Achieving Affordable and Sustainable Healthcare
FOREWORD

For over 100 years, GE Healthcare has worked with governments and healthcare providers to help increase access to quality and affordable healthcare around the world.

In 2015, the ratification of the new Sustainable Healthcare Development Goals (SDGs) presents an unprecedented opportunity to unite all contributors in the global healthcare community to ensure healthy lives and promote well-being for all.

As countries sign their commitment to achieving the SDGs here at the UN Health Assembly; GE Healthcare pledges to work in partnership to help countries achieve SDG Three – which outlines several health-specific targets. This builds on the tremendous progress made by the Millennium Development Goals (MDGs) and will help address the growing need for more equitable and sustainable developments to promote inclusive economic growth and social development, thereby benefiting all.

Most recently, in line with the company’s commitment to the developing markets, GE Healthcare established the new Sustainable Healthcare Solutions (SHS) business, aimed at serving the 5.8 billion people in the world who currently have little or no access to healthcare. GE Healthcare’s SHS combines our operations in India and South Asia, Africa and Southeast Asia, as well as the company’s affordable healthcare portfolio that is designed to bring relevant solutions for better access and quality to underserved populations globally.

With SHS, GE Healthcare will strive to bring solutions to address a wide spectrum of global healthcare needs by;

- Providing technologies with clinically and economically relevant value propositions designed at low cost structures;
- Developing holistic solutions that aim to improve clinical quality and patient outcomes;
- Generating capital solutions and new business models to ensure project viability and long term sustainability and;
- Advancing education, skills development and awareness of healthcare professionals to promote local capacity building.

Education, in particular, plays a key role in sustainable healthcare. GE Healthcare has a long history in supporting education and training to drive improved and sustainable health outcomes, exemplified by our recent announcement of a $1 billion investment in this area by 2020 that will result in the training of over 2 million clinicians and allied health professionals, and is expected to benefit over 300 million patients.

At GE Healthcare, we’re committed to working alongside our partners to help solve the world’s toughest healthcare challenges. Together, we can help bring better healthcare to more people all across the world.

Sincerely,

Terri Bresenham
President & CEO – Sustainable Healthcare Solutions, GE Healthcare

September, 2015
INTRODUCTION

This white paper is focused on explaining how GE Healthcare can work in partnership with governments, hospitals, non-governmental organizations, multi-lateral organizations and other institutions in developing countries to implement sustainable healthcare at the country level. Furthermore, it provides several examples of how GE Healthcare has partnered to achieve sustainable health outcomes.

The paper explains and suggests a framework for sustainable healthcare based on the need to manage costs whilst demonstrating the value and impact of health interventions.

The white paper also focuses on the following Sustainable Development Goals:

Goal 3, which is to ensure healthy lives and promote well-being for all at all ages and provides examples on interventions in relation to the different targets;

Goal 4, which is to ensure inclusive and equitable quality education and promote life-long learning opportunities for all and

Goal 17, which is to strengthen the means of implementation and revitalize the global partnership for sustainable development.

In 2009, GE launched the $6 billion healthymagination strategy which was to increase access and affordability by 15 percent whilst maintaining quality. It also entailed developing 100 new affordable and accessible technologies by 2015, which we have achieved.

GE invests over $1 billion US dollars in Research and Development (R&D) each year, thus it is important that we continue to understand the clinical needs of different countries as we develop new and innovative technologies for health systems.

As governments discuss how they implement the Sustainable Development Goals and which ones they need to focus on, GE Healthcare is committed to working with local partners like you to deliver outcomes for your population and demonstrate that investment in health does achieve demonstrable results.

Gisela Abbam

Global Executive Director, Government Affairs and Policy

GE Healthcare
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1. Securing a sustainable healthcare system

Although vast progress has been made towards meeting the targets set by the Millennium Development Goals, today, 5.8 billion people in the world, nearly 80% of the world’s population, have little to no access to healthcare. To improve this, governments must adopt a whole system approach that takes into account socio-economic, as well as healthcare factors, when prioritising and allocating resources.

Healthcare technologies will have a crucial role to play in tackling the new Sustainable Development Goals (SDGs), as appropriate investment in the latest medical equipment can improve diagnoses and clinical outcomes as well as help drive efficiency if doctors are fully trained to make the most of them. A good example of this is the Homerton University Hospital in East London, an area that due to demographic factors and a local history of economic deprivation, typically suffers from high infant mortality rates. Through a refurbished and extended neonatal unit of Homerton, one of the biggest units in London, clinicians have been able to address critical maternal, child and newborn health related challenges. With the latest GE technology, including ultrasound, incubators and phototherapy blankets, their team is solving key healthcare challenges such as keeping a baby warm when the baby is premature or of low birth weight (with an incubator/baby warmer), and ensuring through regular brain imaging using a cot side ultrasound, that the baby hasn’t developed the catastrophic complication of bleeding into the brain.

This example demonstrates that medical technology companies such as GE Healthcare have an important role in partnering with Ministries of Health to help deliver sustainable, affordable, equitable and accessible health systems. This is a contributing factor for why GE Healthcare has established the Sustainable Healthcare Solutions (SHS) business that brings together our operations in India and South Asia, Africa and Southeast Asia, as well as our affordable healthcare portfolio. Our SHS business has four distinct aims that align perfectly with the new SDGs, namely:

1. Providing technologies with clinically and economically relevant value propositions designed at disruptively low cost structures;
2. Developing holistic solutions that aim to improve clinical quality and patient outcomes;
3. Generating capital solutions and new business models to ensure project viability and long term sustainability
4. Advancing the education, skills development and awareness of healthcare professionals to promote local capacity building.

In this paper we explore how such outcomes can be achieved, drawing on practical illustrations from around the world.

1.1. Creating a sustainable healthcare framework

The 1993 World Development Report Investing in Health\(^1\) was the first major health report to highlight to Ministries of Finance how well-chosen health expenditures are not an economic drain but rather an investment in economic prosperity and individual well-being. Revisiting the 1993 report, a Lancet Commission headed by Lawrence Summers, Chief Economist at the World Bank in 1993 and responsible for the health focus of that report, found that between 2000 and 2011

\(^1\) Investing in Health, World Development Report, World Bank, 1993
low- and middle-income countries saw 24 percent growth resulting from value of additional life-years (people’s willingness to trade off income, pleasure, or convenience for increase in life expectancy). The Commission describes the potential for low-and middle-income countries to make significant gains in global health through low-cost fiscal policies to curb infections, child and maternal mortality; reduce rates of NCDs and injury; and offer a promise for universal health coverage.

Other gains in productivity are attained through reduced rates of absence from work due to illness or the illness of family members. The impact is particularly strong in developing countries, where a high portion of the workforce engages in manual labour. The productivity losses associated with disability, unplanned absences and increased accidents account for as much as 400% more than the cost of treatment. Not only impacting productivity through gains in the workplace, research has also shown that investors are less likely to enter markets where labour suffers a heavy disease burden.

A report by Lancet: Global Health 2035 states that by investing in health over the next 15 years (with an assumption that there will be 50% reduction in deaths) could save sixty one million children, three million mothers, and prevent twenty-one million deaths from AIDS and ten million from tuberculosis (TB). Furthermore, the report states that there will be a nine-fold return on investment. The key would therefore be to develop impact analysis and work with all stakeholders and partners to achieve this.

The health sector needs to demonstrate the impact of the different health interventions and prove to other parts of government and the society at large that investment in health should be a priority as the impact of ill health affects the total economy of any given country. Given GE’s experience of operating since 1879 and providing services and technologies in over 100 countries, we would suggest that a framework for sustainable health outcomes is necessary.

The starting point for creating a sustainable healthcare system is to prioritise the needs of the population so that the finite resources that are available can be deployed in the most effective way. In developing countries in particular, the need for an accountability framework cannot be overemphasized. This means that governments and health ministries must undertake a thorough impact assessment that enables the leading causes of death, illness and disability to be identified and prioritised. Such a process is indicative of the more business-like approach that needs to be adopted by Ministries of Health to ensure the delivery of sustainable healthcare. Instilling this type of rigour more frequently, which thoroughly assesses Return on Investment (ROI) before programmes are pursued, will help enable more efficient deployment of scarce healthcare resources.

Only then can the process of determining the most appropriate healthcare infrastructure to prevent, diagnose, treat and monitor these priority areas, begin.

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4 World Bank 2004

5 Global Health 2035: A World Converging within a Generation was written by The Lancet Commission on Investing in Health – an international multi-disciplinary group of 25 commissioners, chaired by Lawrence H. Summers and co-chaired by Dean Jamison; 2013.
As part of the impact assessment phase GE Healthcare recommends that health ministries should examine and prioritise the following 6 key areas (See Figure 1):

1. Top 3 leading causes of death
2. Top 3 leading causes of disability for the working population
3. Top 3 diseases that cost the most to manage
4. Top 3 reasons why patients present to hospitals/health centres
5. The infectious/communicable diseases that are prevalent in the population
6. The extent to which basic primary health services are available in every region

In addition to helping to focus attention on the areas where the most money should be spent, the impact assessment is also an excellent way to help ministries of health identify the areas where investment in education and training would pay dividends as a way to boost capacity. Such investment can be overlooked, but is vital in building a sustainable healthcare system, as a more highly skilled clinical workforce that has enhanced abilities to take advantage of the most innovative technology, can help deliver higher quality healthcare more efficiently.
This is illustrated by a recent written survey conducted by GE Healthcare among over 110 African and Middle Eastern healthcare leaders. Respondents were asked to prioritize key success factors driving national healthcare transformation. 77% cited training and education to improve skills and enhance capacity as the single most important need to improve healthcare.

This finding challenges conventional thinking that human capital development is simply a question of investing more money. Post-survey focus groups pointed out the importance of education in better utilising existing budgets (higher return on investment on technology, greater efficiency, etc.) and in creating persuasive business cases for more healthcare investment and government spending (e.g., cost-benefit analysis for Ministries of Finance).

1.2. Education and Training

GE Healthcare has a long history in supporting education and training to drive improved health outcomes, exemplified by our recent announcement of a $1 billion investment in this area by 2020 that will result in the training of over 2 million clinicians who will interact with over 300 million patients. We are convinced that improved skills can increase access to more affordable healthcare around the world, as investing in cutting edge technology to alleviate common health issues would be redundant if it is not utilised in the most efficient and effective manner by fully trained clinicians. Such a belief in education and training being crucial to sustainable healthcare is based on extensive experience in this area. This includes partnering with the Saudi Arabian Ministry of Health to support its transformational vision to strengthen the skills of its health workforce through the establishment of a Healthcare Skills Training Institute in Riyadh at King Fahad Medical City. Providing technical, leadership and clinical courses, it has trained over 6,000 healthcare professionals since opening in 2013.

Moreover, GE has extensive experience across Africa, most particularly in infant and maternal health, where our experts will train hundreds of rural midwives to use our affordable and flexible ultrasound technology V-Scan, and its recent update V-Scan Access, to deliver care for pregnant women in remote locations.

It is also important that the engineers and technologists responsible for keeping healthcare technology in service are suitably skilled. For example, GE has partnered with the non-profit organisation Engineering World Health and Duke University in Nigeria, Ghana and Rwanda, to deliver biomedical engineering training programmes in Rwanda which has resulted in hospitals with trained technicians having 43% less out of service equipment in examined departments. Such a consideration is not always at the forefront of decision makers’ minds when prioritising resources for healthcare, but could be highlighted through an impact assessment at the start of the healthcare planning process.

1.3. The role of medical technology companies in enabling a sustainable healthcare framework

After undertaking an impact assessment, Ministries of Health will have identified and prioritised the most pressing healthcare needs in their country. But this is only the beginning of the process to create and deliver a sustainable healthcare system. In the era of constrained budgets and

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6. Africa and Middle East healthcare leadership survey (113 respondents.) conducted by GE Healthcare, November 2014.
7. A. Malkin, PhD, PE and Chelsea Whittle, MSc, Biomedical Equipment Technician Capacity Building Using a Unique Evidence-Based, Curriculum Improves Healthcare, Journal of Clinical Engineering, Vol 39 & Number 1 & January/March 2014
restricted capacity, it is vital that governments consider how the skills of the private and charitable sectors can be harnessed to tackle the targets set out by the new SDGs.

GE Healthcare is actively involved in Public Private Partnerships (PPPs) across Europe, Turkey, India, Latin America, Canada, Africa and ASEAN Regions. For example, in January 2014, GE, USAID and the Kenya Commercial Bank announced a first-of-its-kind collaboration for the development of Small and Medium Enterprise (SME) healthcare in Kenya through a scheme to provide up to $10 million in local financing for the development of private health facilities, including doctor partnerships, diagnostic centres and hospitals. Moreover, a joint venture set up in 1989, Wipro GE Healthcare is the only technology provider in India that has been actively working with state governments on PPPs in healthcare, in areas such as CT and MRI diagnostic imaging services.

PPPs are only one example of a myriad of ways that the private sector can support ministries of health in tackling the key issues set out by the new Sustainable Development Goals. Maternal and Newborn Health is of particular importance considering that according to a recent survey by the World Health Organization (WHO), nearly half of all mothers and newborns in developing countries do not receive skilled care during and immediately after birth, lowering their chances of survival and contributing to increasing mortality rates. However, this survey also states that up to two-thirds of newborn deaths can be prevented if effective health measures are provided at birth and during the first moments of life.

Furthermore, given that at least 50 percent of global births occur in low resource or under-served settings, where access to quality newborn care remains limited, increasing access to potentially life-saving equipment in these early moments is crucial. This is particularly the case in rural areas, where the disparity between the quality of care compared to urban areas can be stark. To address this, low resource areas need access to equipment that is easy to use, robust and reliable, requiring minimal user training. Such an approach achieves far more than simply donating equipment, particularly when, according to the latest estimates, up to 70 percent of donated medical technology sits unused.

GE Healthcare has been evaluating how appropriate ultrasound technology and training provided to midwives can help overcome these challenges. For example, GE’s Vscan, a compact hand-held and battery powered ultrasound, most often used in rural community clinics, helps to optimize the diagnosis, treatment and monitoring of patients, most notably mothers-to-be during pregnancy. Based upon on-the-ground feedback from trials in Tanzania and Indonesia, GE is now introducing the Vscan Access, which is further simplified for primary care health workers, durable for low-resource settings, and clinically optimized for obstetric and abdominal scanning. It also builds on efforts to develop technology specifically to support health policy makers in developing regions.

Another area where medical technologies have a significant opportunity to impact on healthcare delivery and healthcare outcomes is Non-communicable Diseases (NCDs), such as cancer and cardiovascular disease, which are exhibiting a growing economic and healthcare burden around the world. As populations grow and people live longer, healthcare systems are going to have to change to reflect the new demands on their services, such as supporting patients living with disease, rather than just focusing on a cure.

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9 Ibid
For example, from 2008 to 2009, GE Healthcare partnered with the UK Stroke Association on a National Stroke Awareness Campaign that explained the common symptoms of a stroke and how members of the public could spot them in their friends and family. This campaign was all about encouraging people to spot the signs of a stroke at the earliest opportunity, backed by clinical evidence that drew a direct link between the speed that medical care is administered as soon as a stroke occurs and the likelihood of the patient making a full recovery. This was then reflected in the national guidance on stroke.

Of particular note, is the disease and economic burden of breast cancer which is the second most common cancer overall and the most common cancer for women, constituting 25% of all female cancer. The indirect costs of breast cancer are also greater than the direct costs of treatment as the disease affects many women during their productive years (under 65), resulting in working days lost. For example, it is estimated that the costs linked to treatment, detection, prevention or care of breast cancer (direct costs) to be significant, but indirect costs of the disease (the cost of lost productivity due to the patients' disability, illness and premature mortality) can be more than twice as large.

A recent GE sponsored report on ‘the prevention, early detection and economic burden of breast cancer’ suggests that consumer understanding about breast cancer and screening methods is putting lives at risk in the developing world. Another recent survey in Mexico City indicated many women feel uncomfortable or worried about having a mammogram. The report also finds a direct link between survival rates in countries and the stage at which breast cancer is diagnosed. It provides further evidence of the need for early detection and treatment, which is especially important considering the growing burden presented by breast cancer. For example, GE is active in supporting the Ministry of Health of the Kingdom of Saudi Arabia in the development and management of a program to provide mobile breast cancer screening facilities. The program helps address the need to generate awareness for the disease and the benefits of early detection focused on Riyadh region. Since its inception, the program has screened more than 28,500 women in Riyadh, with 168 positive cases.

Moreover, in 2014, GE invested in seven companies who are disrupting healthcare as we know it. For example one of our new portfolio companies, Aver Informatics, is making health related customer bills less confusing. It sounds simple yet the results are profound. Aver aims to re-engineer the complex reimbursement process between insurance payers and healthcare providers through a data management and analytics platform they have built from the ground up. Aver’s software results in millions of dollars in savings, helping to reduce $800 billion a year in healthcare waste.

2. Examples of GE Healthcare Best Practice in support of the UN Sustainable Development Goals

The following case studies from the developing world illustrate the progress that has already been made towards the new UN Sustainable Development Goals. They form the core of the

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11 ‘Prevention, early detection and economic burden of breast cancer’, Bengt Jonsson and Nils Wilking
12 Ibid
13 Ibid
14 Ibid
activity that will now be part of our new business, Sustainable Healthcare Solutions, specifically set up to answer the unique challenges found in India and South Asia, Africa and Southeast Asia.

GE Healthcare supports the Sustainable Development Goal 3 which is to "ensure healthy lives and promote well-being for all at all ages."

2.1 Examples relating to SDG3.1:

By 2030 reduce the global maternal mortality ratio to less than 70 per 100,000 live births

A significant reduction in maternal and infant mortality requires a multi-pronged approach combining affordable technology and innovation, training and education, with innovative business models, financing and multi-lateral partnerships. Across the continuum of care for maternal and newborn health, GE Healthcare offers solutions for an integrated care pathway designed to support better outcomes for all mothers and babies.

- In partnership with the Ifakara Health Institute of Tanzania, GE worked to provide access to portable ultrasound and training on these devices to midwives and nurses. The programme was aimed at making ultrasound services available for pregnant women in rural Tanzania and thus increase reach in remote areas. Reinforcing this commitment, GE in 2013 donated US $85,000 in handheld ultrasound devices and related equipment to the Kisarawe District Hospital, in the Pwani District of Tanzania.

- From 2011-2013, the **Indonesian Ministry of Health** supported by GE Healthcare conducted a randomized clinical study to assess the impact of midwives using ultrasound in the early identification of pregnancy complications. The study trained and equipped 20 midwives across 10 primary health care centres with GE ultrasound devices, and compared with a control group. With more than 4,000 pregnancy cases assessed, the study ultimately concluded that midwives were capable of accurately performing a limited obstetric ultrasound exam. In addition, the study found that high-risk home births decreased by 40%, and that early detection of high-risks cases and institutional deliveries doubled as a result of midwife use of ultrasound.

- As part of an ongoing partnership with the **Ghana** Ministry of Health, GE is supporting the introduction of its handheld portable devices into Ghana's Community-based Health Planning and Services Sites in support of Millennium Development Goals 4 & 5.

- Using mobile technology called RAPID SMS, the GE Foundation and UNICEF are enabling community health workers to track care for expectant mothers and their babies using mobile phones. To date 33,000 community health workers have been trained across Rwanda.

- Universitas Indonesia (UI) and GE Healthcare announced a collaboration to co-develop a telemedicine solution aimed at improving maternal and infant mortality outside of Jakarta. Through the 3-year programme, community health centres, also known as Puskesmas in Indonesia, will equip primary healthcare providers with GE Healthcare’s portable ultrasound device. Using the device, these clinicians will capture ultrasound images of expecting mothers and transfer the images to an Electronic Medical Record (EMR) system where an obstetrician/gynaecologist at Cipto Mangunkusumo Hospital in Jakarta will provide a diagnosis on the mother using the images collected.

- In **Indonesia**, the GE Foundation is partnering with the Ministry of Health to help improve the care and survival rates of pregnant women and newborns through mobile technology, and build the pipeline of primary care physicians in rural areas. Program
partners include Jhpiego, and the Office of President’s Special Envoy on Millennium Development Goals to run a programme called Pencerah Nusantara. The methodology of the programme was adopted as a new standard by the Ministry of Health and was recently launched as Nusantara Sehat.

- In Myanmar, the GE Foundation is partnering with the Ministry of Health and Jhpiego to decrease maternal sepsis at government operated, district-level hospitals and health centres, as well as strengthen other aspects of maternal care.

### 2.2 Examples relating to SDG 3.2:

**By 2030 end preventable deaths of newborns and under-five**

- In February 2014, GE announced the donation of US$1 million to support the Nelson Mandela Children’s Fund. The donation will help fulfil Mandela’s lasting wish for improved child healthcare in **Southern Africa** and will contribute towards ongoing efforts to further develop much needed healthcare facilities including the Nelson Mandela Children’s Hospital.
- GE and Edifice Capital are supporting the American Hospital’s new 75-bed Women’s Hospital in Abuja that will bring international standards to maternal, newborn and child health to **Nigeria**.
- GE Healthcare has provided several hundred medical devices to improve maternal newborn and child care, critical and cardiac care for the people of **Myanmar**. The GE Foundation has also donated $3 million to the country, focussing on decreasing the rate of maternal and newborn infection at Government-operated, district-level hospitals and clinics.
- In efforts to help improve the quality of newborn care in **Vietnam**, GE Healthcare has introduced a suite of new innovative and affordable solutions for the survival and growth of neonates in the primary care settings. The suite includes the Lullaby Warmer Prime, Lullaby Resus Prime and Lullaby Resus Plus, which are in the WHO Compendium of Innovative Technologies.

### 2.3 Examples relating to SDG 3.4:

**By 2030 reduce by one-third premature mortality from non-communicable diseases (NCDs) through prevention and treatment and promote mental health and wellbeing**

#### NCDs

- The National Blood & Cancer Centre (NBCC) selected GE to support the establishment of the first private cancer clinic in the **Kingdom of Saudi Arabia** in May 2015 licensed to screen, diagnose and treat cancer and blood diseases. Focused on establishing their One Stop Breast Clinic by the end of this year with global clinical partners, the clinic features the latest GE technology, bringing contrast-enhanced spectral mammography (CESM), automated breast ultrasound (ABUS) and PET MR for the first time to the Kingdom.
In February 2015, GE Healthcare was selected by the Kenyan Ministry of Health to drive the wide-scale modernization of radiology in 98 hospitals across 47 counties, as part of the country’s Ksh38 billion healthcare transformation programme.

GE is also committed to supporting knowledge-sharing and capacity building in Kenya and across East Africa. Most recently GE announced that it will invest $13 million over the next 10 years to open the GE Healthcare Skills and Training Institute. The Kenya centre will become the Company’s first dedicated healthcare skills development facility in Africa when inaugurated in Nairobi later in Q4 2015. Initially, it will provide biomedical and clinical applications training courses and over the longer-term will be expanded to offer leadership, technical and clinical education courses, working with the Ministry of Health, private healthcare providers and other educational partners, with the goal to train over 1,000 healthcare professionals over the next 3 years.

In Saudi Arabia, GE partnered with the Ministry of Health and other key stakeholders to increase health awareness. Through its digital programme, GE has connected with over 400,000 people through Facebook, Twitter, and GE’s healthymagination website to address topics such as healthier living, safeguards against heart disease and cancer, and personal wellbeing.

GE Healthcare overcame obstacles to bring the 1st CT scanner to Panzi Hospital in the Democratic Republic of Congo providing 3D imaging of the body, including soft tissues for the first time. Over a 2-year period, GE partnered with the Panzi hospital team to define logistics, establish a purpose-built room fitted with its own electric generator to ensure a consistent and reliable power supply to house the scanner and trained two radiologists and two technicians.

GE has committed $500,000 to improve cancer care in Ethiopia, supporting the Bush Institute’s Pink Ribbon Red Ribbon initiative via collaborations with PEPFAR and the Ethiopian-American Doctors Group.

The Qatar Science and Technology Park and GE partnered to develop Contrast Enhanced Spectral Mammography (CESM) technology, bringing home-grown innovation to the global fight against breast cancer.

The Filipino National Kidney and Transplant Institute (NKTI) awarded the KHealth Corporation a GE Healthcare Cyclotron and a Positron Emission Tomography-Computerized Tomography (PET-CT) system. This is part of a concerted effort to help bring better health to more Filipinos and help combat the country’s rapid increase of cancer incidence, the 4th highest killer disease in the Philippines.

In an aim to improve the diagnosis and treatment of cardiovascular disease, one of the leading causes of death in Vietnam, GE Healthcare and the Vietnam National Heart Institute co-hosted a medical education seminar on the use of echocardiograms in Hanoi and Ho Chi Minh City, training more than 200 physicians in the country.

According to the Brazilian Institute of Geography and Statistics, around 40% of Brazilian women aged between 50 to 69 years don’t have an annual mammogram. One of the reasons behind this fact is the uneven distribution of mammography systems within the
country, particularly a lack of access in remote areas. To help address this need, the Hospital de Cancer de Barretos, a public hospital in Brazil, in partnership with GE, has equipped 8 trucks that travel around the country to provide free breast screening, in addition to other cancer prevention exams. In 2014, almost 100,000 women had a mammogram scan completed.

- GE is playing a critical role in China's breast cancer fight by adapting its technologies in bringing the diagnosis and detection by care providers up to a new level. 2015 marks the 10th Anniversary when GE initiated its Pink Action public awareness campaign in China, focused on educating women to improve breast care knowledge with a cross-boundary partnership with Uber, a global leading new emerging internet transit company.

- GE is leading the stroke war in China and tackling this big industrial challenge with its innovative technologies and strategic partnerships with the Chinese government. GE has partnered with the Ministry of Health’s Stroke Screening, Prevention and Treatment Project (SSPP) from 2014 to build up three-level screening and prevention model (three-level model – at province, city and county-level) across China covering 10 show sites, 50 base hospitals, training 1,000 doctors in 300 base hospitals, free screening for over 4,000 people and education for 1.5 million members of the public.

2.4 Examples relating to SDG 3.8:

Achieve universal health coverage (UHC), including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all. This should include medical technologies.

Every condition needs to be diagnosed so that the appropriate treatment is given and medical technologies are critical to diagnosis and treatment. “No medical treatment can or should be considered or given until a proper diagnosis has been established.”  -WHO Development of Medical Devices Policy (2011). The importance of diagnostics cannot be overemphasised.

- GE Healthcare spent over four years and the equivalent of about $20 million to develop a new CT system that uses 40% less power, produces less radiation doses, and is 40% cheaper than imported equivalents. For example:
  - The MAC 2000 ECG Analysis system from GE Healthcare helps the clinician make a fast and accurate diagnosis with the power of the Marquette* 12SL analysis programme.
  - LOGIQ 100: India’s first portable ultrasound system is one of the largest selling Black and White Ultrasound systems across the world. Over 25000 units are working across the globe as of today.
  - Lullaby™ Warmer Prime is GE’s latest innovation that is designed to efficiently deliver exceptional thermoregulation at a fantastic Total Cost of Ownership (TCO). It is designed to improve access in primary care settings in remote and rural areas. Lullaby Warmer Prime is designed to operate in tough conditions including voltage fluctuations from 198V to 264V. It comes equipped with a re-usable probe made with Kevlar (bullet proof material), can work without a voltage stabilizer and consumes up to 46% less electricity.
Every year, since 2011, the Medical Devices Unit of the World Health Organization (WHO) releases an update to the “Compendium of Innovative Medical Technologies for Low Resource Setting” that aims to promote the increase of universal health coverage through innovative, affordable and accessible technology. GE Healthcare had 3 products selected in 2013-14 and has 6 technologies that have been approved and are in the process of being published in the World Health Organization (WHO) Compendium of Innovative Technologies for 2014 – 2015. The 9 products are:

- Vscan (hand held ultrasound)
- Lullaby baby warmer
- LED phototherapy for neonatal jaundice
- Lullaby Warmer Prime (baby warmer)
- Lullaby Resus Prime (baby resuscitation device)
- Lullaby Resus Plus (baby resuscitation device)
- Brivo CT385 (CT)
- Brivo XRS75 (Galaxy) (X-Ray)
- Carestation 30 (anaesthesia delivery system)

**Tele-medicine (remote application) Gansu project**

The Chinese government has been investing great effort and finance on building up tele-medicine projects across China to address the issues caused by unbalanced distribution of medical resources and a shortage of medical professionals, like the situation in Gansu Province. To support the government’s focus, GE developed its first tele-medicine show-site project in Gansu province in 2010. To build up a network, GE picked one level-3 (provincial), three level-2 (county) and three level-1 (township) hospitals and then provided essential equipment and information IT solutions (PACS/RICS and tele-medicine) to improve the region’s overall primary care service and benefit hospitals at different levels in Gansu. The Gansu tele-medicine show-site project reaches nearly 1.5 million people in this province.

**Data Analytics (asset management)**

Asset Plus, an Industrial Internet software of GE, has helped Renji Hospital, a typical, leading level-3 grade-A hospital in China, with their system analytics and integration into digitised healthcare. With the power of big data, Renji Hospital is transforming from device management to comprehensive asset management, completely changing the model of hospital management.

As a result of embracing the new “Internet+” era, Renji hospital can make the most of limited medical resources. Through sensor-based location services, big data analysis and process optimization, the hospital has increased utilization of first aid equipment like respirator by 35 percent. The predictive and proactive maintenance also improved equipment efficiency by 35 percent.

By the end of 2014, China had over 1900 level-three hospitals and each of them has five large imaging machines like CT or MR (more at Grade-A hospitals) in average. If Asset Plus can help these 9,500 imaging machines to increase scanning rate by 20 percent, these 1900 hospitals can add $3 million revenue each day, which leads to $800 million or RMB4.8 billion more revenue each year.
2.5 Examples relating to SDG 3.c, 4 and 4.4:

SDG 3.c: Increase substantially health financing and the recruitment, development and training and retention of the health workforce in developing countries.

SDG 4: Ensure inclusive and equitable quality education and promote life-long learning opportunities for all.

SDG 4.4: By 2030, increase by x% the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

GE Healthcare Education and Training Examples

Investing in the continuous education and training of the healthcare workforce is imperative in achieving sustainable healthcare. GE Healthcare has a long history in supporting education and training to drive improved and sustainable health outcomes, exemplified by our recent announcement of a $1 billion investment in this area by 2020 that will result in the training of over 2 million clinicians and allied health professionals, and is expected to benefit over 300 million patients.

In addition, GE Healthcare is investing USD $100 million in a 3-year commitment being made for GE Healthcare’s 84-country Eastern & Africa Growth Markets (EAGM) region to cover initiatives to help address health challenges in Africa, Turkey & Middle East and Russia & CIS. Building on GE Healthcare’s education and training footprint in the region, these new investments include the establishment of new healthcare training centres, locally configured curricula and a range of education partnerships with reputable regional academic institutions.

Since 2013, GE has delivered technical, clinical and leadership training to over 10,000 healthcare professionals in the region, with over 1,000 courses and 50,000 hours delivered in the last 12 months alone. In parallel, other initiatives leveraging education and training as a key pillar include:

1. **Addressing maternal and infant mortality:** the $20 million healthymagination Mother & Child Initiative, a partnership announced at the World Economic Forum (WEF) Africa 2014 between the Nigerian Ministry of Health, USAID and GE, which will introduce ultrasound usage and task-shifting training for antenatal care.

2. **The need for safer surgery:** The Safe Surgery Clinical Training Programme, supported by GE and executed by the Kenya Society of Anesthesiology in partnership with the National Association of Anesthesia Clinical Officers, has trained more than 130 professionals across Kenya.

3. **Supporting the development of all levels of the healthcare system:** Together with Engineering World Health and Duke University, the GE Foundation supports biomedical engineering training programs in Nigeria, Ghana and Rwanda that provide basic technical knowledge of repairs and equipment management at the local-hospital level. Aimed at developing professional biomedical technicians, the programmes in Rwanda...
have resulted in hospitals with trained technicians having 43% less out of service equipment in examined departments.\textsuperscript{16}

- GE trained almost 100 anaesthesia professionals in the \textit{Ivory Coast} on the importance of monitoring oxygen levels in the blood, airway management technologies and the proper usage of related technologies as part of a focus on supporting safer surgery.
- In collaboration with POGI (Indonesia OB/GYN Association): Perkumpulan Obstetri dan Ginekologi Indonesia (POGI), GE Healthcare initiated the first ultrasound certified competency training to enhance medical education for OB/GYNs across \textit{Indonesia}. In support of the programme, GE Healthcare has provided its ultrasound technology for the training. GE Healthcare has also provided an educational grant to cover textbooks for trainees and the use of computers during training.
- GE Healthcare will set up healthcare education and training institutes across \textit{India} in partnership with public and private institutions. GE Healthcare built its first Institute in 2014 and commenced training for the first batch of technicians. GE Healthcare offers intensive skill creation programmes to eligible 12\textsuperscript{th} standard pass students to become technicians in the areas of diagnostic imaging, OT/Surgical and Bio-med etc. GE Healthcare also offers skill enhancement programmes for upgrading skill sets of existing technicians, nurses, clinicians and leadership.
- In \textit{Saudi Arabia}, GE has rolled out its healthymagination programme that aims to help improve healthcare delivery by tackling the high incidence of lifestyle related diseases. Through a concerted communications effort and an educational website, GE helped develop greater awareness for healthier living in core segments of Saudi society.
- Moreover, The Healthcare Skills Training Institute (HSTI) in Riyadh, \textit{Saudi Arabia} is part of the Ministry of Health's transformational vision to strengthen the skills of its health workforce. Recognizing the critical role of capability building in delivering high quality, highly accessible healthcare, the Kingdom emphasized the critical importance of education and training in the healthcare sector.\textsuperscript{17}
- Under GE Healthcare’s ASEAN Healthcare Learning Institute (AHLI), a virtual institution set up by GE Healthcare to address the need for healthcare education across \textit{ASEAN}, GE Healthcare has led many AHLI training programs locally, including a clinical and basic maintenance training for the Giraffe Incubator, Lullaby Warmer and LED phototherapy for paediatricians, nurses and midwives in \textit{Myanmar}.
- Since 2012, GE Healthcare has invested US$ 3.5 million in a partnership with Senai (National Service for Industrial Training), focused on developing technical and clinical hands-on courses to their employees and customers in \textit{Brazil}. Located in Sao Paulo, the education center is equipped with GE solutions and more than one thousand people have been trained so far.
- By the end of 2012, GE launched a Health Training Center in Panama, to contribute to the qualification of specialized healthcare professionals in \textit{Latin America}. The Center features 3 training facilities that include audiovisual systems and state-of-the-art product technologies developed by GE. For the past three years more than 350 people have been trained at the Panama Health Training Center.

\textsuperscript{16} A. Malkin, PhD, PE and Chelsea Whittle, MSc, Biomedical Equipment Technician Capacity Building Using a Unique Evidence-Based, Curriculum Improves Healthcare, Journal of Clinical Engineering, Vol 39 & Number 1 & January/March 2014

\textsuperscript{17} Saudi MOH National Strategy, 2020-2010, page 9.
In **China**, GE has partnered with China government entities to train medical talents especially in the rural areas. The rural doctor training initiated by GE and Chinese Medical Doctors Association (CMDA) in 2011 has trained more than 6,500 rural doctors in China since 2011 through 36 sessions, featuring professors as guest lecturers from influential Level 3 hospitals across China. This has improved their clinical diagnosis and operation levels for common diseases as well as knowledge about technologies.

### 2.6 Examples relating to SDG 17:

**Strengthen the means of implementation and revitalize the global partnership for sustainable development**

#### 4.1 Technology

GE Healthcare through its healthymagination commitment invested $6 billion to develop 100 new innovative technologies that increases access by 15% and are 15% more affordable, but also maintain the highest quality standards. These technologies are for diagnosis, patient management and monitoring and in surgical settings, examples of which are listed below.

- GE was the first company to install MRI technology at the Palestinian Authority Ministry of Health hospitals, supporting 2.7 million people in the **West Bank**.
- GE’s Vscan, a hand-held and battery powered ultrasound most often used in rural community clinics can also be utilised in developed nations. Originally developed for low resource settings, Vscan is a compact portable visualization tool with ultrasound technology that provides a non-invasive look inside the body for immediate visual validation of what a clinician can feel or hear. This additional information helps clinicians optimize the diagnosis, treatment and monitoring of patients, most notably mothers-to-be during pregnancy. Vscan’s battery capacity provides over one hour of scanning on a single charge, giving it enough power for a full day’s worth of patient exams in a remote rural setting.
- Based on on-the-ground feedback from trials in **Tanzania** and **Indonesia**, GE is now introducing the Vscan Access, the next generation of Vscan tailored to address the needs of developing regions. Vscan Access is further simplified for primary care health workers, durable for low-resource settings, and clinically optimized for obstetric and abdominal scanning, continuing our trend of developing technology expressly to support health policy makers in developing regions.

### 2.7 Examples relating to SDG 17.9:

**Enhance international support for implementing effective and targeted capacity building in developing countries to support national plans to implement all sustainable development goals, including through North-South, South-South, and triangular cooperation.**

GE Healthcare is committed to working with customers to build capacity through leadership, clinical and technical training. Our performance management leadership training has been customised for several developing countries. All GE Healthcare technologies and solutions include training where applicable. Examples are set out below:

- In September 2014, the Algerian Ministry of Health signed a strategic framework agreement with GE for collaboration in the areas of infrastructure modernization,
capacity building, optimization of the emergency services and health awareness, in line with Algeria’s health development plan.

- GE is supporting the Ministry of Health in Egypt with the development of a centralized image repository for the country, enabling hospitals to send, share and store X-ray images to facilitate remote assessment by radiologists, addressing critical clinical and operational challenges facing many hospitals in the emerging markets. Also in Egypt, GE Healthcare and the Ministry of Health of Egypt have signed a partnership agreement to boost the country’s healthcare technology management system, with plans to establish a Biomed Center of Excellence in Egypt.

- With a focus on advancing healthcare transformation in the area of capacity building and infrastructure enhancements in Nigeria, GE Healthcare in 2013 collaborated to commission three new Diagnostic Imaging Centres at Mecure and Vedic Life Care in Lagos and Upko Centre in Calabar. GE Healthcare also delivered education and training in seven A&E hospitals across the country, as well as partnering in the design of the first-ever Paramedic Curriculum approved by the National Council of Health.

- In partnership with the Nigerian Ministry of Health, USAID and GE, the $20 million ‘healthymagination Mother & Child Initiative’ will introduce ultrasound usage and task shifting training for antenatal care, in support of the Save One Million Lives initiative.

2.8 Examples relating to SDG 17.17:

Encourage and promote effective public, public-private, and civil society partnerships, building on the experience and resourcing strategies of partnerships.

GEHC is committed to being a technology partner for Public Private Partnerships and has worked in Europe, India, Latin America, Africa, Canada, and ASEAN regions. Some examples of this are outlined below:

- In January 2014, GE, USAID and the Kenya Commercial Bank announced a first-of-its-kind collaboration for the development of SME healthcare in Kenya through a scheme to provide up to $10 million in local financing for the development of private health facilities including doctor partnerships, diagnostic centres and hospitals.

- To increase access to safe surgery and lifesaving care, the GE Foundation has developed a Public Private Partnership model to establish oxygen production plants and training on how to administer oxygen therapy in Kenya and Rwanda.

- A joint venture set up in 1989, Wipro GE Healthcare is the only technology provider in India that has been actively working with State Governments on PPPs in healthcare. Government of Madhya Pradesh and Gujarat have signed agreements with Wipro GE Healthcare and its service provider partners for outsourcing of CT & MRI diagnostic imaging services in the teaching hospital of the states. Earlier, Wipro GE had installed a MRI scanner at SGPGI Lucknow in a similar arrangement.

- GE has also signed an agreement with the Governments of Andhra Pradesh, Karnataka and Maharashtra along with Service Provider Partners to provide radiology services in three medical colleges of Andhra Pradesh and two Government hospitals of Karnataka through the use of CT, MRI, Mammography and Ultrasound machines.

- In Turkey, as part of Hedef 2023, GE is supporting the Turkish Ministry of Health’s focus on the development of public/private partnerships to support the development of public health. In 2015, GE will open its first Life Sciences Technology and Training Laboratory to
accelerate the development of the biopharmaceutical sector in the region, as part of the GE Turkey Innovation Centre.

To expand access to healthcare in Mexico, GE Healthcare developed a partnership with Saud Diana, a private not-for-profit organization that provides diagnostic services for prevention and early stage diagnosis to lower income communities and so far have trained 30 physicians in clinical ultrasound procedures, provided 87 ultrasound units, bone density, x-ray and tomography equipment allowing over 1.7 million patients in more than 11 states in Mexico to undertake these examinations.

3. Conclusion

A whole of government approach is required to ensure a fully sustainable healthcare system, and ultimately a healthier population. Governments around the world have a real opportunity to initiate accessible and affordable health systems that deliver higher quality healthcare and better outcomes for billions of patients everywhere. Carrying out a thorough impact assessment; adopting a business focused approach to healthcare; and working in partnership with all sectors will enable governments including Ministries of Health to achieve a sustainable health system and make significant progress towards the new Sustainable Development Goals (SDGs).
4. **Country Index**

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5. APPENDICES

5a. UN Sustainable Development Goals Relevant to GE Healthcare

**Goal 3. Ensure healthy lives and promote well-being for all at all ages**

3.1 By 2030 reduce the global maternal mortality ratio to less than 70 per 100,000 live births

3.2 By 2030 end preventable deaths of newborns and under-five children

3.3 By 2030 end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases and combat hepatitis, water-borne diseases, and other communicable diseases

3.4 By 2030 reduce by one-third pre-mature mortality from non-communicable diseases (NCDs) through prevention and treatment, and promote mental health and wellbeing

3.6 By 2020 halve global deaths and injuries from road traffic accidents

3.8 Achieve universal health coverage (UHC), including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all

3.9b Support research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration which affirms the right of developing countries to use to the full the provisions in the TRIPS agreement regarding flexibilities to protect public health and, in particular, provide access to medicines for all

3.9c Increase substantially health financing and the recruitment, development and training and retention of the health workforce in developing countries, especially in LDCs and SIDS

**Goal 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all**

4.4 By 2030, increase by x% the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

**Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development**

17.1.7 Encourage and promote effective public, public-private, and civil society partnerships, building on the experience and resourcing strategies of partnerships.

17.9 Enhance international support for implementing effective and targeted capacity building in developing countries to support national plans to implement all sustainable development goals, including through North-South, South-South, and triangular cooperation.
5.b List of GE Healthcare technologies in the WHO Compendium of Innovative Technologies

The GE Healthcare technologies that have been selected for the WHO Compendium of Innovative between 2013 and 2014 are:

- Vscan (hand held ultrasound)
- Lullaby baby warmer
- LED phototherapy for neonatal jaundice
- Lullaby Warmer Prime (baby warmer)
- Lullaby Resus Prime (baby resuscitation device)
- Lullaby Resus Plus (baby resuscitation device)
- Brivo CT385 (Computed Tomography (CT))
- Brivo XR575 (Galaxy) (X-Ray)
- Carestation 30 (anaesthesia delivery system)

5.c Maternal, Newborn and Child care pathway
For additional information, please contact:

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**About GE Healthcare**  
GE Healthcare provides transformational medical technologies and services to meet the demand for increased access, enhanced quality and more affordable healthcare around the world. GE (NYSE: GE) works on things that matter—great people and technologies taking on tough challenges. From medical imaging, software and IT, patient monitoring and diagnostics to drug discovery, biopharmaceutical manufacturing technologies and performance improved solutions, GE Healthcare helps medical professionals deliver great healthcare to their patients.

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