Fighting the Bat in a VUCA world:

The Case of the Sheba Medical Center (SMC)

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We would like to thank Sheba Medical Center management and staff for their contribution and cooperation. This case study was conducted using qualitative methodology, by means of in-depth interviews, including our participation in organizational meetings with SMC representatives in different positions and fields of expertise. We were also given access to internal documentations, communications, and publications.

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Case Study

At 1:00 PM on February 3, 2020, a management meeting at the Sheba Medical Center (SMC) attended by *Israeli Ministry of Health* (IMH) representatives was underway.

"*Professor Kreiss had something urgent to take care of. He will join us later, so we can start the meeting without him,*" said Professor Arnon Afek MD, MHA, the Acting Director of the General Hospital of Sheba Medical Center, while participants were waiting for Professor Yitshak Kreiss, MD, MPH, MHA, Managing Director of the Sheba Medical Center. The purpose of the meeting was to discuss Israel's health system of the future and present a forward-looking strategy. The circumstances, however, high-jacked these plans.

"*Excuse me for being late… We had a suspected Covid patient, but we found no Covid-19 so we can now start the meeting,"* Professor Kreiss announced as he entered the room.

Although there were no corona cases in Israel at the time, the lack of knowledge about the mysterious disease triggered a major panic among both the professionals and the Israeli public.

February 21, 2020 was no typical morning at the SMC, which was the hospital to admit the country's first Covid patients in an insulated compound that was practically built over night.

SMC was, in more ways than one, a pioneer that sets an example for other hospitals of how to respond to the deceptive disease while looking forward in an ever-changing environment. Its efficient response was possible thanks to the existing combination of organizational resources, infrastructures, and assets that served as *Organizational Reserves* during this health crisis.

Here Comes the Bat: A Worldwide Pandemic

November 2019: A mysterious disease spreads in the Chinese province of Wuhan and causes a major panic in China.

January 2020: Publications around the world emerge, showing disturbing images of people lying lifeless in the streets of China, while government officials, outfitted in protective gear from head to toe, lock the doors of public buildings. The media reports

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that China's streets are empty. A flurry of reports about this deadly pandemic appears globally.

COVID-19 Spread

The coronavirus disease 2019 (COVID-19) pandemic spread around the globe in the first half of 2020 and caused the deaths of 5.4 million people by December 2021 worldwide.

Healthcare systems around the world were facing a rapidly spreading respiratory infection with unknown pathophysiology. One of the main challenges was to provide optimal medical care to patients with a highly infective disease while using isolation measures. Another key challenge was the patient burden on hospitals, which quickly reached their maximum capacity. These challenges were compounded by a lack of trained staff and required medical equipment, and sharply illustrated the full power of a VUCA environment. Many organizations subsequently adopted this acronym (volatility, uncertainty, complexity, and ambiguity) to describe the turbulent, rapidly changing, and chaotic business environment that had become the "new normal" for organizations around the globe.

VUCA conditions created dynamic changes and new global trends in which healthcare systems were forced to operate. They too, like other business entities, must be able to operate and make significant decisions in a disruptive environment.

Covid-19 spread compelled hospitals and other health systems to redesign their organizational structures and cultures and redefine processes to better face the challenges in the present and prepare for the challenges ahead.

Once main global healthcare trends are identified, hospitals can better plan their response to unpredictable change, according to each of the four VUCA categories, by developing new models of human resource management, capabilities for innovation, and an organizational culture that supports such changes.

In such circumstances, the management process entails the deliberation of many decisions considering the course of action from several possible alternatives. However, many hospitals typically had limited information and knowledge about the "possible alternatives" for providing optimal medical treatment to COVID-19 patients and treatment guidelines and protocols were continuously being re-written as the world started sharing and collecting data to gain a better understanding of the disease's behavior.

This also raised the question of whether countries and their healthcare systems had failed to anticipate the future threat of a global viral pandemic. Was COVID-19 a "black swan" or a "gray rhino"? Unlike the Black Swan theory, which describes an unpredictable event, the notion of a Grey Rhino refers to events that we tend to miss or ignore because of the threat they represent, even though they are right in front of us.

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We can't say that the world was unaware of the risk a viral disease and pandemic since it has experienced several pandemics throughout history, including the Spanish Flu, and more recently, SARS Cov. But COVID-19 differed from those diseases in its pattern and mechanism. In Israel, based on the experience Israel acquired in the SARS (severe acute respiratory syndrome coronavirus) outbreak in 2002, the Israeli Ministry of Health (IMH) prepared a detailed action plan on how to cope with future infectious diseases, which included designated the authorities that would be responsible for developing a national strategy. But these plans were irrelevant when it came to COVIT-19 threat.

The Hospital Industry: An Overview of Global Trends

In recent years, the face of global medical industry has been changed by several significant trends, including demographic changes, and increases in community-based home hospitalization and digital health care services, to name a few. Globalization and the outbreak of the COVID-19 pandemic are forcing healthcare systems to adopt new best practices while in motion.

An Aging World

According to the Aging World (2015) report, the population aged 65 and over will expand by approx. 150 percent expansion by the year 2050. While an aging population reflects human success in increasing longevity, increasing longevity also plays an important role in predicting future illness for the purpose of improving the healthcare ecosystem's preparation for the future.

The incidence of chronic diseases is increasing, which means that preventive medicine must be at the center of attention today, and hospitals must take proper measures to train the required personnel training, and foster hospital and community collaboration as a long-term strategy.

COVID-19 has had a great effect on mortality rates in aging countries such as Italy, where the mean age of death was 81. An aging population was the main cause in intensive care units reaching their maximum capacity, which led to medical staff burnout and adverse effects to the quality of medical care provided to patients.

Digital revolution in health

Digital health services and technologies play a significant role in improving the quality and effectiveness of healthcare, and reducing costs for both healthcare systems and patients.

It enables better data collection, sharing, and analysis, which support clinical decision-making and improve healthcare delivery. AI, which describes any computational programs that simulates human abilities, such as learning and problem solving, has revolutionized the medical world and fundamentally changed healthcare practice and

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research. Covid-19 prompted healthcare systems to focus on 'digital health' solutions to better face the challenge of treating COVID-19 patients who require full isolation.

Community-based home-hospitalization (CBHH)

The pandemic has also resulted in recommendations for home care for patients with COVID-19 symptoms who were self-quarantined and treated themselves at home unless seriously ill. Community-based home hospitalization (CBHH) is relatively new approach to hospitalization in Israel, developing from the global of transition from healthcare services provided only within formal institutions and facilities (e.g., hospitals, clinics) to healthcare services in informal settings such as the patient's home. Home hospitalization reduces hospital stays and hospitals visits, which reduces the workload in hospitals, especially when hospital's main concern is to avoid reaching their full capacity during a major health crisis caused by the COVID-19 pandemic.

World Leader in Healthcare: The Israeli Health System

Israel is an exceptional country and differs from other countries in Europe in its structure and demography. While Europe is facing the challenge of an aging population, which had a direct impact on the number of COVID-19-related deaths, Israel suffered a relatively low number of casualties because of its demographic uniqueness.

Israel has created a very efficient healthcare system with relatively low spending. OECD Health Care Quality Reviews of Israel stated that "Israel has established one of the most enviable healthcare systems among OECD countries" (2012). According to the Bloomberg's annual ranking of countries with the most efficient healthcare from 2018, Israel is ranked 6th. In Israel, the healthcare system is supervised by the *Israeli Ministry of health* (IMH) and consists of two sectors: public and private healthcare. The private healthcare sector including private hospitals and medical institutions, while the public sector includes government-owned hospitals and the community-based health systems of four non-profit Health Funds (HF), which are mainly financed from tax revenues and from government spending.

The Israeli healthcare system is governed by the *National Health Insurance Law* (1995) which is based on the principles of justice, equality, and mutual responsibility, and provides for universal coverage. All citizens have freedom of choice from birth to choose between the four Health Funds (HF), income-based premiums are allocated to HFs based on a capitation formula, a national Health Basket is defined to provide an essential bundle of healthcare services, and finally, the system provides healthcare delivery that includes community care through the HFs, non- profit and public government and HF-owned hospitals, and the private sector. The structure of the healthcare system in Israel enables a shift in the burden from hospitals to community-based health services, which has implications for health expenditures on community care vs. hospital care.

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Since healthcare is an essential need and a basic human right, the government of Israel plays a key role in the national expenditure on health, with 67% of national expenditure on health financed by the government and the remainder by hospitals themselves.

Although the OECD 2019 and 2021 health indicators show that countries that spend more on health have better health outcomes, Israel deviates from this basic relationship with high life expectancy (82.6) and relatively low health expenditure as a share of GDP (7.5%), compared to the average OECD life expectancy (80.7) and health expenditure as a share of GDB (8.8%) (see Exhibits 1 and 2).

Despite the efficiency of the Israeli healthcare system, COVID-19 has highlighted the system's weaknesses, which affect its absorption capacity during an emergency as a global pandemic. There is a shortage of medical staff, which directly affects the quality of healthcare provided by doctors and nurses who work for extended hours. In addition, inpatient departments are typically at full capacity, with a high density of beds and patients (see Exhibits 3 and 4).

"… Sheba too, like every other hospital in the country [Israel], is facing a shortage of intensive care beds… to meet the standard it should have had at least 120 intensive care beds yet it has only 14 (!!!) "

- ***Dr. Yoram Klein, Director of the Trauma and Critical Surgery Unit, Sheba Medical Center***

Dr. Klein also warns against a deceptive sense of security and notes that such a shortage of intensive care beds in routine times becomes much more critical during a crisis, where the need for intensive care beds increases dramatically.

It seems that COVID-19 created a significant challenge for the world's most efficient healthcare system, which was effectively ill-equipped and unprepared for what was to come. As the pandemic first erupted in Israel, there was no official strategy or plans for responding to a national pandemic that the hospitals could follow. Due to the limited experience of other healthcare systems, each country struggled to develop its own national response, including policies and strategies for its medical facilities. In Israel, the Israeli Ministry of Health (IMH) was the governmental authority through which the government implemented its policy, priorities, and strategies in the entire healthcare system.

The case of Sheba Medical Center (SMC) is the story of one institution's local initiative and proactive approach in responding to a worldwide health crisis, acting in a chaotic environment.

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The Sheba Medical Center: Brief Background

The Sheba Medical Center at Tel Hashomer is a university-affiliated tertiary referral hospital that serves as Israel's national medical center in many fields.

Adjacent to Tel Aviv, it is the most comprehensive medical center in the Middle East, renowned for its compassionate care and cutting-edge medicine. It is also a major medical and scientific research powerhouse that collaborates internationally with biotech and pharmaceutical industries to develop new drugs, treatments, and technologies, and is a leading global center of medical education. Today, SMC combines six major facilities: a vast medical research complex, an academic medical education campus, an acute care hospital, a children's hospital, a women's hospital, and the Israel's main rehabilitation hospital (see Exhibit 5). Sheba has close to 10,000 health professionals, all are fully committed to the highest standards in medical diagnostics and personal medical service, provide almost four million treatments and medical tests a year (see Exhibit 6).

SMC is considered as the state's leading hospital, due to its leading medical center of international repute. Sheba is ranked in the top 10 best hospitals in the world according to Newsweek Magazine (2019) and recently placed ninth among the best hospitals in the developed world for 2020 according to Statista and Newsweek Magazine.

The historical development of the SMC is strongly related to the history of the State of Israel. Sheba Tel Hashomer Hospital was originally established as a military hospital by Prof. Haim Sheba, who served as the IDF's (*Israel Defense Forces*) first chief medical officer.

Another interesting fact is that since its establishment, SMC had only four General Directors: Prof. Haim Sheba (1953-1971), Prof. Mordechai Shani (1971-2004), Prof. Zeev Rotstein (2004-2015) and the current General Director, Prof. Yitshak Kreiss, since 2016. The unique perspective of long management tenures facilitates the implementation of long-term policies and strategies that strengthen the system and increase its stability.

Since its establishment, SMC has defined itself as more than a hospital, which led to its development in four main fields that constitute the foundation of Sheba's vision and mission: clinical superiority, research powerhouse, digital innovation, and education.

SMC's collaborations with international organizations and researchers have advanced its innovative medical practices, hospital systems, and biotechnology.

The tertiary referral hospital, affiliated with Tel Aviv University, includes centers for nearly all medical divisions and specialties, and serves over 1 million patients per year. More than 25 percent of all Israeli medical clinical research takes place at its state-of-the-art facilities, and it works with nearly every Israeli medical institute to educate students and advance the future of the medical profession.

SMC's Core Values

Culture of Clinical Excellence

- *Research Powerhouse*

SMC is committed to top standard clinical excellence based on strong research and development by investing in professional human resources, infrastructures, and facilities. Sheba's excellence in groundbreaking medical research is highly recognized in Israel and around the globe. As a research center for clinical studies across a varied spectrum of medical disciplines, Sheba offers its staff a challenging, stimulating working environment.

SMC is the first choice of PhD research professionals who wish to contribute to new scientific findings, and more than a quarter of all clinical research in Israel is conducted at Sheba's research campus.

In addition, SMC maintains a current Federalwide Assurance (FWA) for the Protection of Human Subjects, making Sheba eligible for US federal grants for research involving human clinical trials. As a result, Sheba serves as a major site for industry-sponsored clinical trials and clinical product development.

SMC research is funded by internal sources, donations, local and international research trusts, and private companies (e.g., biotech, pharmaceutical, medical devices). SMC Scientists and doctors, together with industry, co-develop breakthrough medical innovations, including therapeutic solutions, diagnostic tools, imaging modalities, drug delivery systems and medical devices. Sheba works together with top national and international biotech and medical companies and has an outstanding record of basic and clinical research and services, promoting effective translation from "bench to bedside."

Sheba's internationally renowned scientists have made significant contributions to the advancement of knowledge and medical solutions in fields as diverse as cell biology, biotechnology, genetics, imaging, and medical technologies. Its mission is to continue to be a medical research powerhouse that will help to improve the lives of people in its region and around the globe.

- *Innovation*

Sheba is at the forefront of medical innovation, leading the global future of healthcare in several emerging fields. Its mission is to transform healthcare delivery and improve patient care through collaboration with strategic partners, in line with the global trends of virtual healthcare that include home hospitalization, online medical consultation, and online clinics. Sheba also invests in technological development of medical devices, medical imagine, cell therapy, and diagnostic tools.

The ARC Innovation Campus, which is short for accelerate, redesign and collaborate, was founded in October 2019 by Professor Eyal Zimlichman, who currently serves as ARC Director, and SMC Chief Medical Officer and Chief Innovation Officer. ARC has six hubs

focusing on big data and AI (Artificial Intelligence), telemedicine, precision medicine, virtualized medicine, innovation in surgery and rehabilitation. All aim to develop future solutions with the ambitious mission of creating a meaningful impact on healthcare by 2030.

For this purpose, ARC unites with innovative startups, leading academical centers and other strategic partners such as the Health Funds in Israel, leading pharmaceutical companies and big corporates as Microsoft, Elbit, technological units of Israel's security services etc.

- *Education*

Sheba believes in collaborating with the academia to meet its goal for clinical excellence. It partners with the leading medical education institutions in Israel, and serves as the campus for students training in all aspects of the medical and healthcare professions. SMC is affiliated with the Sackler Faculty of Medicine at the Tel Aviv University and holds a unique position as an academic teaching hospital in both acute care (the general hospital) as well as sub-acute and chronic medical services (the rehabilitation hospital).

Sheba also promotes revolutionary programs to develop Israel's leadership in healthcare. It has about 20,000 students in various academic schools and programs, including the academic school of nursing, MSR - The Israel Center for Medical Simulation, the Talpiot Medical Leadership Program, Tel-Aviv University School of Physiotherapy, The Arrow Project, and Tel-Aviv University School of Communication and Disorders.

SMC assumed the role of developing the future generation to protect and pursue a legacy of clinical excellence. The Arrow Project, which supports the development of young, multidisciplinary research teams, is an excellent example of Sheba's strategy of always looking ahead and shooting far. Young, motivated students in their early years of education in medicine, biology, bioinformatics, psychology, statics, physics and computer science are invited to participate in research studies, from their early stage to the final results presented in medical conferences.

Patient-Focused Approach

SMC promotes its patient-focused approach through a collaborative network with local and global medical research centers, universities, and medical industries to achieve solutions that improve patient care and save lives. Its multidisciplinary research teams of clinical investigators, scientists, physicians and academia, strive to transform latest breakthroughs in science and technology into new cures, devices and diagnostic tools for the most challenging health conditions and diseases of the 21st century. Its physician-scientific model is the driving force that translates research findings into medical advances.

Putting the patients at the center is not merely a formal declaration, it is the mind-set of everyone at Sheba Medical Center, and is reflected in its organizational culture of caring

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for patients, doing their utmost to give the best medical care with a personal touch. According to Mr. Avi Baruch, Deputy Director for Organizational Management and Human Resources, a person who does not share this perception and devotion cannot be an employee of Sheba.

Mr. Yehuda Katorza, Deputy Director of Operations and Infrastructures, is responsible for six main operational functions at Sheba: logistics, operation, procurement, construction unit, transport unit and service carriers. "Patients come first" is a core value in the way Mr. Katorza perceives the mission of his units in the organization. When first entered his role, he decided to increase the number of parking lots for patients and their families, explaining that "*when a cancer patient comes for treatment at Sheba, he should not have to look for parking. Parking has to be available to him,*" and overrising the initial resistance of staff whose parking spaces were moved to different locations. He also changed the name of the transportation unit to the service carriers unit, to reflect their role representing the hospital in its first contact with patients. This symbolic change emphasizes Sheba's perception of the patients whose needs are at the center.

Human Capital and the Physician-Scientist Model

> *"One of my main roles is to build the NBA team in Sheba, state-of-the-art human capital, [by] attracting the best talents in each field of expertise using headhunters both in Israel and abroad... The logic behind this concept is that by recruiting the best, other talents will follow."*
>
> - ***Mr. Avi Baruch, Deputy Director of Organizational Management and Human Resources***

According to Mr. Baruch, the extraordinary importance of a hospital's human capital is its duty to save human's lives. The degree of the intensity of their work, the constant need for development and training, and burnout potential are incomparable to any other field.

Senior physicians in Sheba's management mention the unique DNA of Sheba's staff, especially their dedication to care and commitment to their patients and colleagues, which was a key factor in Sheba's success in achieving its mission during the pandemic, which was to "***maintain the functional continuity of the hospital" (Mr. Avi Baruch)***.

Everyone, professional and administrative staff, was fully engaged in the hospital's mission and contributed their share in the battle against COVID-19. However, this was not the case when COVID-19 first outbroke in Israel.

Initially, very little was known about the behavioral patterns of the virus, even among the top health officials in Israel, which caused a great panic among the public. The uncertainty sowed fear even in the medical staff, who were concerned for their safety and the safety of their family members. Once the hospital gained initial knowledge and experience about COVID-19, everyone quickly became engaged: productive cooperation developed

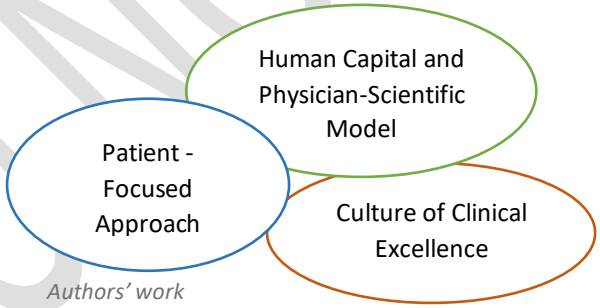
between the different units, assistance and resources (including manpower and knowledge) were willingly extended and shared.

Despite the mental and physical difficulty of being a Sheba employee, even with the presence of COVID-19, SMC is ranked first in the healthcare sector in Israel as the best place to work at in 2021 according to Globes, Israel's leading financial newspaper, which reflects SMC's strength and uniqueness as the leading choice of talents in the healthcare system.

Referring to the lack of resources in Israel's healthcare sector, including a huge shortage in manpower, Mr. Baruch stated, "We are not shrinking but breaking forward."

Human capital is the most expensive component of an organization's expenditure, especially in health systems where the organization is as good as its people. While other hospitals may look for ways to reduce labor costs, Sheba's approach is different. It always searching for ways to extend its income-generating activities, allowing it to pay higher salaries and attract more talents. SMC invests many resources in the development of its human capital, providing them with the most advanced research infrastructure and tools, thanks to its strategic partnerships with other institutions including local and international research trusts, and private companies.

SMC's physician-scientist model has proven to be a driving force in biomedical research and the source of major medical contributions and breakthroughs. Physician-scientists can shape the future of healthcare by translating their research findings into medical applications and advances.



Authors' work

Coronavirus Crisis Management: *The SMC Model*

In March 2020, COVID-19 had officially erupted in Israel. What initially seemed to be something that concerned only China and the Far East hit us all intensively and rapidly, reminding us that globalization is a two-sided coin.

Although the Israeli *Ministry of Health* (IMH) carefully monitored the development of the mysterious virus and kept contact with *the World Health Organization (WHO)*, at that time no one appeared to have any clear answers about how to detect the virus, how it transforms and is transmitted from one person to another and more importantly, the medical treatment protocol for COVID-19 patients.

As other countries in Europe, Israel collected and shared information with other health authorities around the world to discover the best formula for dealing with this unfamiliar enemy. The system needed some time to adapt to the new circumstances and define clear guidelines for Israel's hospitals and other medical facilities, and to provide the tools and resources required to deliver the best medical care. But time was precious: Hospitals could not wait and were forced to develop measures, organizational policies and protocols immediately.

Consequently, each hospital followed what it considered to be the best response strategy at the time, and each hospital's general manager acted according to their best understanding. This led to local bottom-up initiatives and promoted resourcefulness, as was the case of SMC.

SMC took the lead nationally and served as the role model for other hospitals in Israel and around the world, in the way it managed the largest health crisis the world has known for many years, both internally and on a national level, through strong leadership, innovation and strategy.

SMC's Vision:

- Leading in groundbreaking and patient-focused biomedical **research**
- Positioned at the forefront of national and international medical **innovation** and novel research
- Source of attraction for outstanding physicians and researchers, and for collaborations with the **academy, industry and community**.

Sheba's vision, supported by its core values, created the foundation for the implementation of its crisis management strategy in a VUCA environment.

From Responsive to Proactive Management

When organizations facing an unfamiliar threat have limited information, organizational performance quickly falls. Because many of the old rules no longer apply, strong leadership is a key factor in coping with unexpected managerial challenges during a crisis.

In the early stages of the COVID-19 outbreak in Israel, there was no orderly national plan or strategy. All health institutions acted according to what they thought to be the best practice, which was mostly a responsive strategy based on the limited and most recent data available.

All Eyes on Sheba

In February 2020, the *Israeli Ministry of Health* (IMH) decided to bring back the first Israeli COVID-19 patients who were onboard the Diamond Princess cruise ship in Japan.

However, no hospital in Israel was willing to be the first to deal with COVID-19 patients, with the exception of Sheba.

This was the first step that stabilized Sheba's national role in leading Israel's strategy in its battle to prevent the spread of COVID-19 in the country.

> "*Professor Kreiss made the brave decision that Sheba would take the lead in the national response strategy to the spread of COVID-19…. this is a bold decision that goes against any managerial rationale since its immediate impact was to impair the functional activities of the hospital…..Why? Because it caused great panic among the staff who lived on [the hospital campus]. Sheba's employees feared this new virus, and patients, such as women who were about to give birth, didn't want to come to the hospital because they were afraid of the virus*."
>
> - ***Professor Arnon Afek MD, MHA, Acting Director of the General Hospital, SMC***

Professor Kreiss' decision was not only brave but also the right decision for SMC, although it didn't seem so at that time. The residents of adjacent Ramat Gan neighborhoods were furious at the decision to admit the first COVID-19 patients in the hospital next to them.

At that time, no one knew anything about the disease and people were afraid that it would be transmitted through the municipal sewers and infect everyone. Despite the mounting public panic, and demonstrations in front of the hospital that required the mayor's intervention, Sheba refused to back down from its decision.

This was the first of many actions that positioned Sheba as the national entity concerning COVID-19. The Israeli Ministry of Government, the Ministry of Defense and the Ministry of Health all set up their command offices within Sheba. Sheba was also the first hospital that built a COVID-19 ICU in its underground parking lot in 5 days, an unprecedented operation that had inspired other hospitals around the world. Sheba drafted a plan of how to build an intensive care unit in a short time and provided written manuals to other hospitals that implemented their concept.

Sheba was consistently the first hospital that responded to emerging needs, thanks to its medical and operational capabilities, which enable the provision of a proper medical care to all citizens in Israel. It was the first hospital to open the first COVID-19 unit, the first hospital with a COVID-19 maternity ward, a COVID-19 psychiatric unit, and other COVID-19-related units.

Thanks to its strategic and unconventional collaboration with the IDF, Sheba successfully imported facial masks despite a worldwide shortage, and purchased a significant number of respiratory machines from overseas while the rest of the world suffered from a real shortage.

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Sheba also played a leading national role in COVID-19 testing. The Ministry of Health had a biological laboratory that should have provided the COVID-19 tests, but the facility lacked the operational capabilities to perform the testing. Therefore, it turned to Sheba to take control of the laboratory tests. While it had no biological laboratory of its own at that time, Sheba built the national biological laboratory of Israel, proving once again that there is nothing impossible when there is a will and the full engagement of its organizational system.

The national strategy for preventing the spread of the virus was followed by the recommendations of Prof. Gili Regev, Head of the Infection Prevention and Control Unit at SMC, who is responsible for the effective detection and prevention of the spread of COVID-19. She was the professional authority who defined the national standards for the protective measures required to cut off the chain of infection, including guidelines for protective gear for medical staff, determining how many days of isolation are required, and the transition to a double-shift operating model.

Thanks to its leading physicians' expertise, SMC was also involved in the decision-making process in different national operations. SMC recommendations served as the basis for new models for returning safely to routine life, which enabled the gradual re-opening of the Israeli economy.

SMC's epidemiological knowledge was used to define the guidelines for the Green Classroom model, used to allow Israeli educational institutions to return to routine, and for the re-opening of cultural and entertainment events in Israel.

Sheba's top physicians and managers, including Prof. Afek (MD, MHA), Dr. Itai Pessach (Director of the children's hospital and manager of the COVID-19 intensive care unit), Prof. Eyal Leshem (Director of the Center for Travel Medicine and Tropical Diseases), and Prof. Galia Rahav (Head of Infectious Diseases Unit) became new cultural heroes and familiar public figures, making regular appearances in the newscasts of Israel's three leading television channels.

National ceremonies and symbols recognized Sheba's role as the national leader in the struggle against COVID-19:

- The Head of Cancer Research Center at Sheba and one of the hospital's senior researchers and physicians, Prof. Rechavi Gideon, MD PhD was awarded the prestigious Israel Prize in the field of medical research in 2020.
- Prof. Galia Rahav, Head of Infectious Diseases Unit at Sheba Tel Hashomer Medical Center, lit a torch at the national ceremony celebrating Israel's 72nd Independence Day, on behalf of her fellow doctors who led the national battle against the COVID-19.

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- Dr. Itai Pessach, Director of the children's hospital and manager of the COVID-19 intensive care unit, was honored to recite the Yizkor prayer at the torch-lighting Independence Day ceremony in 2020.
- Instead of flying over the crowded beachfronts and parks across Israel, the Israeli Air Force Aerobatic Team flew four T-6 Texan II aircraft over Sheba Medical Center, and other hospitals in the country, to salute the medical workers as they work on the frontlines in the battle against the COVID-19 pandemic.

Leadership Agility

Leadership agility refers to a leader's capability of sustaining success in a VUCA world by making continuous shifts in manpower, processes, technologies and structure. Leaders who focus on building agile organizational infrastructures excel in responding to rapid changes with actions that are fast and flexible. Moreover, they can motivate and guide their teams to perform in a complex business environment.

Sheba's leadership conducted daily multi-disciplinary meetings with the representatives of its each unit for efficient brainstorming and to strengthen the collaboration between the units.

Professor Kreiss, alongside his board of members, provided clear guidance and direction to their managers on the organizational mission ahead of them in their battle against COVID-19. He instructed his management to conduct daily briefings with their teams, granting them full authority to operate independently in their field of expertise. Each manager received his responsibilities and a mission, and once roles were assigned it was up to them to perform the tasks however they deemed fit. Senior head of units at Sheba reported having received the full support of the management for their decisions. This approach encouraged these managers' initiatives, which supported the cross-organizational efforts to meet the organization's objectives. The managerial style of empowerment through full authority delegation was also practiced by other senior managers at Sheba.

"Sheba's vision is to be a world leader by expanding the scope of health care."

- **Professor Yitshak Kreiss, M.D., MPH, MHA, Director General of the Sheba Medical Center**

Professor Kreiss has been the Director General of the Sheba Medical Center, Tel Hashomer since 2016, Behind him is an impressive military career in the IDF where he served as a front-line combat surgeon, through all levels of command, until assuming overall leadership of the Medical Corps as the IDF Surgeon General.

Prof. Kreiss used military doctrines and practices to manage the COVID-19 crisis, making the required adjustments to the civilian environment. Performing in chaotic environment

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is one of the specialties that Prof. Kreiss acquired over the course of his career. He has extensive experience in medical care in disaster events, treating victims in emergency conflict-related events across the world.

He led many emergency campaigns and humanitarian missions, including the establishment of a field hospital for Kosovo refugees in Macedonia, leading a rescue mission for victims of a terror attack in Egypt; he headed the Israeli field hospital for the victims of an earthquake in Haiti; conducted humanitarian medical operation for the victims of the civil war in Syria; and headed the humanitarian medical mission for the victims of a typhoon in the Philippines.

SMC's rapid transition from routine working processes to an emergency mode of operations has proven to be one of its most important organizational strengths. The experience of SMC's leadership in crisis management had a great impact on its capability to respond effectively to COVID-19 threat.

When he first got the call from the Director General of the Israeli Ministry of Health, who asked him to receive the first COVID-19 patients, it took him less than a few seconds to accept the national responsibility and challenge while other hospitals recoiled. At that very moment, Prof. Kreiss understood that Sheba would lead the national battle against COVID-19, which meant that SMC would be fully committed to national needs, prioritizing national interests over its own organizational interests.

Professor Kreiss stressed the main leadership principles he used to manage the hospital in order to support SMC's organizational vision. He believed that in order to lead and design the future of health care systems, not only nationally but globally, one has to follow these principles. He also believed that a true leader is tested in their ability to implement the organizational vision even and especially in times of crisis.

- **Always be First**

  SMC was always the first hospital to respond to the COVID-19 crisis. For example, it was the first hospital to treat COVID-19 patients in Israel, the first to open a COVID-19 ICU unit, psychiatric unit, maternity ward. etc. It was the first to vaccinate members of the population, the first medical facility globally to give the third dose (booster shot). Even now, as this case study is being written, SMC is the first hospital worldwide that is conducting extensive research on the effectiveness of the fourth (booster) vaccination.

- **National and Global Responsibility**

  SMC was involved in defining national policies, not only the clinic aspects of these policies, but also the national strategy for safe return to routine life. Based on its epidemiologic experience and recommendations, Israel developed new models for re-opening cultural events and educational institutions.

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Professor Kreis points out that an organization that considers itself a leader has a national responsibility to extend assistance during a crisis even when it is experiencing difficulties. As a result, SMC always put national needs first. Even as it experienced an in-house shortage, it continued to provide other hospitals with the required supplies and equipment and developed alternative solutions for its own needs.

SMC believes that as a leading organization it has a moral and humanitarian responsibility to reach out to those in need. SMC sent professional delegations to assist other countries, in their battle against COVID-19, such as Italy and Uruguay.

Israel was the first to vaccinate its population and was followed later by other countries. Sheba led the national vaccination campaign, both operationally and research-wise, through its involvement in defining the national vaccination strategy. Then Israeli Prime Minister Mr. Benjamin Netanyahu, chose Sheba as the site to launch the national vaccination campaign.

SMC has taken responsibility for the vaccination of populations at risk including individuals with allergies, and Holocaust survivors. Rather than waiting for instructions from national authorities, Sheba forged ahead and was proactive in offering its resources to vaccinate entire national systems including the police, Israeli defense forces, the education system etc..

Additionally, Sheba was the first to conduct breakthrough studies on the effectiveness of each the vaccine doses which later defined Israel's vaccination policy.

- **Be Innovative and Agile**

  Professor Kreiss emphasized the importance of "out of the box" thinking. This "making the impossible possible" mind-set is evident in various organizational units. Building a COVID-19 Intensive Unit in an underground parking facility is one of many examples of creative solutions that Sheba pioneered.

  Professor Kreiss also received a request from the White House for the manual of building an intensive care unit in an under-ground parking lot. He admitted that no such manual existed, since it had been built in several days thanks to the combination of the unconventional thinking and agile capabilities of Sheba's organizational resources.

- **Collaboration as a Strategy**

  SMC has a strong network of suppliers and strategic partners in many fields around the globe. These strategic relationships, which were developed over the years, contributed significantly to its ability to respond effectively to COVID-19. SMC conducted more than 70 Webinars to train medical teams around the world

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and share its knowledge to help others to implement practices and models that have been proven to be effective against COVID-19.

- **Set the Bar High**

  Professor Kreiss mentioned that SMC has a unique organizational culture of stretching the limits of one's ability. This approach was implemented by various organizational units that constantly set the bar higher and pushed forward when the circumstances became increasingly difficult during the crisis. Still, Sheba's management was attentive to its staff's needs and assigned a special team responsible for identifying individuals' difficulties and supporting them before they reached a state of burnout.

- **Always Plan Two Steps Ahead**

  When the first reports of the mysterious virus in China started to surface, Prof. Kreiss knew that Sheba had to be ready for the worst-case scenario. He started to prepare the hospital for the unknown so that Sheba would be able to assume national responsibility for Israel's healthcare services when COVID-19 arrives.

  During the outbreak of COVID-19 in Europe, he had worked closely with the IMH, informing the ministry on Sheba's actions. He established multidisciplinary teams and conducted daily status meetings, divided SMC personnel into two shifts, gave instructions to increase the manpower by recruiting reserve manpower and students. He also instructed the unit heads to define rapid training programs, increase supplies, and make other preparations.

Always Looking Ahead

Even in the early stages of global spread of COVID-19, Sheba's leadership adopted a forward-looking approach, always considering several steps ahead. Prof. Kreiss knew that organizational communications are highly important to ensure that everyone is engaged. Miss Lee Gat, VP of Strategy and Government Relations at SMC, was responsible not only for external publications but also for publishing internal communications within Sheba daily, to give the staff essential information and guidelines, with the organizational mission always in mind.

Moreover, Prof. Kreiss was aware of the importance of eliminating any conflict of interests between Sheba's internal units in order to guarantee productive collaboration and mutual support. He created multiple work teams and brainstorming groups of staff from different fields, such as finance, technology, human resources, and innovation, to allow each unit to present its own needs and hear about the other units' requirements.

Another organizational unit was established during the pandemic. Prof. Eldad Katorza was assigned to the headquarter team and was responsible for reviewing the world's professional literature on the disease in real time and publishing it internally every day.

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Strategic thinking is identified with SMC's management mind-set, even during a crisis. When the virus first appeared in Israel, Prof. Eyal Leshem, Director of the Center for Travel Medicine and Tropical Diseases at SMC, was assigned by the management to lead the professional writing project based on SMC's experience with COVID-19. In a short period, Prof. Leshem and his colleagues published numerous medical articles in various fields (see Suggested Readings).

Additionally, thanks to his training and professional experience in the CDC (*Center for Disease Control and Prevention*), professionals from all over the world approached Prof. Leshem for information based on Sheba's experience. As a result, SMC assumed a position at the forefront of the global battle against COVID-19, and its top physicians were strategic partners in COVID-19 worldwide forums.

SMC faced an additional challenge when the IMH ordered to suspend all hospital activities except for COVID-19-related medical care. All ambulatory activities were suspended, and hospitals were instructed to cancel any other medical treatments and elective surgical procedures. This decision seemed out of place since it hindered the hospitals' ability to cope effectively with COVID-19 since they had no sources of revenue to cover their increasing costs. Moreover, SMC's mission, which had been defined by its management early in the crisis, was to maintain the functional continuity of the hospital.

Despite these instructions Sheba's management informed the IMH of its intention to maintain the hospital activities to fulfill its commitment to provide the best healthcare to all patients. Unlike other hospitals, SMC had the organizational resources and infrastructure to do so. While other hospitals struggled to shift internal resources to COVID-19 units, Sheba had the organizational reserves to build new units exclusively for COVID-19 patients without harming its other units' activities. For example, Sheba opened a separate emergency room for COVID-19 patients, as well as other units specifically designated for COVID-19 patients.

There is no doubt that Sheba's strong leadership had played a key role in its ability to successfully manage a worldwide health crisis.

Innovation

Innovation is essential to devise solutions when familiar practices and know-how are no longer relevant. This can be achieved by creative and "out of the box" thinking.

Sheba is known for its innovative approach, which is supported by investments in research, world-class human capital, and its strategic collaborations with the academia and startups. These created a solid foundation to build creative and unconventional solutions during a crisis.

Professor Arnon Afek mentioned the hospital's Innovation Center as a unique feature that played a significant role in Sheba's organizational resilience during the crisis.

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Sheba's innovative approach was also reflected in its creative use of advanced technological infrastructure and capabilities to provide COVID-19 patients the best medical care under the limitations of isolation, for example through the use of telemedicine and by converting medical devices to respiratory machines.

The extensive network of relationships that Sheba has developed over the years is one of its core competitive advantages and a platform for knowledge sharing and strategic collaborations. This network has a significant impact on its organizational capability to respond effectively during a crisis. The ARC campus supported Sheba during the COVID-19 crisis by collaborating with its strategic partners and creating a platform for productive brain-storming sessions to develop creative solutions in the fields of diagnosis, remote medicine, and other specialties.

"Innovation is not only essential, but also critical to better face COVID-19 challenges."

Professor Eyal Zimlichman, MD. MSC, ARC Director, Chief Medical Officer & Chief Innovation Officer at SMC

According to Professor Zimlichman, the ARC Campus was a key factor in Sheba's ability to develop innovative solutions for the diverse challenges that emerged in the pandemic. In a short period, ARC, in collaboration with its strategic partners, was able to develop 45 inventions, including:

- ARC collaborated with the Intelligence Unit of IDF to develop a new model of respiratory device in just 6 weeks. ARC supplied 150 new devices, some of which were donated to third world countries. The entire process, which normally takes about 5 years**,** included the concept stage, device development, and experiments, first in animals and then in humans, to the final stage of regulatory approval.
- ARC developed a COVID-19 diagnostic test that provides reliable results within 10 seconds. It is in use across Europe and is pending FDA approval.
- ARC developed a new technology that uses a vest to simulate physiotherapeutic treatment, allowing respiratory physiotherapy to be performed to patients automatically. This new technology will become available in USA in the near future.

ARC worked together with SMC's operational and logistics units to build new working environments for COVID-19 units, which incorporated new technologies and telemedicine devices to allow medical staff to provide healthcare treatment under limitations of physical distancing.

"The conceptual perspective of ARC campus is that innovation processes, contrary to what is commonly thought, need to be structured," said Professor Zimlichman.

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Professor Zimlichman attributes ARC's ability to respond quickly to emerging challenges to the fact that ARC Campus has a structured plan for innovation development ("The ARC Cookbook"). As a result, its implementation during a crisis was relatively rapid as only few adjustments were required. The *ARC Cookbook* defines the main activities, which are divided into six designated hubs, as well as the eco-system of the campus, which includes the internal and external partners in each field of expertise. During the pandemic, ARC's human resources and infrastructures were fully engaged in the battle against COVID-19. It reassigned its six to new areas as he circumstances demanded and used its eco-system for new initiatives concerning COVID-19-related challenges.

National Strategic Infrastructures

SMC has also developed national infrastructures within the hospital campus to support its innovative initiatives. The development of such centers is unique to SMC and reflects its goal to be a leader in national and international healthcare standards.

- ***The Medical Simulation Center (MSR),*** Israel's only national multi-modality, interdisciplinary simulation center, was established at SMC by Prof. Amitai Ziv in 2001. Training at MSR reinforces clinical proficiency, teamwork, and other essential skills critical to patient safety.

  During the pandemic, the MSR was used for national training programs for medical staff from all the hospitals in Israel. Medical staff trained in new skills such as operating respiratory devices while wearing protective suits, in a work environment that simulated highly-risk infection conditions.

- In 2017, SMC established the ***Center for Disaster Medicine & Humanitarian Response***. The center's director, Professor Elhanan Bar-On has an impressive track record and over three decades of experience providing emergency medical responses to several countries. Prof. Bar-On was awarded the Yigal Alon Prize for pioneering excellence.

  > *".. I would say that the center is something unique worldwide, not that there are no centers like ours in the world, since there are many, but I think we are the only center that is a part of a large hospital on the scale of Sheba. This allows us to use both the infrastructure and the manpower resources of the hospital for our activities."*
  >
  > **Prof. Elhanan Bar-On, Director of the Center for Disaster Medicine & Humanitarian Response**

  The Center dispatches delegations that provide medical treatment in disaster areas and other humanitarian activities that are non-disaster related and include staff training, especially in the developing world. Additionally, the Center

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specializes in establishing a "field hospital" in Sheba or elsewhere in Israel or around the world to ensure functional continuity.

- ***The Central Laboratory for Viruses*** is a laboratory of the Ministry of Health, which is a center of expertise in diagnosing diseases caused by viruses. It operates nine national canters, three of which are recognized by the World Health Organization (WHO). The laboratory performs clinical and environmental tests and serves all hospitals and health funds (HFs) nationwide.

  The laboratory conducts initial clinical tests and is prepared to respond to emerging diseases caused by viruses, in accordance with the guidelines of the Ministry of Health. The central laboratory made an important contribution during the COVID-19 outbreak in Israel by providing services to the entire Israeli population as the operational extension of the Israeli Ministry of Health (IMH).

- ***The Gertner Institute for Epidemiology and Health Policy Research*** was founded in 1991 by Prof. M. Shani to promote extensive epidemiological research on major chronic diseases and to assist in national health policymaking in Israel.

  Until July 2020, the Gertner Institute was an independent association that operated within Sheba Hospital, and in January 2021 joined forces with SMC and became one of its official national Institutions. Gertner's studies are regularly published in leading medical sources positioning Sheba in the forefront of international scientific research.

  > "*The Gertner Institute has a reputation of about two decades as an international center of excellence, and in the past year has contributed greatly to the struggle in COVID-19 with ground-breaking research. It has also strengthened its status as a driving force in national resilience. The mission of the institute is to lead ground-breaking research in various fields of health and to assist in determining national and international health policy.*"
  >
  > **Prof. Eldad Katorza, Director of Gertner Institute**

  The Gertner Institute, headed by Prof. Eldad Katorza, MD, MSC, MBA, received the mandate from the Prime Minister's Office and the Israeli Ministry of Health (IMH) to lead national research efforts on COVID-19. National studies on the mechanism of COVID-19 have been conducted at the Gertner Institute, which included data processing and the development of new models and statical methods.

  Following Gertner Institute's findings, the *Israeli Ministry of Health* (IMH) decided to endorse a third dose of the COVID-19 vaccination for the population of Israel. Israel was the first country to make the booster shot available, and other countries quickly followed.

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In addition to its theoretical contribution, the Gertner Institute supports SMC's response strategy by defining potential scenarios regarding the development of the disease, offering a detailed operational plan for each scenario. Today, the Gertner Institute continues to play a key role in SMC response strategy, both in the theoretical and operational fields.

These are a few of the unique platforms that Sheba had developed over the years, and constitute a reflection of SMC's organizational philosophy and mission. The development of these platforms could not have been possible without the required financial resources.

Financial stability is one of SMC's greatest strengths allowing it to advance its vision for clinical excellence by investing in innovation and research. Unlike other hospitals, SMC has a very large revenue and high cash flows. Its financial stability is based on an astute financial management, an efficient procurement and supply management system, profitable services and initiatives, collaboration with strategic partners worldwide, and its contribution in the international field.

Being Agile

In the COVID-19 crisis, Sheba did what it does best – It led the healthcare system by example through its response to the COVID-19 threat. SMC acted on multiple levels simultaneously to ensure a rapid, effective response. It expanded all its existing resources, adjusted its technologies, shifted existing resources and medical equipment, and set up an internal unit that was responsible for implementing agile procedures quickly. These efforts included the identification and preparation of an isolated unit, administrative measures such as modification of workflows and organizational procedures, personnel training and recruitment, and the formulation of clinical guidelines.

While other hospitals limited and even suspended their activities and focused mainly on COVID-19 care, Sheba pursued its mission, defined by its management, to retain the activities necessary in order to maintain the functional continuity of the hospital alongside the pandemic.

Its existing infrastructures, organizational resources, culture and structure served Sheba at a time of crisis by providing it with agility. This was the key success factor in SMC strategy.

- *Physical Structure*

Sheba Medical Center is the largest hospital in Israel and one of the largest in the Middle East. The hospital is built as a small city ("The City of Health") covering an area of 800 dunams, of which 400,000 square meters is built-up area.

The availability of large spaces in the hospital area made it possible to establish isolation wards to prevent the infection of other patients and medical staff. Sheba admitted the

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first COVID-19 patients in Israel. Facing a new and unknown pandemic, it took all the precautionary measures and constructed an improvised isolated compound outside the entrance, to allow the hospital to maintain its other activities. Based on Israel's experience of several waves of the spread of the disease, Sheba continues to shift its departments' locations within the hospital area, including opening and closing designated COVID-19 departments and others.

- *Organizational Culture and Resources*

During the pandemic, Sheba was forced to shift manpower, technologies, and medical equipment. It rebuilt departments, redefined internal processes, and trained unskilled staff to operate respiratory machines.

Initially, the national concern in Israel was the lack of respiratory machines, yet no one talked about the shortage in the skilled properly trained to operate these machines. Dr. Yoram Kliein, Director of Sheba's Trauma and Critical Surgery Unit, was in charge of the rapid training of respiratory machine operators.

According to Dr. Klein it takes four years of internship in internal medicine followed by another two years in an intensive care unit before one has the required skills to operate these complicated devices. He had to devise an immediate training solution that would allow hospitals to treat COVID-19 patients in the safest way, using the resources available at that time.

He built teams that included nurses, senior physicians, technician doctors, and a respiratory technician who was responsible for the machine's technical operation. Using telemedicine, these teams were able to perform this complex monitoring procedure together

Dr. Anda Lazarovich, Head of Hospital Pharmacy Services at SMC is responsible for six units. During the pandemic, she was forced to shift manpower from one specialization to another and develop rapid training programs. According to Dr. Lazarovich, two Pharmacy units faced significant challenges during the pandemic.

The dispensing unit is responsible for preparing medicines in commercial form for dispensing. The unit also provides services to different units within the hospital, by preparing requested medicines for SMC patients. This unit was significantly affected by the COVID-19 as it was required to set up and dismantle medicine rooms frequently.

COVID-19 also affected the storage unit, which is responsible for storing the hospital's medicines and drugs. Dr. Lazarovich knew that it was imperative to increase SMC drug inventory, despite a severe global shortage. Thanks to SMC's network of global suppliers, it was able to respond quickly and increased its inventory on time. This required the full cooperation of the procurement and logistics unit, as an increase in storage space and equipment was also required to maintain large quantity of sensitive drugs.

Resourcefulness and creative thinking were demonstrated by other organizational units as well. Sheba had to train its staff rapidly and increase its manpower in a short time. But

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intense care teams needed more than training – they needed the capacity to work around the clock. This was especially challenging during lockdowns when all schools were closed and children were at home.

Mr. Baruch understood that he had to provide a solution for childcare in order to ensure that the employees would be able to perform their job. He collaborated with the adjacent Ramat Efal elementary school and used its 30 classrooms to open a school for the employees' children, shifting manpower to work as teachers in the school. In addition to the pedagogical solution, Mr. Baruch created a holistic solution by assigning SMC staff to roles including administrative manager, food provision inspector, etc.

Sheba also opened kindergartens and nursery schools in conjunction with Beit Emanuel, providing preschool daycare solutions for 120 children, allowing their parents to work in the hospital during lockdowns.

'*Precious Time'* was an internal initiative aimed to utilize the existing human resources to support SMC's main mission, which was the functional continuity of the hospital. Sheba developed internal rapid-training programs in real time, set up a 'manpower utilization forum' that assigned manpower to core tasks, classifying services on the basis of the hospital's essential and non-essential needs during the crisis. For example, they SMC canceled the activities of travel medicine unit and re-assigned its manpower to other essential services.

> "*Taking employees with a certain specialization and shifting them to another profession that has nothing to do with their role [in the organization], in minimum time, was a real challenge […] but this was possible thanks to* the remarkable DNA we have at Sh*eba,"* said Mr. Baruch.

Another challenge Sheba faced was transportation during the lockdown for its employees who relied on public transportation. In lieu of public transportation, which was suspended, Mr. Baruch signed agreements with auto leasing companies and rented 100 vehicles for the employees' use.

SMC also established a contact unit that communicated daily with the employees who tested positive for COVID-19. These employees appreciated the support of the hospital and Professor Kreiss asked Mr. Baruch to set up a similar contact unit for the families of the hospital's patients as well, feeling it was the hospital's moral responsibility to care for the families of the patients who were fighting for their lives, isolated in the COVID-19 wards.

Additional values that distinguish Sheba's organizational culture are equality and openness, which set the tone for personal initiatives that significantly contributed to employees' sense of belonging and organizational identification.

Any employee could present an idea to seniors at Sheba if it was beneficial to the organization. An outstanding example is Dr. Amil Zavatani, an orthopedic intern at Sheba,

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who directly approached Professor Kreiss, to show him his innovative development for converting home respiratory equipment and other auxiliary equipment into respiratory machines suitable for the treatment of COVID-19 patients.

- *Operational flexibility*

Sheba has strong logistics, procurement, and operational capacities thanks to its financial strength and its extensive network of contacts and collaborations with suppliers in Israel and around the world.

During the COVID-19 crisis, Sheba was able to maintain its operations and respond rapidly to the constantly changing requirements in many operational areas. The first operational challenge for Mr. Yehuda Katorza, Sheba's Deputy Director of Operations and Infrastructures, was to build the first COVID care unit in Israel in three days. With the patients' health and safety in mind, he understood that this was not possible inside the hospital's spaces, and he came up with the idea to build an isolated compound in the residential staff building located outside of Sheba. This was not an easy decision, as Sheba's staff and their families lived in this building. He recalls that people seriously doubted that his idea was feasible, and no one thought he could pull it off in three days. Professor Kreiss, however, believed in him and gave him a green light to execute his plan.

The first step was to evacuate the families from the building and move them to nearby hotels. Then, the required infrastructure was installed, including electrical, HVAC, and gas systems. The final, most complicated step was to install the medical equipment, including devices such as CTs, as well as backup systems in case of power failure. Mr. Katorza and his team thought of every little detail in this operation, down to the exterior landscaping. Ordinary, the establishment of a medical unit takes up to18 months, yet with his team's full engagement, they were able to achieve this goal in time.

The principle of "*always think one step ahead"* is what guided Mr. Katorza's realization that the compound they had constructed could not be used for long to provide medical treatment to a massive number of COVID-19 patients. Thus, he came up with another unconventional solution that at first seemed unrealistic and moreover impossible.

Mr. Katorza proposed building a COVID-19 Intensive Care Unit (ICU) in the underground parking facility of Sheba's maternity unit. This bold decision was again supported by Professor Kreiss. An ICU unit is the most complicated of all hospital units to construct, and constructing an ICU unit in limited time and in an underground parking facility without existing infrastructure, it is nearly impossible.

An important issue that needed to be considered was the control system that would effectively operate the treatment administered to COVID-19 patients under conditions of physical distancing. To this end, the team created an external control room and purchased 700 cameras, which the medical staff could use to monitor their patients in

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real time. Mr. Katorza had personally called to Israel Motorola CEO to provide him the requested devices including the implementation instantly.

Another concern that arose was related to the backup system as it was clear that the unit could not commence operations without it. "*Do not cut back on backup infrastructures, even if it takes time*." This was one of Mr. Katorza instructions when he insisted on installing a generator before the unit opened. This proved to be the right decision when the power went off with four patients in the ICU unit, and the generator kicked into operation.

This is how Sheba's underground parking facility turned into the biggest Corona ICU in Israel in five days, with 100 intensive care beds, advanced control systems, telemedicine tools, electricity, gas, and water. Having the employees' welfare in mind, it also included a gym, lounge, and dining room for the staff.

"My work is for the benefit of the patient, and once you do that in routine times, you can do the same in an emergency," said Mr. Katorza while reflecting on the reasons for Sheba's effective response to the COVID-19 crisis.

Another field in which Sheba excelled during the pandemic was procurement. Its procurement capabilities were based mainly on productive collaboration between the medical specialists and the logistics unit, and its strategic relationships with worldwide leading suppliers. To support the national efforts against the COVID-19 crisis, Sheba used its procurement unit to provide supplies to other hospitals as well.

It was impossible to overlook the fact that SMC's senior management, Prof. Kreiss, Mr. Baruch, and Mr. Katorza, all had an impressive military career in the *Israel Defense Forces* (IDF), which excels in rapid transitions from routine to emergency.

These managers instilled a team spirit and sense of pride in their employees and easily reverted to the emergency practices they had acquired during their military service. According to Mr. Katorza, a clear yet thin chain of command is essential in implementing top-down organizational policies effectively. But that is not the case in an emergency, where the need to implement and execute new policies quickly requires the elimination of links in the chain of command. This approach had a significant impact on the way each manager performed and managed their units during the COVID-19 health crisis.

> *"A highly motivated organization combined with high capabilities is an organization that can lead an entire country in a time of a crisis."*
>
> - **Prof. Eyal Leshem**

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Are we ready for a second "Bat-tle"?

It seems that SMC's resilience can be attributed to several main factors that facilitated its rapid transition from routine to emergency. Agility is the capability that was demonstrated by cross-organizational units, and an agile mindset was at the center of SMC's strategy.

Sheba's pre-crisis organizational reserves helped it to perform effectively in the largest VUCA event that the world of healthcare has known for many years. Sheba was able to shift resources, engage its manpower, leverage its global reputation and networks thanks to the foundations it built over the years: a strong leadership, an innovative approach, and a unique organizational culture and human capital.

Looking back to Sheba's management meeting in February 2020, when little was known about COVID-19, and its experience leading the national health crisis in Israel make use wonder about Sheba's future. What will Sheba decide to adapt and/or improve its coronavirus crisis management model to be properly prepared for a future health threat?

It is quite clear that SMC has the right organizational reserves to successfully lead the healthcare system even during a crisis. But Sheba is only a micro-cosmos of the entire health system.

Can we really determine that, based on their experience in managing the Coronavirus health crisis, other health care organizations in Israel and around the world are setting today, the required organizational foundations, so they can better face with future threats and challenges?

Are Health Care Systems truly ready for the next VUCA event? **Only time will tell.**

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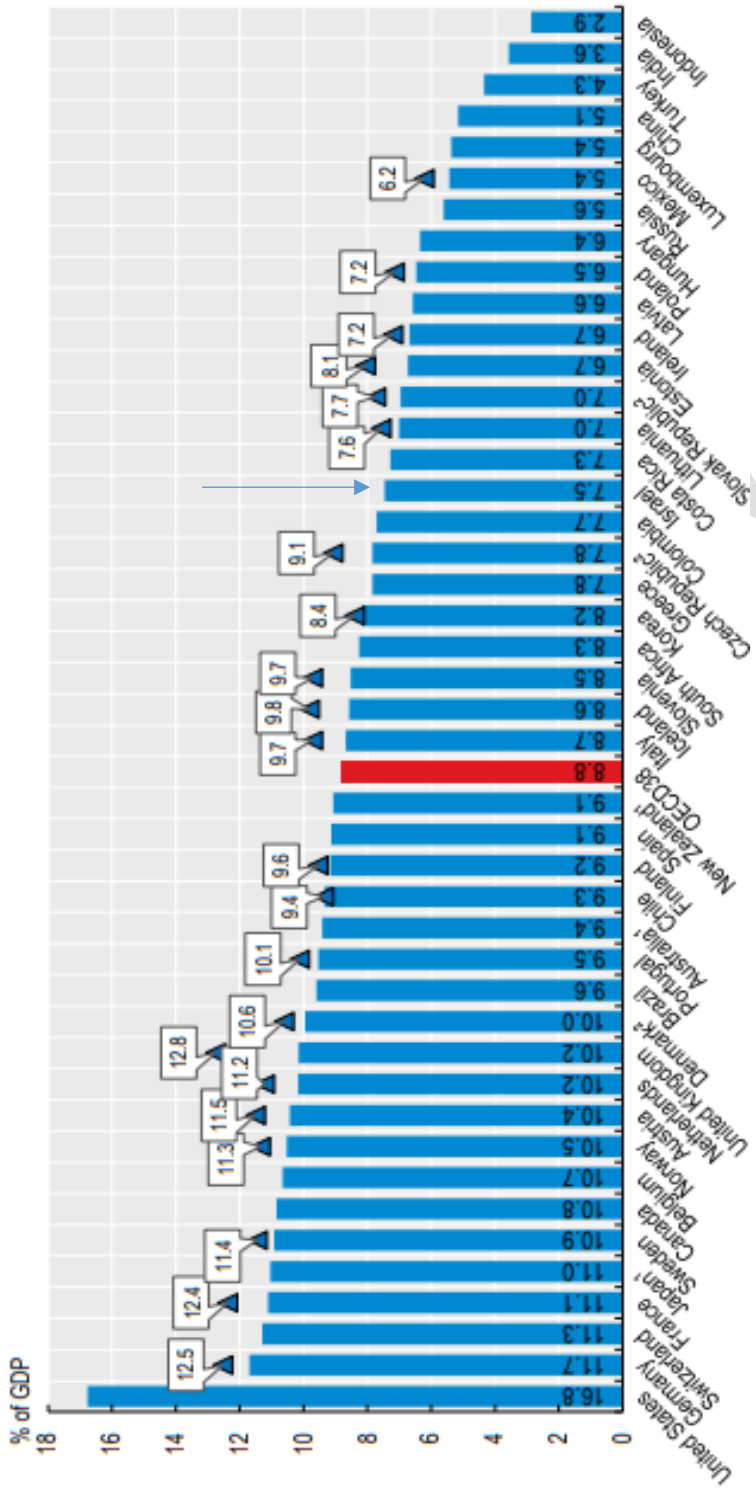
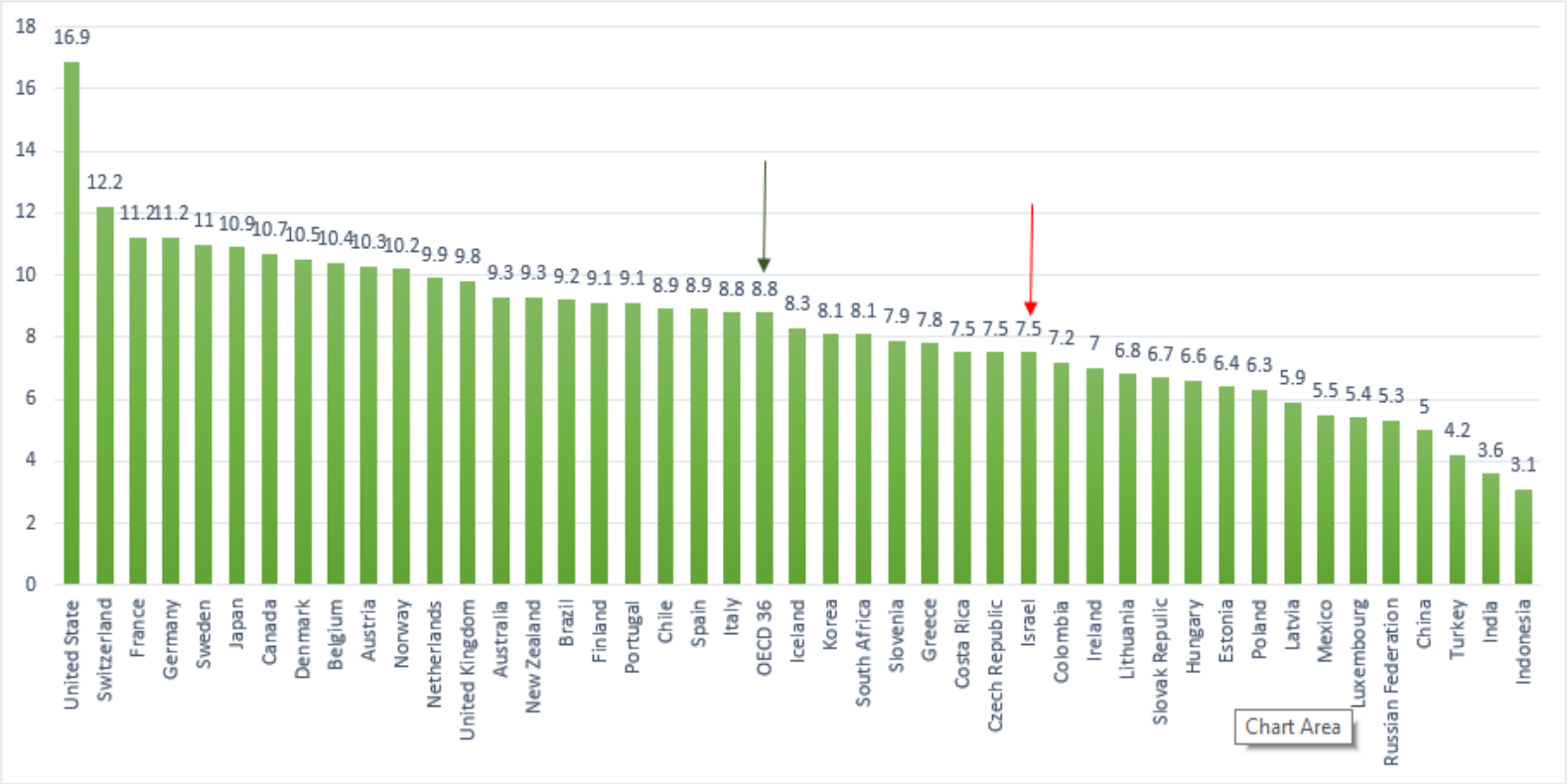
Exhibit 1: Health Expenditure (% of GDP), 2019 and 2020



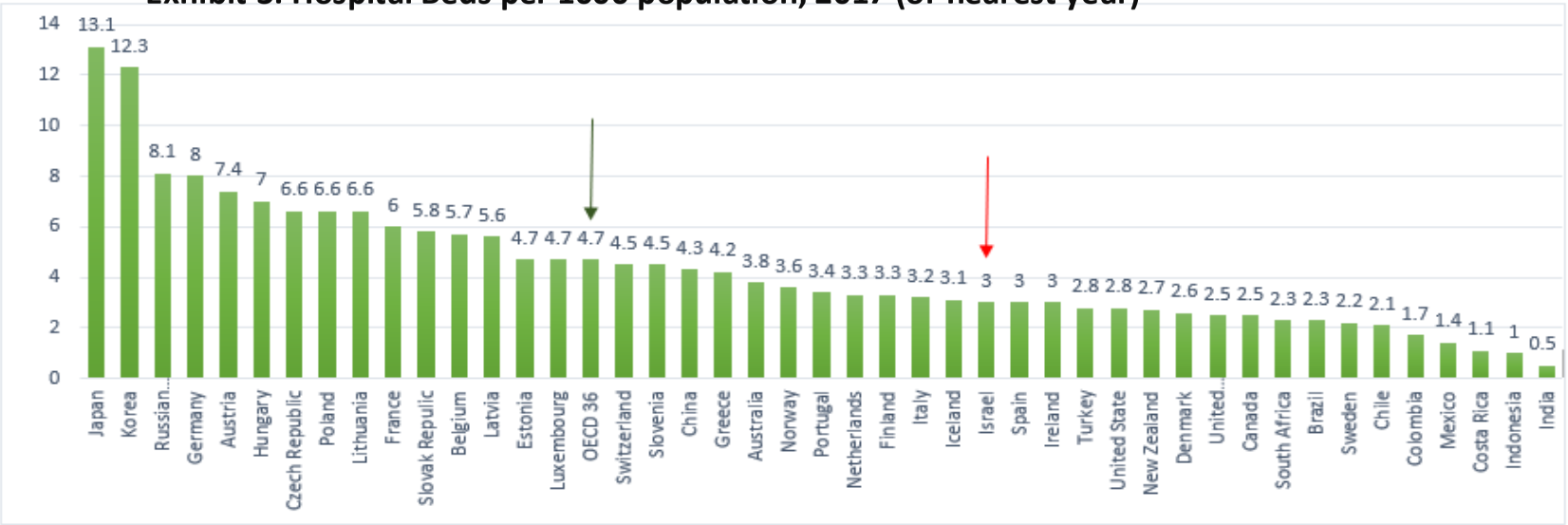
Source: OECD Health Statistics 2021, WHO Global Health Expenditure Database.

Exhibit 2: Health Expenditure (% of GDP), 2018



Source: OECD Health Statistics 2019

Exhibit 3: Hospital Beds per 1000 population, 2017 (or nearest year)



Source: OECD Health Statistics 2019

Exhibit 4: Hospital Beds per 1000 population, 2009 and 2019 (or nearest year)

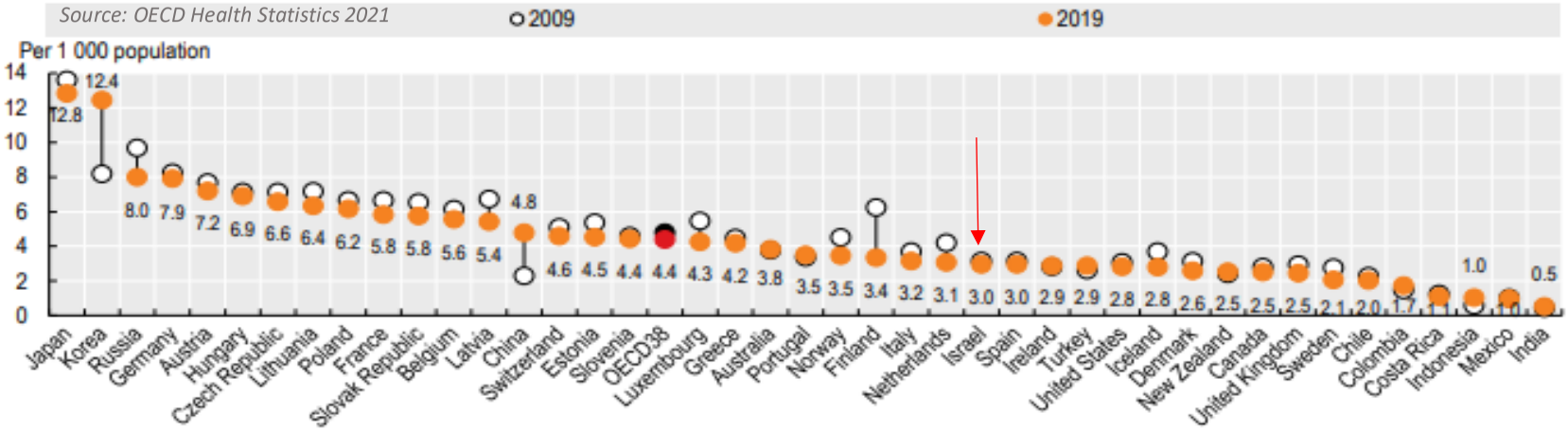
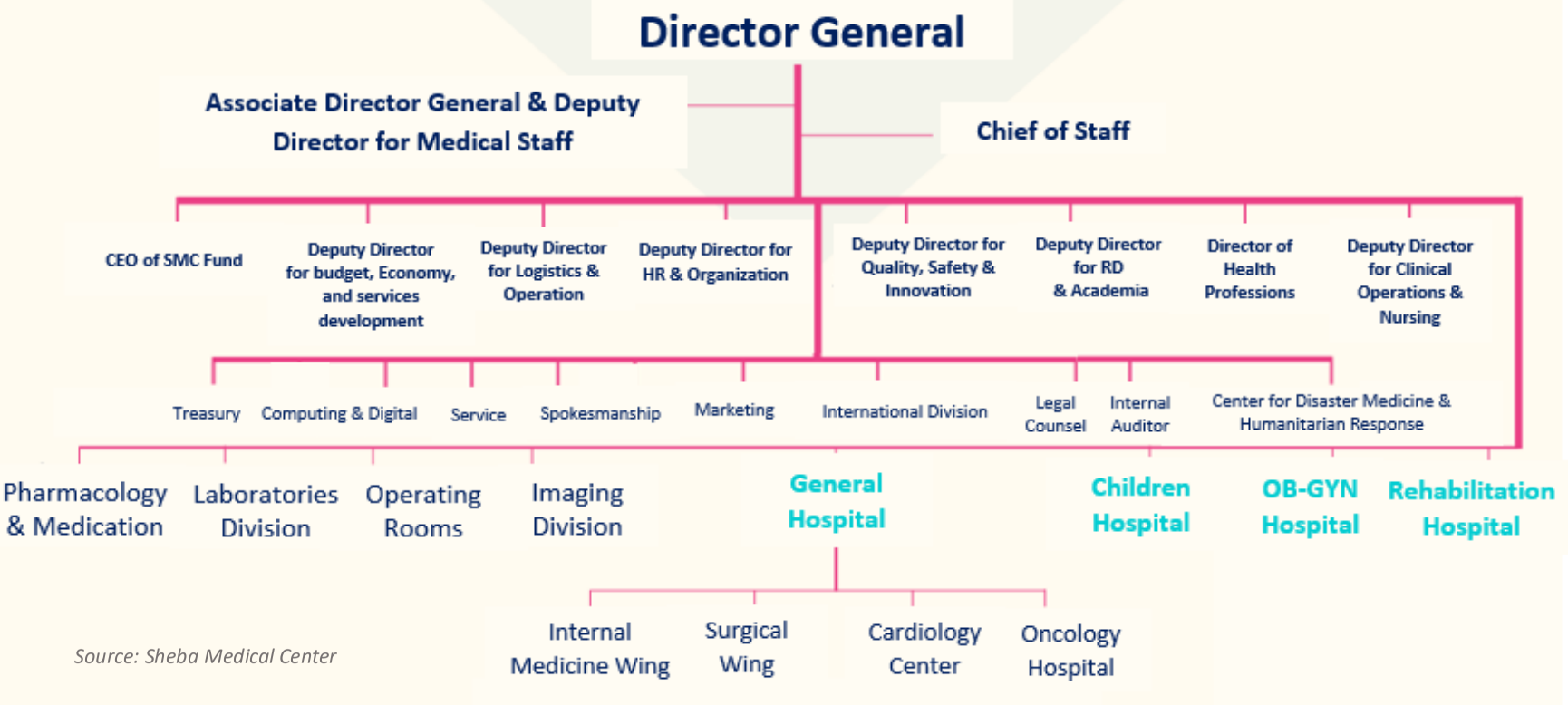
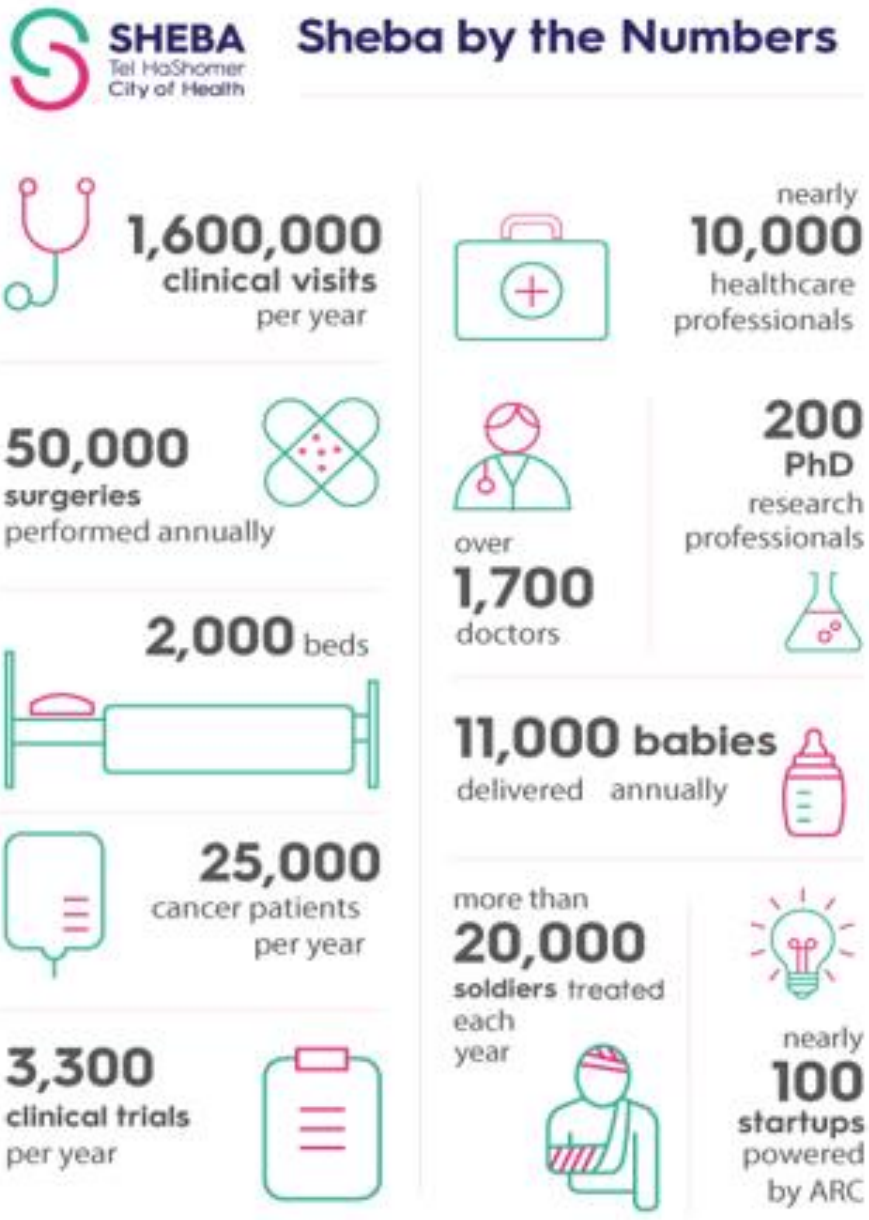


Exhibit 5: Sheba Medical Center Organizational Chart



Source: Sheba Medical Center

Exhibit 6: SMC in Figures



Source: SMC website: https://eng.sheba.co.il/sheba-by-the-numbers

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