it up, leading, at least in theory, to a decrease in the carcinogenic compounds produced. **What is certain is that 350 ° C, although less than traditional combustion, are certainly not low and, in any case, they could be enough to generate carcinogenic substances.** According to some studies, HTD vapors contain nicotine at high concentrations and other chemical compounds already present in traditional cigarettes, but in lower concentration. This would seem excellent news, given that the toxicity of a compound is highly dependent on its concentration, and a decrease in it can only bring relatively significant benefits. Too bad that the studies highlighting these encouraging results have been conducted by the same companies that market the product.

Moving away from conflicts of interest, it turns out that the situation is less rosy but still leaves a glimpse of a little hope. In fact, a study conducted by the Japanese Government on the chemical profile of the cartridges and smoke emitted by these new devices has shown that, if the analyzes are carried out by independent laboratories, both the nicotine content and that of the other chemical substances present is in similar quantities to cigarette smoke, but they contain one fifth of nitrosamines and one hundredth of carbon dioxide. In short, a more polite cigarette. A further confirmation of what said is a work from the end of 2018 that compared the toxicity (in vitro cytotoxicity on bronchial epithelium cells) of smoke from electronic cigarettes, HTD and traditional cigarettes. **What emerges from the data is that e-cig proves to be the least toxic, followed by HTD and, as expected, classic cigarettes act as a tail, showing the highest levels of cytotoxicity. Clearly these results must be interpreted in the right way. Although both e-cig and HTD are a less aggressive alternative than traditional cigarettes, it does not mean that they do not damage the tissues.** They too exert a toxic action on the cells of the bronchial epithelium and they too, given the nicotine content, create a strong dependence. However, there is another spear to break in favor of these new alternatives. Being in fact new, it is not known with certainty which are the pathologies that those who use it for a long time could face and therefore you can at least hope not to get sick or, in a less optimistic scenario, to run into less serious ailments compared to those associated with traditional smoking. But this is a dangerous hope and science, knowing this very well, continues to warn consumers about the potential dangers of 2.0 cigarettes, repeating loudly that the only substance well accepted by our lungs is air.

[1] Leigh NJ, et al. Tob Control 2018; 27: s26–s29. doi:10.1136/tobaccocontrol-2018-054317.
[2] Kanae Bekki, Yohei Inaba, Shigehisa Uchiyama and Naoki Kunugita, "Comparison of Chemicals in Mainstream Smoke in Heat-not-burn Tobacco and Combustion Cigarettes", Journal of UOEH 39(3): 201-207(2017).*
[3] AIRC (www.airc.it).
[4] Fondazione Umberto Veronesi (www.fondazioneveronesi.it).
[5] Wikipedia (www.wikipedia.it).

Marketing The Future Is Definitely Hybrid

To say that the year that has just ended has been a whirlwind would be an understatement. In a matter of days, live events and conferences that had been planned months ahead were suddenly cancelled or postponed... and the storm is all but finished. The uncertainty caused by the ongoing Corona crisis has changed business and it is also noticeable within the medical industry where international event organizers, and the medical industry as a whole, seem to agree that most events going forward will have a component of a virtual audience. Virtual events became the new normal and to think that virtual attendance won't continue after the crisis ends is unrealistic.

During this time, we all had to become fluent in virtual event technology and we had to learn how to create effective programs. We navigated through the storm and learned a lot of lessons along the way. One of the most important lessons the industry learned was that while virtual events certainly have their benefits, live events will always be an important part of any robust event program and of business. **We now know the benefits of attending online events, as much as we are aware of the limitations. So, it is definitely time to think about a different type of event – hybrid events, or events that combine both in-person and virtual experiences, that will be an essential part of the new normal in future business.** All this is achieved through techniques like live streaming, webinar broadcasting or setting up a virtual space that mirrors the ongoing physical event. There will be situations, such as this global pandemic, where a virtual event is the only option, so attendees can remain safe and comfortable. During this time, we have also all realized that some meetings in person are completely unnecessary. Traveling for thousands of miles polluting the environment for a two-hour meeting is a waste of resources and money few will be able to afford. On the other side though, there will also always be situations where an in-person event will be the most effective way of collecting leads and engaging your audience.

"I foresee a digitalization of business in any sector and therefore also in the dental sector. The formulas on how to economically support 'the virtual exhibition space' and 'quality virtual events' probably already exist, but I am convinced that there will be a phase of great reshaping of the parameters in the coming times. To all this we must add the possibility of a physical encounter. This can always be done with some basic rules. It will not be drugs or vaccines that will provide psychological security.
In times of uncertainty, it will be calm, common sense, personal and social hygiene that will make the difference. Growing knowledge on the SARS CoV-2 virus and on the COVID-19 disease - and this will also be true for any virus unknown today but tomorrow ready to hit man and his biological, economic, political, and social environment - will lead to the modulation of basic behaviors and the selection of appropriate care. When all this shall be considered and when we will put 'health above wealth', nothing and no one forbids organizing a real meeting of people.
…The fact is that we have to train to be 'remote live instructors' and 'remote live controllers'. The control guarantees the passage of information; it must never become, nor be perceived as, an instrument of the 'blaming philosophy'."

- Dr. Gerhard K. Seeberger, dentist and international opinion leader -

Being hybrid events a new concept, many people might find them intimidating but, if done well, virtual events can lead to more immersive (content) experiences for attendees, offer longevity through recordings and provide an even stronger sense of community… **there's no way that you can lose out on an audience by providing a more convenient mode of participation and rather by giving passive attendees a taste of your compelling content online.** A successful digital event will not only require a great virtual streaming provider but, most importantly an engaging and quality content. Make sure that all your speakers and moderators are prepared to be recorded and to speak in front of a camera and that their presentations are entertaining, so that your virtual attendees should be involved throughout the event. **We cannot think to plan virtual events with an agenda made for live only. It is much more difficult to keep virtual attendees engaged in front of a computer screen.** "Entertaining" is the key word. Short attention spans online will need to be taken into consideration, no one wants to sit through a five-hour keynote speech. To keep content engaging, make sure that it will translate well over video. Incorporate live polls or Q&A to keep virtual attendees involved. Your virtual attendees may have to take more breaks throughout the day, or they may only be able to join the event for an hour or two at a time. Make sure that most of your content is offered on-demand so that they can access it at a more convenient time.
When combined with the right technology, digital events offer marketers an unprecedented opportunity to vastly expand audiences and transform their event into a formidable engagement vehicle. By implementing virtual elements and creating opportunities for worldwide audiences to consume your event content year-round, you can grow your attendance, optimize your event strategy, and gain powerful insights to continually improve your event.

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Website: www.reedexpo.co.jp
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03-07/03/2021

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Email: communications@myesr.org
Website: www.myesr.org

Venue: to be announced

www.myesr.org/congress/congress

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

MAY

01-04/05/2021

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Maastricht - Netherlands

Scientific Host:
The International Association of Parkinsonism and Related Disorders

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The Netherlands

Email: info@iaprd.org
Website: www.iaprd.org

Congress Organization
INTERPLAN

Congress, Meeting & Event Management AG
Office Hamburg
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IAPRD@interplan.de

www.iaprd-world-congress.com

27-30/05/2021

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International Fair Rehabilitation, Inclusion and Accessibility Technologies

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Organised by:
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04140-950
Sao Paulo
SP - Brazil
Phone: +55 11 5585 4355
Fax: +55 11 5585 4359

E-mail: info@fieramilano.com.br
Website: www.fieramilano.com.br

Venue
Sao Paulo Exhibition & Convention Center
Sao Paulo
Brazil

www.reatechbrasil.com.br/16/en/

JUNE

21-24/06/2021

Arab Health 2021

Online: 23 May - 22 July 2021
Live: 21 - 24 June 2021

Dubai - United Arab Emirates

Informa Life Sciences
Gubelstrasse 11, CH-6300, Zug, Switzerland
Phone: +971 4 3365161
Email: info@lifesciences-exhibitions.com
Website: www.informalifesciences.com
Venue: Dubai International Convention & Exhibition Centre - Dubai
United Arab Emirates

www.arabhealthonline.com

JULY

06-08/07/2021

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Dubai - United Arab Emirates

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& Exhibitions Organisation Est.
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General Enquiries: Vaneza Liaguno
(Senior Project Manager)
Phone: +971 4 520 8888 Ext: 603
Direct: +971 4 520 8848
Mobile: +971 50 8939312
vaneza.santos@index.ae

Venue: Dubai International
Convention and Exhibition Centre
Dubai - UAE

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AUGUST

25-27/08/2021

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Organized by: Imec Expo Sdn Bhd
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Email: enquiry@imec-expo.com
Venue: Kuala Lumpur Convention Centre
Kuala Lumpur
Malaysia

www.imec-expo.com

SEPTEMBER

01-03/09/2021

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Organised by: Informa Markets

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Venue: Conrad
Dubai - UAE

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Website: www.abcex.com
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Kuala Lumpur - Malaysia

www.abcex.com

NOVEMBER

15-18/11/2021

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Phone: +49 211 45 60 01
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Email: info@messe-duesseldorf.de
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● Avazzia BEST advanced microcurrent technology is incorporated into the easy-to-use, four-mode device for the temporary relief of pain associated with sore and aching muscles in the shoulder, waist, back, back of the neck, upper extremities (arm), and lower extremities (leg) due to strain from exercise or normal household work activities.
Advanced Microcurrent Solutions SDN BHD
Malaysia
reaswaran@avazzia.com

● We are a medical distributor. We are looking for consumable products. Contact person: Elham Basiri, P.: +98 9352 6259 17
TG Med - Tadbir Gostar Darman Iranian Co.
Iran +98 2166 4919 15
import@tgdarman.com
www.tgdarman.com

● We are looking for a manufacturer for fire extinguishers.
Allenco - Medical & Surgical Supplies CC.
South Africa +2731 463 3396
sales@allenco.co.za

● Caribbean Medical is the largest supplier of medical products in Guyana and the largest in the Caribbean. We are looking for strategic partners in the Caribbean Region to expand our scope. **Caribbean Medical Supplies Inc.**
Caribbean
caribdiag@yahoo.com

Control-X Medical develops high-quality medical and veterinary diagnostic x-ray equipment. We meet the specific demands of markets with high-performance products, flexible configurations and low total cost of ownership. Our products are sold in over 50 countries through our reseller network which we are looking to expand.
Contact us at **sales@cxmed.com**

● Helvetica Health Care markets and distributes a wide range of molecular controls and panels, including those for COVID-19, SARS and influenza. Our broad customer base consists primarily of Pharmaceutical and Diagnostic companies working on developing either vaccines or COVID-19 related testing products, as well as laboratories performing molecular testing on patient samples. We are looking for other products and collaborations to complement this product range.
HHC - Helvetica Health Care
Switzerland +41 22 5349703
nsalazar@h-h-c.com - suppliers@h-h-c.com
www.h-h-c.com

● Alwanmed is a licensed pharmaceutical and medical devices/supplies distributor in Saudi Arabia. We provide a full suite of in-house regulatory, logistics, and sales capabilities to our global manufacturing and wholesale partners. We are interested in adding both retail and hospital lines to our expanding product portfolio.
Alwan Medical
Saudi Arabia
b.alkuraya@alwanmed.com
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Mr. Sergio A. Pleszowski
WE Med Lab Center Co., Ltd.
renabis8@gmail.com

● We have been one of the first families in the medical field trade in Yemen for the last 5 decades. In 2014, we established to become a pharmaceuticals and medical appliances importer. Walking with balance steps, balanced between the local market needed and import a good product.
Jnntan Global for Importing
Yemen
jnntanglobal@gmail.com

● LTD "Unimedi" was founded in 2011. LTD "Unimedi" distributes medical equipment and disposable medical goods in Georgian market. Our company has equipped and serves numerous advanced clinics in Georgia market.
Highly qualified specialists of LTD "Unimedi" provide customers with high quality products and related services.
Unimedi LTD - Georgia
+995 322 96 92 15
import@unimedi.ge
www.unimedi.ge

● We are looking to distribute IVD products, bench top immunoassay analysers, Troponin T test, Filariasis Rapid kit.
Sui Generis (Pvt) Ltd - Sri Lanka
info@suigeneris.lk

● Epic Innovations medical supplies company import and partnership with the best reputable manufacturer worldwide. We provide you with the best services and trusted products. We will help you raise up because TOGETHER WE DO BETTER
Epic Innovations - Egypt
asma.sami8989@gmail.com

● We mostly import medicine from different countries. The categories we prefer are antipains and vitamins.
Barwaqo Drug Company
Somalia +252 615 575 857
info@barwaqodc.com

● Pharmworks is an importing company of medical equipment which distributes its products throughout Greece. Our customers are hospitals, medical diagnostic centres, proprietary clinics, doctors' offices, pharmaceutical stores, pharmacies, public and private institutions and stores.
Pharmworks - Greece
+30 2610333533 M. +30 6934529599
info@pharmworks.gr
www.pharmworks.gr

We are looking for all kind of products for Veterinary Diagnostics market in Mexico and Central America. **DESEGO** - Mexico
gibran@desego.com

We are a medical distributor based in Saudi Arabia. We are looking to distribute medicine, food supplement, medical disposable especially haemodialysis segments.
Al Basateen Trading Co., Ltd. Saudi Arabia
yaser@albasateen.com

We are importers & distributors of medical equipment, intensive care/cardiac surgery disposables in all over Pakistan. We are working in Pakistan with different products and exclusive distributors of international medical manufacturers like cardiac equipment, cardiac surgery division, dental equipment, medical furniture in health devices etc. Our main focus is to target all hospitals/institutes in Pakistan to promote our sales and introduce latest technologies in the medical division.
Cares Worth Pakistan (Pvt) Ltd - Pakistan
yaseen@cwp.com.pk

Galaxy Technologies is a renowned distributor in Pakistan of the following range of products: Scientific Lab Equipment, Clinical Lab Equipment, Biochemical, Research Chemicals and Equipment, Blood Banking Equipment, Medical Healthcare Equipment, Hospital Equipment and Appliances. We are looking for new international partners. Feel free to contact us:
galaxytech.uae@gmail.com
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We are looking to distribute consumable, disposable materials, respiratory, dentistry and oncology pumps.
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mahmuttutal@gmail.com

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theophanides@orthodynamic.gr

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Ataard Scientific Distributional Bureau is an Iraqi pharmaceutical distribution company. We have been in the pharmaceutical field since 2008 and our pharmaceutical warehouse is located in Baghdad. Our company has succeeded in the field of distribution of generic drugs and food supplements of Indian manufactures and we are under procedure of registration of Spanish and Canadian supplement companies. We are interested in cooperation with new companies to be your distribution agent in Iraq.
Please contact me: Ali Al- Saadawi
Cob.ataard@outlook.com Iraq
Ataard Scientific Distributional Bureau

Alfa Pharma is a professional company in the field of marketing and distributing of both pharma and medical products in the territory of Yemen. We have our own branches in all main cities and a full distribution and marketing net.
Alfa Pharma Corporation Mexico
alfapharma13@yahoo.com

Our company has a long experience in the medical field and we distribute in the most main cities. We deal with all government and private hospitals too. We are looking for innovative solutions which reward the patient and medical centres with high efficiency.
Albilali Medical - Saudi Arabia
info@albilali-med.com

We are looking to distribute contrast media, radiology equipment, dental cartilage and ophthalmology consumables. We believe in quality and we are looking for manufacturers who are responsible to their products.
Brown Pharmaceuticals PLC Etiopia
asfawmed@gmail.com

I am Warintorn, Business Development Manager-Ethical of Great Eastern Drug Co., Ltd (GED) Thailand, which is a business partner of UNILAB (United Laboratories) in Philippines. I am in charge of new products sourcing. Regarding new business opportunities, our company has been one of the leading pharmaceutical ones in parenteral specialty products, tendering products and OTCs products in Thailand since 1961.
Great Eastern Drug Co. Ltd. Thailand
warintorn@unilab.co.th

Tadbir Gostar Darman Iranian is a distributor located in Tehran, Iran. We distribute many kinds of medical consumable and disposable products such as blood pressure monitors, thermometers, pulse oximeters, wound dressings, etc. Contact Mr Elham Basiri for business opportunities:
import@tgdarman.com
Tadbir Gostar Darman Iranian - Iran

Our company specializes in distributing foreign medical devices, health and medical products in China. We are very interested in collaborating with you to bring your products into Chinese market.
DongJian Technologies, Ltd. - China
dongjian.business@outlook.com

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