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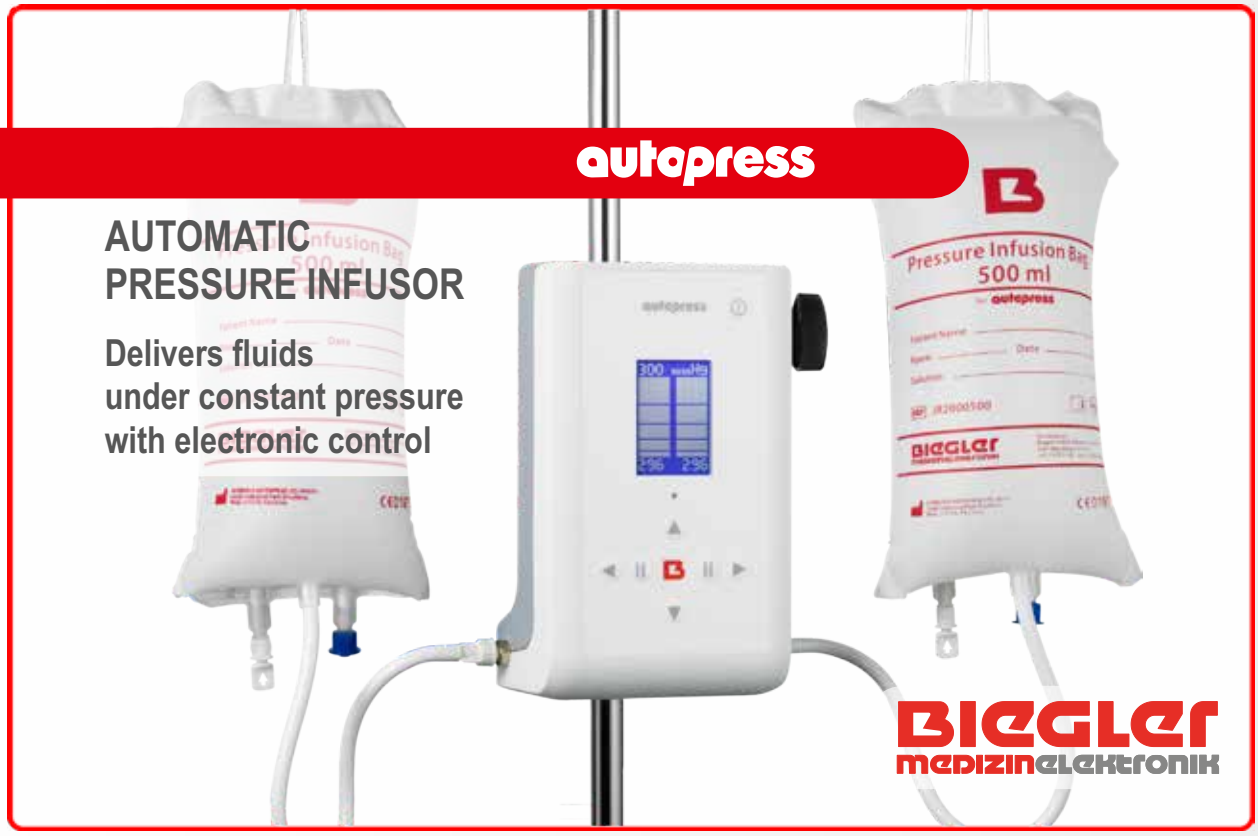

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PREVENTION FIRST OF ALL

In a recessionary period like the current one, investing in prevention and promotion of an active and healthy lifestyle and in vaccination practices, is not only ethically correct because health is a universally recognized right, but also because it represents an important contribution towards the creation of a more sustainable and productive society.

With its focus on vaccinations, **Infomedix International** is doing its small part in changing attitude towards our lives, starting from prevention: we believe health education should become a normal part of our daily lives from the age of primary school onward.

The OECD confirmed that in Europe health expenditure in prevention has dramatically decreased in the last few years. Reducing funding in prevention and vaccination leads to lower public health standards on one hand and on the other hand increased mortality and morbidity risk exposure for the European citizens of all ages.

...we believe health education should become a normal part of our daily lives from the age of primary school onward.

Using influenza as an example, only two countries (NL and UK) in Europe met the EU vaccination target coverage rates of 75% for the elderly; reaching the 75% target in all the European countries would have a tangible and measurable impact: it would avoid the death every year of between 9,000 to 14,000 people for influenza.

The effect of not reaching the 75% target not only demonstrates a disinvestment from the societal perspective, but would also have an impact on the industry business model ("low incentives - low investment"). Today, we are losing investment, know-how and talent.

Unfortunately our health systems are still built on illness and not health promotion. Immunization should be put at the centre of our public health agenda: vaccines are a key tool for spending smarter and they contribute to freeing resources for medical innovation.

Baldo Pipitone
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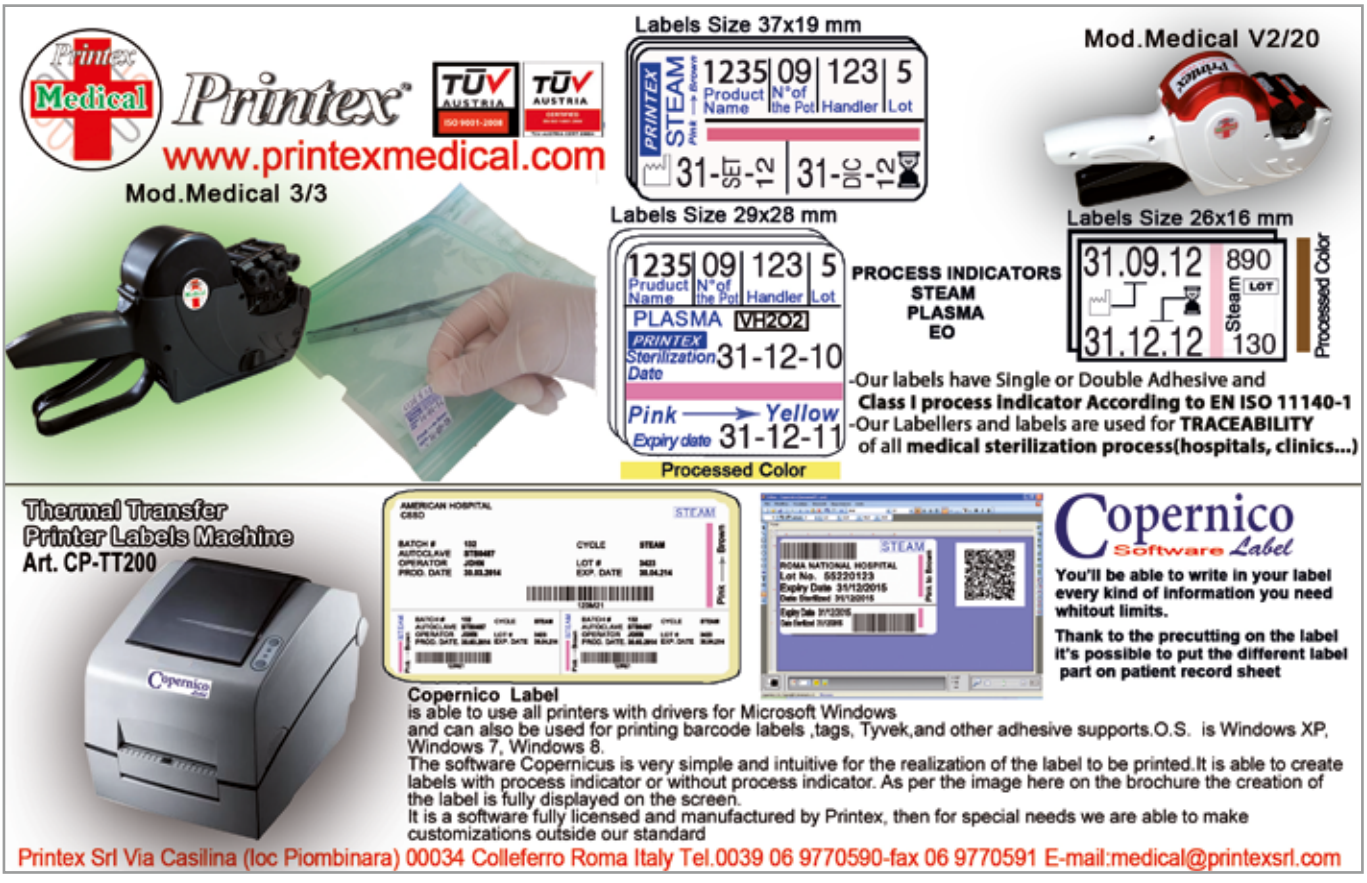

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IAE history started in 1955 as manufacturer of electronic valves but very soon this production was abandoned and the Company focused all production efforts on rotating anode tubes. **Nowadays IAE is a major role player in the International X-Ray market as the only independent manufacturer in Europe of rotating anode tubes.**
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http://www.qioptiq.com/x-ray.html / info@qioptiq.de ***Visit us at: ECR (European Congress of Radiology), Booth D/4 (Foyer)***

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To learn more about these products and see our entire product portfolio, please visit our website.

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Focus
Vaccination, a Most Successful Public Health Initiative

Protecting yourself is also about protecting others; yet, the memory of Europe's success in eliminating polio and smallpox is unfortunately fading.

Vaccination has become a victim of its own success and its importance has been increasingly disregarded, misleading people into believing that jabs are no longer necessary.

Author: Silvia Borriello

Photo Shutterstock // Bork

Falling vaccination rates throughout Europe are leading to an increase in infections such as measles and rubella and Europe fears new epidemics. Measles viruses, for instance, could be prevented from circulating if 95% of the population was inoculated, but vaccination rates fall far short in the 53 countries of the WHO European region to stamp out this extremely contagious disease. Studies showed that between 2010 and 2011 the number of measles cases in the EU had risen by a factor of four. Public fears in vaccination fuelled by internet-driven campaigns and lack of funding are worsening the situation. Costs are among the factors in preventing many from getting vaccinated. Countries which spend the least on subsidizing seasonal flu vaccination also have the lowest coverage rates in Europe such as Austria, the Czech Republic and Poland.

According to World Bank health experts, there is clear evidence that immunizations are among the most cost-effective public health interventions, but falling healthcare budgets are challenging vaccinations.

The issue of whether or not to pay for such medical interventions does not only apply to developing countries, which are often more pioneering in their approach. In many low-to-middle-income countries, like Brazil, Mexico, and Turkey, some social services such as school fees are linked to vaccinations.

Such initiatives should be encouraged elsewhere and **Europe should give more political support to vaccination programs, otherwise the risk is that highly-contagious diseases will recur, bringing in their wake suffering, disabilities, and death.**

The internet is also proving to be a hindrance to vaccinations, there is not only a great deal of misinformation on vaccination circulating on the internet, opponents are also organizing actual campaigns and are recklessly frightening parents into not having their children vaccinated.

Such aggressiveness drowns out everything else and evidence-based facts on vaccines or successful vaccination programs have less chance of being taken seriously as a result.

Quick Facts

- The impact of immunization on reducing human mortality is second only to the provision of safe drinking water.
- Approximately 17% of deaths in children under five are vaccine-preventable.
- If all children were immunized with existing vaccines, nearly 25 million lives could be saved between 2011 and 2020.
- Measles continues to kill about 400 children each day, mainly in Africa and Asia.
- Maternal and neonatal tetanus is a disease that killed 49,000 newborns in 2013 alone; it persists as public health problem in 24 countries, mainly Africa and Asia.
- A quarter of child deaths are due to pneumonia or diarrhea. Severe diarrhea kills over 531,000 children each year.

The impact of immunization policy on vaccine-preventable diseases has been listed as one of the top public health achievements.

Vaccination Policies

"A vaccine is a biological preparation that improves immunity to a particular disease. A vaccine typically contains an agent that resembles a disease-causing microorganism, and is often made from weakened or killed forms of the microbe, its toxins or one of its surface proteins. The agent stimulates the body's immune system to recognize the agent as foreign, destroy it, and "remember" it, so that the immune system can more easily recognize and destroy any of these microorganisms that it later encounters".

Vaccine efficacy varies according to the type of vaccine and the manner in which the vaccine antigen is processed by the immune system. Individuals do not respond identically and vaccines may fail to induce immunity in a few individuals. It may also vary between different populations. **However, vaccines could be expected to reduce the attack rates in the vaccinated population by 70–100% compared to the attack rates in the unvaccinated.**

The benefits of vaccination are indisputable. But because of the immune reactions that they induce, vaccines can cause some minor discomfort, such as pain at the injection site or mild fever. Some serious adverse events may be so rare that they occur only once in millions of vaccine doses delivered. Some individuals may be sensitive to some components or trace elements in some vaccines, such as eggs, antibiotics, or gelatin. Otherwise, the cause of rare or very rare adverse events is usually unknown and believed to be associated with individual differences in immune responses. All governments regulate the clinical development of vaccines. A thorough evaluation of vaccine safety must be performed before a government will grant a license to allow its use. After a vaccine license has been granted, almost all national immunization programs will continue to monitor the nature and frequency of AEFI (adverse events following immunization).

Only a vaccine which meets all of the regulator's safety requirements will be considered. If there is a possibility that a rare adverse event is associated with the vaccine, the regulator may grant a conditional license such as conducting post-marketing studies over a large sample size over a long period of time. Vaccination policies aim to produce immunity to preventable diseases. Besides individual protection from getting ill, some vaccination policies also aim to provide the community as a whole with herd immunity. **Herd immunity refers to the idea that the pathogen will have trouble spreading when a significant part of the population has immunity against it. Herd protection can indirectly protect individuals with poorer access to healthcare or vaccination programmes, as well as those who cannot be vaccinated** (e.g. newborns too young to be vaccinated, the immunocompromised, and the immunosenesscent). With clear objectives, solid policies and robust implementation systems, Europe and the US have been very quick to adopt recently licensed vaccines. These investments in prevention are expected to have net advantages over curative care that would otherwise be required. But not all countries have been so quick. By 2000, many developing countries had not updated their immunization programs and policies from the 1970s when they were first launched. The WHO's Vision and Immunization Strategy, launched at the start of the 2000s, was developed to assist developing countries on this regard.

Many are the global action policies undertaken to boost immunization. In 2012, the World Health Assembly endorsed the Global Vaccine Action Plan (GVAP), a commitment to ensure that no one misses out on vital immunizations. Despite gains in the past years, global vaccination targets remain off track. The plan, set from 2011-2020, is intended to "strengthen routine immunization to meet vaccination coverage targets; accelerate control of vaccine-preventable diseases with polio eradication as the first milestone; introduce new and improved vaccines and spur research and development for the next generation of vaccines and technologies".

The impact of immunization policy on vaccine-preventable diseases has been listed as one of the top public health achievements. Each year, vaccination averts between 2 and 3 million deaths, across all age groups, from diphtheria, tetanus, pertussis

(whooping cough) and measles. These diseases used to be among the leading causes of death worldwide. According to the WHO, in 2015 immunization led to some notable wins in the fight against polio, rubella and maternal and neonatal tetanus. But they were isolated wins. Polio was eliminated in 1 country, tetanus in 3 and rubella in 1 geographical region.

However, an additional 1.5 million deaths could be avoided if global vaccination coverage improves. Today, an estimated 18.7 million infants – nearly 1 in 5 children – worldwide are still missing routine immunizations for preventable diseases, such as diphtheria, pertussis and tetanus.

In 2015 India joined Cambodia, Madagascar and Mauritania in eliminating maternal and neonatal tetanus. It also improved coverage of the diphtheria-tetanus-pertussis-containing vaccines (DTP3) to 83%. Despite challenges imposed by Ebola, the African Region became one-step closer to being certified polio-free with the removal of Nigeria from the list of polio-endemic countries. As recently as 2012, the country accounted for more than half of all polio cases worldwide. Now, only two countries – Afghanistan and Pakistan – remain polio endemic.

The Region of the Americas became the first to eliminate rubella, a contagious viral disease that can cause multiple birth defects as well as fetal death when contracted by women during pregnancy. Additionally, 5 years after the introduction of an affordable conjugate meningitis A vaccine, immunization of more than 230 million people has led to the control and near elimination of deadly meningitis A disease in the African "meningitis belt" that stretches from Senegal to Ethiopia. New vaccines against dengue, Ebola and malaria have the potential to be game-changers in immunization in the near future.

Although the world has seen some achievements in immunization, global vaccination coverage has stalled in the past few years. Far too many opportunities to reach unvaccinated children and close the immunization gap are still being missed every day. More than 60% of children who are unvaccinated live in 10 countries: the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Iraq, Nigeria, Pakistan, the Philippines, Uganda and South Africa.

Because prices paid for vaccines represent a large share of countries' immunization budgets and the prices of new vaccines are higher than those of traditional vaccines, costs represent a strong barrier to countries introducing new vaccines.

In recent years, emphasis has been placed on the importance of price transparency. Vaccine pricing is considerably less transparent than pricing for other lifesaving pharmaceuticals. Efforts have been made by a few manufacturers to publish some of the criteria used to establish pricing in some markets. However, no single manufacturer reports all the specific prices in all markets in which they sell. In strengthening the quality and use of data, the World Health Assembly passed a resolution last year on vaccine pricing, which called on countries to provide their vaccine prices to WHO. Also international buyers, such as UNICEF, GAVI and the procurement platform available in the WHO Region of the Americas, have made publically available some of the price arrangements they have in place with some manufacturers. The WHO database currently contains 1,600 vaccine price records on almost 50 different types of vaccines from 42 countries, making it the largest international vaccine price database. Nevertheless, the most crucial aspect to all of these efforts is the willingness of countries to share pricing data and information. **Furthermore, the majority of vaccines are supplied by a handful of well established manufacturers. Such a restricted number of manufacturers may limit competition, as such the ability to obtain an optimum vaccine price and may increase the supply chain uncertainty,** both in terms of gaining access to vaccine supply (i.e. willingness of the manufacturer to supply the product to a specific market) and gaining uninterrupted supply of contracted products (i.e. in case of manufacturing or supply disruptions).

Compulsory Vaccination - is a difficult policy issue, requiring authorities to balance public health with individual liberty. To eliminate the risk of disease outbreaks, at various times governments and other institutions established policies requiring vaccination. Beginning with nineteenth century early vaccination, these policies stirred resistance from a variety of groups, collectively called anti-vaccinationists, who objected on ethical, political, medical safety, religious and other grounds. Common objections included claims of "excessive government intervention in personal matters" or that proposed vaccinations were not sufficiently safe. Many modern vaccination policies allow exemptions to mandatory vaccinations for people with compromised immune systems, allergies to vaccination components or strongly held objections, but some believe that decreased rates of vaccination may cause loss of herd immunity, substantially increasing risks even to vaccinated individuals.

The implementation of immunization programs varies from country to country. All countries provide basic immunization services through the public sector. The private sector plays an important role in offering many of the same vaccines, and several others, to segments of population that access healthcare outside of the public sector.

New vaccines against dengue, Ebola and malaria have the potential to be game-changers in immunization in the near future.

Australia - In an effort to boost vaccination rates, the Australian government has decided that from 1 January 2016, certain benefits (such as the universal 'Family Allowance' welfare payments for parents of children) will no longer be available for conscientious objectors of vaccination. In 2014, about 97% of children under 7 years were vaccinated, though the number of conscientious objectors to vaccination has increased greatly.

Republic of Ireland - childhood vaccination (up to age 16) requires the consent of the parents. The Department of Health strongly recommends vaccinations.

Malaysia - mass vaccination is practiced in public schools. All the children in a given school year are vaccinated as a cohort.

Slovenia - has one of the world's most aggressive and comprehensive vaccination programs. Its program is mandatory for nine designated diseases (tuberculosis, tetanus, polio, pertussis, Haemophilus influenza type B, measles, mumps and rubella and hepatitis B). While a medical exemption request can be submitted to a committee, such an application for reasons of religion or conscience would not be acceptable. Failure to comply results in a fine and compliance rates top 95%, while for non-mandatory vaccines, such as human papilloma virus, coverage is below 50%.

Malaysia - mass vaccination is practiced in public schools. All the children in a given school year are vaccinated as a cohort.

Pakistan - The government in 2014, following a multitude of minor polio epidemics has ruled that the polio vaccination is mandatory and indisputable. According to a statement from Pakistanis police commissioner "Anyone who refuses [the vaccine] will be sent to jail".

South Africa - The South African Vaccination and Immunization Centre works with WHO and the South African National Department of Health to educate, do research, provide technical support, and advocate. They work to increase rates of vaccination in order to improve the nation's health.

Latvia - Some nations, such as Latvia, say they have mandatory vaccination policies but contend that the notion of "mandatory" differs from that of other nations. Vaccines that are not mandatory are not publicly funded. Latvia also appears unique in that it compels healthcare providers to obtain the signatures of those who decline vaccination. Individuals have the right to refuse a vaccination, but if they do so, health providers have a duty to explain the health consequences.

United Kingdom - Health experts have criticized media reporting of the MMR-autism controversy for triggering a decline in vaccination rates and a rise in the incidence of these diseases. Before publication of Wakefield's findings (that the MRR vaccine could lead to autism), the inoculation rate for MMR (measles, mumps, and rubella) vaccine in the UK was 92%; after publication, the rate dropped to below 80%. In 1998, there were 56 measles cases in the UK; by 2008, there were 1,348 cases, with two confirmed deaths.

United States - The Advisory Committee on Immunization Practices (ACIP) is the only federal government recommending body for vaccines, in both public and private systems. Currently, in a push to eradicate pertussis, tetanus, diphtheria, polio, measles, mumps, rubella, varicella, and hepatitis B from the population, schools across the United States require an updated immunization record for all incoming and returning students. While all states require an immunization record, this does not mean that all students must get vaccinated. Opt-out criteria take one of three forms: medical; religious; and personal philosophical opposition. As of 2015, 47 states allow religious exemptions, with some states requiring proof of religious membership. Mississippi, West Virginia and California do not permit religious exemptions. Only 15 states allow personal philosophical opposition as a form of exemption; Vermont and California eliminated this exemption in 2015. The American Academy of Pediatrics (AAP) advises physicians to respect the refusal of parents to vaccinate their child after adequate discussion, unless the child is put at significant risk of harm (e.g., during an epidemic, or after a deep and contaminated puncture wound). Under such circumstances, the AAP states that parental refusal of immunization constitutes a form of medical neglect and should be reported to state child protective services agencies. The US CDC Vaccine for Children (VFC) program purchases about 55% of childhood vaccines directly from vaccine manufacturers. Funding for the program is provided by Medicaid. Children under 18 years of age who qualify for Medicaid, or do not have health insurance, or whose health insurance policies do not provide for vaccines, or who are Native Americans receive vaccines at no cost through the VFC. The remaining 45% of childhood vaccines (non-VFC vaccines) are delivered through the private sector, in doctors' offices and health clinics. Likewise, under the Affordable Healthcare Act, health insurers must now provide ACIP recommended vaccines at no out-of pocket expense to the policy holder, and insurers cannot charge premiums for vaccines.

France - According to the 2013 INPES Peretti-Watel health barometer, between 2005 and 2010, the percentage of French people between 18–75 years old in favor of vaccination dropped from 90% to 60%. Conversely, those who claimed to be anti-vaccination increased from 8.5% in 2005 to 38.2% in 2010. In 2012, the French government and the Institut de Veille

Sanitaire launched a 5-year national program in order to improve vaccination policy. The program simplified guidelines, facilitated access to vaccination and invested in vaccine research. In 2014, fueled by rare health-related scandals, mistrust of vaccines became a common topic in the French public debate on health. According to a French radio station, as of 2014, 3 to 5% of kids in France were not given the mandatory vaccines. Some families may avoid requirements by finding a doctor willing to forge a vaccination certificate, a solution which numerous French forums confirm. However, the French State considers "vaccine refusal" a form of child abuse. In some instances, parental vaccine refusals may result in criminal trials. As of 2015, while failure to vaccinate is not necessarily illegal, a parent's right to refuse to vaccinate his or her child is technically a constitutional matter. Additionally, children in France cannot enter schools without proof of vaccination against diphtheria, tetanus, and polio. Most recently, the Prime Minister's 2015-2017 roadmap for the "multi-annual social inclusion and anti-poverty plan" includes free vaccinations in certain public facilities. Vaccinations within the immunization schedule are given for free at immunization services within the public sector. When given in private medical practices, vaccinations are 65% reimbursed.

Italy - The fact that services and decisions are delivered by 21 separate regional authorities creates many variations in Italian vaccine policy. Regions may add more scheduled vaccinations, but cannot exempt citizens from nationally mandated or recommended ones. Childhood vaccinations included in national schedules are guaranteed free of charge for all Italian children and foreign children who live in the country. Estimated insurance coverage for the required three doses of HBV-Hib-IPV vaccines is at least 95% when the child is 2 years old (diphtheria, tetanus, acellular pertussis, hepatitis B (HBV), inactivated poliomyelitis and Haemophilus influenzae type b (Hib) conjugate vaccine). Later, Influenza is the only nationally necessary vaccine for adults, and is administered by general practitioners. To mitigate some public concerns, Italy currently has a national vaccine injury compensation program. Essentially, those who are ill or damaged by mandatory and recommended vaccinations may receive funding from the government as compensation. In spite of the National Immunization Prevention Plan issued in 2012 both infant vaccine coverage rates and influenza immunization in the elderly have been decreasing. A 2015 government plan aimed to boost vaccination rates and introduced a series of new vaccines, triggering protests among public health professionals. Partially in response to the statistic that less than 86% of Italian children receive the measles shot, the National Vaccination Plan for 2016–18 (PNPV) increased vaccination requirements. For instance, nationwide varicella shots would be required for newborns. Under this plan, government spending on vaccines would double to €620 million annually, and children may be barred from attending school without proving vaccination. Although these implementations would make Italy a European frontrunner in vaccination, some experts question the need for several of the vaccines, and some physicians worry about the potential punishment they may face if they do not comply with the proposed regulations.

Spain - Spain's Constitution does not mandate vaccination, so it is voluntary unless authorities require compulsory vaccination in the case of epidemics. The first systematic immunization schedule for the provinces of Spain was established in 1975 and has continuously been updated by each autonomous community in regard to doses at certain ages and recommendation of additional vaccine not proposed

Spain's Constitution does not mandate vaccination, so it is voluntary unless authorities require compulsory vaccination in the case of epidemics.

in the schedule. Due to vaccination coverage in each Community, there is little anti-vaccine activity or opposition to the current schedule, and no organized groups against vaccines. The universal public healthcare provides coverage for all residents, while central and regional support programs extend coverage to immigrant populations. Vaccines are financed from taxes and paid in full by the Community government.

Germany - Although the Standing Vaccination Committee (STIKO) makes recommendations, immunization in Germany is voluntary and there are no official government recommendations. German Federal States typically follow the Standing Vaccination Committee's recommendations minimally, although each state can make recommendations for their geographic jurisdiction that extends beyond the recommended list. In the event of vaccination related injuries, federal states are responsible for monetary compensation. Germany's central government does not finance childhood immunizations, so 90% of vaccines are administered in a private physician's office and paid for through insurance. The other 10% of vaccines are provided by the states in public health clinics, schools, or day care centers by local immunization programs. Physician responsibilities concerning immunization include beginning infancy vaccination, administering booster vaccinations, maintaining medical and vaccination history, and giving information and recommendations concerning vaccines.

Vaccines are one of the most cost-effective interventions available.

The Asia-Pacific region - is very heterogeneous. Countries in the region span all classes of economic development. As a result, approaches to immunization are widely varied. Unlike Europe, the region does not have a centralized regulatory body to license vaccines. But the Japan Pharmaceuticals and Medical Devices Agency (PMDA) and the Ministry of Health, Labor, and Welfare is a signatory to the International Conference on Harmonization (ICH) with the US and Europe. This is intended to encourage the standardization of the requirements for vaccine licensing between Japan, the US, and Europe. The Asia-Pacific region does not have a regional vaccination support program, like the one administered by the Pan-American Health Organization (PAHO) in Latin America. Most countries in the region rely on national expert immunization committees to recommend vaccines. Most countries then provide recommended vaccines at no cost through public sector health outlets. However, recommendations for vaccines vary considerably between countries in the region.

Costs and Benefits

Spending on prevention in EU countries is less than 3% of the overall healthcare expenditure and the purchase of vaccine is 0,5% or less of national healthcare budgets; nevertheless vaccination accrues a wealth of benefits and significant returns on investment.

Several analyses of the economic costs and potential benefits that immunizations have on individuals and society have been studied, evaluated and calculated. Vaccines are one of the most cost-effective interventions available. In the U.S., a study looking at the benefits of vaccination between 1994 and 2013 estimated a net savings of $295 billion in direct costs and $1.38 trillion in total societal costs.

Economic Benefits

• -86% PROJECTED CASES over lifetime in HPV related cervical cancers: between Euro 7,500 & Euro 14,500 per quality-adjusted-life year saved (UK)
•18 YEARS of universal Hepatitis B vaccine: Euro 580 million in net savings (Italy)
•Euro 96 million SAVED by avoiding 715,000 lost days of work and productivity thanks to influenza vaccination + 25,000 lives spared/year (EU)

Public Health Benefits

• Vaccination reduces illness & death:
US Smallpox cases, eradicated from 1988 to 2014
Global polio cases, nearly eradicated from 1988 (350,000 cases) to 2014 (359 cases)
• Vaccination protects patients with chronic diseases, e.g. Influenza vaccination:
-50% heart attack occurrence
-28% death in diabetic patients
-24% the risk of strokes after respiratory diseases
• Vaccination helps fighting against antimicrobial resistance (AMR):
e.g. The use of conjugate pneumococcal vaccine reduces the use of antibiotics.

While a conspiracy theory circulating online that both doctors and pharmaceutical companies stand to profit financially from vaccination, it wasn't too long ago that the vaccine industry was struggling with slim profit margins and shortages. In fact, vaccines were so unprofitable that some companies stopped making them altogether. In 1967, there were 26 vaccine manufactures. That number dropped to 17 by 1980. Ten years ago, the financial incentives to produce vaccines were so weak that there was growing concern that pharmaceutical companies were abandoning the vaccine business for selling more-profitable daily drug treatments. There are many factors that make vaccine production tricky, and thus less lucrative: live vaccines are troublesome to manufacture, and they're closely regulated for quality control. Altogether, a combination of high production

costs, low market prices and heavy regulation may have contributed to occasional vaccine shortages. **But in recent years global demand, particularly in developing countries, shot up. The growth is driven by the sales of recently developed vaccines and by new vaccine markets.** The fastest rate of growth is anticipated in the Asia-Pacific region and in Latin America and new vaccines under development are projected to add to the growth of the current market. The market opened up once Hepatitis B vaccine showed that you can sustain very high prices for single dose, unheard of back in the 1980s. Two "blockbuster" vaccines also hit the market: pneumococcal conjugate for meningitis and other bacterial infections and the vaccine for human papillomavirus (HPV). New candidates for vaccinating against cancers and HIV are also projected to hit the market. **One estimate puts the vaccine market now at $25 billion; representing a mere 2 to 3 % of a trillion-dollar worldwide pharmaceutical industry.** The market is expected to return a compound annual growth (CAGR) rate of more than 8% through 2018, with some segments like adult vaccines showing even better. A big part of the growth in vaccine sales has been in the adult influenza market with the big focus on flu prevention. While vaccine prices have always been higher in the U.S. and Europe due to tiered pricing, prices have been rising dramatically in recent years. In the U.S., the current Center for Disease Control (CDC) pediatric-contract price for MMR is $ 20.11, while the private-sector pediatric price for MMR has risen to $67.03. But profit margins are hard to know, as R&D (which can take up to 18 years), manufacturing, trials to test efficacy and distribution costs for specific vaccines and drug products are not public. Analysts estimate the profit margin of giant pharmaceutical companies at anywhere ranging between 10 to over 40%; and **while once worries were that low vaccine prices would drive manufacturers out of the market and lead to shortages, there are now worries that prices are too high for both the developed and developing world.** In response to calls for vaccine costs to come down, supporters of increasing vaccine supply have argued that not only is vaccine production very complicated with high fixed costs, but research and development budgets would suffer. So while the vaccine industry is likely more profitable now than in the 1970s or 1980s, pharmaceutical companies need incentives to keep producing vaccines. **Regardless of profits the economic and social benefits of vaccination are huge—in lives and the billions of dollars saved.** A study released in 2014 estimated that fully immunizing babies resulted in $10 saved for every dollar spent, about $69 billion total. If the question is whether vaccines are safe and effective, the answer is unambiguously yes.

How long to develop a vaccine?

1. Research & Development (R&D): from 8 to 18.5 years with costs up to USD 900m
2. Regulatory approval marketing authorization: from 12 to 18 months
3. Introduction in the national immunization program after marketing authorization: 6.5 years median timeline
4. Production:
-24 months lead time
-quality control represents 70% of time
-costs up to USD 600m for building single manufacturing unit

The vaccine market - is dominated by a few large vaccine suppliers in industrialized countries. The costs associated with developing new vaccines require that vaccines be sold on the global market in order to be able to recoup R&D investments. Furthermore, almost all countries import at least some vaccines because not all national suppliers produce every antigen available. Vaccine research and development has largely been restricted to the few vaccine producing countries. Europe is at the heart of the global vaccine industry playing a key role in the research and development of preventive as well as therapeutic vaccines. According to Vaccines Europe (the European Vaccine Manufacturers Association), 80% of doses of vaccines are produced within the EU and exported worldwide with more than 50% of exports going to humanitarian groups like UNICEF, PAHO or GAVI. In 2014, 54% of vaccines were exported to Humanitarian groups, 34% to the rest of the world, 6% to Asia and 6% to North America. North America accounts for around 11% of doses produced, 4% in Asia and 5% in the rest of the world. The US vaccine market was estimated at $12.8 billion in 2012, or about $10.2 billion for human vaccines and projected to reach $17.4 by 2018, at a CAGR of 5.3%.

Vaccine research and development (R&D) is lengthy and risky. From discovery to license requires 10–18 years. Approximately 1 out of 10 vaccines that enter clinical development will reach the market. Which vaccines will be successfully developed is impossible to predict. Over 100 vaccines are currently under development. A few of these may reach the market in the next decade. Global spending for R&D amounts to around Euro 2 billion, of which 71% of investment in vaccine R&D in 2014 came from Europe and a 21% from North America. During the last twenty years, the extraordinary pace of innovative vaccine development has been the result of new knowledge and technology that has emerged from basic research, e.g. use of recombinant DNA and hybridoma technologies. The vaccine industry is actively engaged in research and de-

The costs associated with developing new vaccines require that vaccines be sold on the global market in order to be able to recoup R&D investments.

velopment of new vaccines, including use of live viral vector vaccines, DNA plasmid technology and immunotherapy. A number of vaccines in development target diseases that are difficult to treat, such as HIV/AIDS and other viral diseases (e.g. cytomegalovirus, dengue, ebola); cancer; Alzheimer's disease; rheumatic disorders; bacterial diseases (e.g. Clostridium difficile, chlamydia, E. coli) or parasitic diseases (e.g. malaria, hookworm, leishmaniasis) among others. For all of the new developments and growth, **vaccines are a market primarily made up of a handful of well established players, capturing more than 90% of vaccine sales, with another handful of small operators.** The top four firms by 2020 are expected to be within less than one percentage point of market share of each other: The New York-based *Pfizer* is expected to generate 7.4 billion U.S. dollars in vaccine revenues by 2022, largely due to success with its pneumococcal vaccine, Prevnar 13. *Merck & Co.*, is enjoying increased sales of Gardasil, the second best-selling vaccine worldwide and expected to reach 7.2 billion U.S. dollars in vaccine revenues by 2022. For the Paris-based company, *Sanofi Pasteur,* the upcoming focus is on its decades-in-production dengue vaccine. But it also has several other irons in the fire, including a joint venture in Europe with Merck in which it'll garner 50% of sales from Gardasil 9 there. Its vaccine revenues are expected to reach 8.3 billion dollars. *GlaxoSmithKline*, completed a multibillion-dollar asset swap with Novartis that saw it pick up most of the Swiss pharma's vaccines stall as it establishes a full-court press on vaccines while *Novartis*, as mentioned, agreed to hive off its vaccines assets and completed its final vaccines divestiture, selling its flu vaccines business to BioCSL in a move that cements its departure from vaccines. Among other relevant players are Abbot Biologicas, AstraZeneca, Novavax, Mitsubishi Tanabe, Astellas Pharma, Emergent BioSolutions, Dynavax Technologies, Grifols, Protein Sciences and a few others.

...vaccines are a market primarily made up of a handfulof well established players, capturing more than 90% of vaccine sales, with another handful of small operators.

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THE HISTORY OF VACCINATION

The first attempts to prevent disease by using the disease-causing toxin itself are reported from 7th century India where Buddhist monks drank snake venom in order to develop immunity against snake bites. Variolation, the practice of inoculating the dried pustules of smallpox (caused by the Variolae virus) from a sick individual into a healthy individual, to prevent the healthy individual from developing the disease, developed in Central Asia in the second millennium. The practice then spread east to China and West to Turkey, Africa, and Europe. In 1798, in England, Edward Jenner published the results of his experiments on "vaccination", the practice of inoculating the cowpox virus (closely related to the human smallpox virus), Variolae vaccinae, to prevent smallpox in humans. The term vaccination was derived from vaccinae virus. The practice became widely popularized. At the end of the 19th century Louis Pasteur began to apply the concept of vaccination to other diseases. He demonstrated that the harmful nature of disease causing microorganisms could be weakened (or attenuated) in the laboratory. He first demonstrated the effectiveness of vaccines against chicken cholera and anthrax in animals, before developing his vaccine against rabies for use in humans in 1885. At almost the same time, in the US, Daniel Elmer Salmon and Theobald Smith, in 1886, demonstrated that vaccines could be produced not just from live microorganisms, but also from killed disease-causing microorganisms. Their discovery would lead to the subsequent development of inactivated vaccines against several human diseases. In the early 20th century it was discovered that some diseases were caused not by bacteria themselves, but by the toxins that they produced. Inactivated toxins acted like vaccines by providing protection against these toxin-induced diseases. These vaccines are known as toxoids. By the end of the 20th century, a spurt of innovation led to the development of several new methods of producing vaccines including by recombinant microorganisms, by conjugation of polysaccharides to carrier proteins, and by the assembly of virus-like particles (VLPs).

Source: http://www.phrma.org/sites/default/files/pdf/PhRMA_Vaccine_FactBook_2013.pdf

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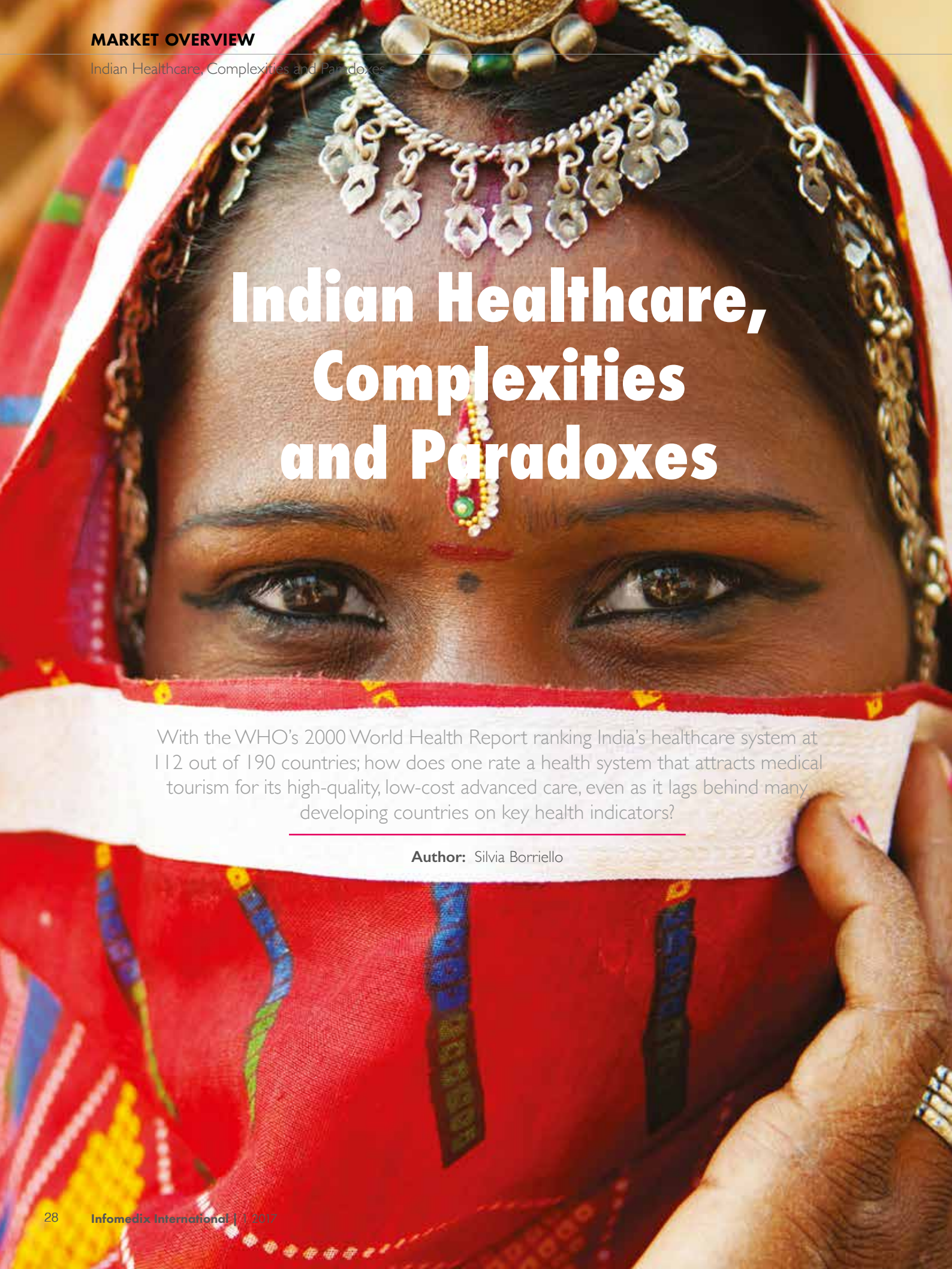

Indian Healthcare, Complexities and Paradoxes

With the WHO's 2000 World Health Report ranking India's healthcare system at 112 out of 190 countries; how does one rate a health system that attracts medical tourism for its high-quality, low-cost advanced care, even as it lags behind many developing countries on key health indicators?

Author: Silvia Borriello

What can we make of a country that's become the global pharmacy for myriad inexpensive drugs but allows 63 million of its people to sink into poverty each year as a result of unaffordable healthcare costs?

India's health system has become a bundle of such paradoxes since its independence from Britain in 1947 and since its adoption of a **constitution, in 1950, that assigned newly demarcated states primary responsibility for health service delivery, while mandating that the central government design national health programs.** Variations among states in economic development, social conditions and political governance led to wide disparities in service quality and population health. For decades, economic planners regarded health expenditures as financially non-productive social spending and public financing levels were low. Poorly resourced public services failed to meet the health needs of an expanding population. The emergence of cardiovascular diseases, cancers, diabetes, chronic respiratory disease and mental illnesses as major public health challenges, plus the unfinished agenda of infectious diseases, now including HIV–AIDS, stressed health systems beyond their capacity. As the ability of public-sector health systems to respond to growing health needs dwindled and performance dimmed, the private sector grew. Initially, small private clinics proliferated, but after India's economy opened up in the early 1990s, large corporate hospital chains took hold. Because of their urban aggregation and non-engagement with primary healthcare providers, however, these facilities don't provide basic healthcare to large segments of the rural population or the urban poor. Though modest by international standards, the cost of private-sector healthcare is unaffordable for most Indians. With weak regulatory systems failing to set and enforce quality and cost standards, some patients receive inadequate, inappropriate or unethical care.

Healthcare between states and rural and urban areas can be vastly different. Rural areas suffering from doctor shortages, lack of healthcare resources and infrastructures mostly rely on homeopathic or cultural remedies. 70% of the population still lives in rural areas while only 2% qualified medical doctors are available in these areas, consequently, only a quarter of the Indian population has access to allopathic medicine, and most of them live in urban centers.

Public and Private Healthcare

In spite of strong economic growth, India's total expenditures on health represent 4.1% of its national GDP (compared to 18% in the US). Per capita health spending has risen from USD 21 in 2000 to USD 44 in 2009 (WHO, 2015). The 12th five-year plan (2012–17) aims to increase public spending to 2% of GDP (MOH, 2011).

According to National Family Health Survey, **the private medical sector remains the primary source of healthcare for 70% of households in urban areas and 63% of households in rural areas.** Several are the reasons; the main reason at the national level is poor quality of care in the public sector. Most of the public healthcare caters to the rural areas; and the poor quality arises from the reluctance of experienced healthcare providers to visit the rural areas. Consequently, the majority of the public healthcare system catering to the rural and remote areas relies on inexperienced and unmotivated interns who are mandated to spend time in public healthcare clinics as part of their curricular requirement. Other major reasons are distance of the public sector facility, long wait times and inconvenient hours of operation. The study conducted by IMS Institute for Healthcare Informatics in 2013, across 12 states in over 14,000 households indicated a steady increase in the usage of private healthcare facilities over the last 25 years for both outpatient and inpatient services, across rural and urban areas.

Non-availability of diagnostic tools and increasing reluctance of qualified and experienced healthcare professionals to practice in rural, under-equipped and financially less lucrative rural areas is becoming a big challenge.

Social and Private Health Insurance

In principle, coverage of health services is universal and available to all citizens under the tax-financed public system. However, in practice, severe bottlenecks in accessing government healthcare services compel households to seek private care, often resulting in high out-of-pocket payments. In addition to public health facilities, a number of health insurance schemes currently exist in India. The central government's health services for civil servants and state-level employee insurance for formal workers are mandatory schemes. More recently, a number of social health initiatives, like Rashtriya Swasthya Bima Yojana (RSBY), have been launched to broaden healthcare access, mainly for the poor. **These have enrolled 36 million people, expanding coverage from 5% to 15% over a six-year period** (RSBY, 2015). **With proposed expansion of the RSBY scheme to include rickshaw and taxi drivers, rag pickers, sanitation**

Variations among states in economic development, social conditions and political governance led to wide disparities in service quality and population health.

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workers, domestic workers, street vendors, building and construction workers, and beedi (tobacco) workers, health insurance coverage under the social scheme is expected to increase further.

Privately purchased or employer-provided health insurance is available to only a small proportion of the population, considering that 93% of the workforce comprises self-employed or contracted workers, and poverty levels are high. **The majority of private expenditures are out-of-pocket payments made mainly at the point of service, and less than 5% are financed by voluntary (private) health insurance (VHI).** Despite tax exemptions for insurance premiums, only upper-class urban populations are able to afford VHI, which serves as a substitute for government health services. Health insurance schemes however, mostly cover hospitalization and associated expenses (inpatient primary care) and do not cover costs of consultation or medication. **Therefore, roughly 70% of healthcare expenditures consist of out-of-pocket spending mainly for outpatient care and medicines.** Secondary/tertiary and outpatient care is very underdeveloped. Furthermore, the insurance payment structure is almost exclusively retroactive. Beneficiaries need a plan which can cover medical costs up front instead of paying out-of-pocket and waiting long periods of time to get reimbursed. In spite of India's expanding middle class, lack of clarity in the government's insurance and healthcare regulatory policies has had a limiting effect on the growth of private health insurance in India.

Health Personnel and Infrastructures

A major barrier to service delivery is the severe shortage of qualified health care personnel. Although there are 398 Indian medical colleges with an annual intake of 52,000 students, there are shortages of both generalist and specialist doctors, which are aggravated by urban concentration and emigration. Shortfalls of nurses and allied health professionals are even more acute. The average number of patients seen by a registered doctor and nurse is 1,212 and 532, respectively (WHO, 2013). This implies an average of 0.7 doctors and 1.1 nurses per 1000 population, compared to 3.2 and 8.8, respectively, in OECD countries. Although India has a much younger population than OECD countries, this acute shortage of providers is a major constraint as India moves toward universal coverage. Healthcare services are delivered by a complex network of public and private providers, ranging from single doctors to specialty and "super-specialty" tertiary care corporate hospitals. The government healthcare system is designed as a three-tier structure comprising primary, secondary, and tertiary facilities. **For primary healthcare, the Indian government spends only about 30% of the country's total healthcare budget. This is just a fraction of what the US and the UK spend every year.**

Primary care - Facilities at the primary level include: sub-centers (SC), for a population of 3,000 to 5,000; primary health centers (PHC), for 20,000 to 30,000 people; and community health centers (CHC), which serve as referral centers for every four PHCs, covering 80,000 to 120,000. Primary health centers are the cornerstone of rural health services, serving as a first "port of call" to a qualified doctor in the public health sector and providing a range of preventive and curative health services. On average, they have about six beds for inpatient admission. In 2012, there were 148,366 sub-centers, 24,049 PHCs, and 4,833 CHCs (CBHI, 2013). **Availability of staff in these primary care facilities is a major concern. For example, specialist shortage at CHCs is nearly 70%** (CBHI, 2013). In the private sector, an array of services is provided, in both urban and rural areas, by solo practices ranging from unregistered "quacks" to registered medical practitioners to small nursing homes and polyclinics. There are estimates that as much as 40% of private care is provided by unqualified providers (MOH, 2014). Patients pay out-of-pocket for the services received. There are no fee schedules.

Outpatient specialist care - In government health facilities, salaried, full-time specialists are located at CHCs and district hospitals. Usually, choice is limited in rural areas. These specialists are not permitted to work in private practice in most states. In the private sector, there is a huge choice of specialists, especially in urban areas. Consultation fees vary, as there is no fixed fee schedule and they operate from their own clinics, hospitals, polyclinics or from speciality hospitals. Private specialists are commonly visited by upper- and middle-class urban residents.

Hospitals - District hospitals function as the secondary tier of public providers for the rural population (MOH, 2011). The average population served per public bed is 1,946. Of a total of 628,708 government beds, 196,182 are in rural areas (CBHI, 2013). There has been a major expansion of the private hospital sector recently and government-sponsored health schemes rely on private hospitals as a part of public–private partnerships. **Between 2002 and 2010, the private sector created more than 70% of new beds, contributing 63% of total hospital beds. The private sector currently provides about 80% of outpatient care and 60% of inpatient care (MOH, 2014).** In addition, about 80% of doctors, 26% of nurses and 49% of beds are in the private sector.

Private-sector hospitals range from small, family-run general hospitals to corporate facilities providing super-speciality tertiary care. There has also been a considerable expansion in tertiary care service providers in recent years, mostly in the private sector. The need for tertiary care is growing, but the costs are growing even

faster and have become prohibitive (MOH, 2014).

Major Health Concerns

Among the main concerns in India is the high vulnerability of young children. Children under five are born underweight (43.5%, the highest percentage in the world) and roughly 6.6% die before their fifth birthday (compared to 0.8% in the U.S.). Only 30% of the population has access to quality sanitation and this figure dips below 20% when focusing solely on the rural population. The final concern is disease. The top three are malaria, tuberculosis, and diarrhea. Combined, these health concerns have hindered India's life expectancy: 63 for males and 66 for females, which is considerably lower than the United States life expectancy of 69 and 75 respectively.

Mental health is one of the most neglected areas of India's health system. India has less than 21% of the psychiatrists its population needs and less than 2% of clinical psychologists and social workers required (CBHI, 2013). Attempts are being made to rectify the situation. Furthermore, to address the gap in mental health resources and increase training capacity, 10 centers of excellence and 23 postgraduate departments in mental health specialties have been established across the country.

Strong Growth in Healthcare Expenditure

• During 2008-20, the market is expected to record a CAGR of 16.5 %.

• The total industry size is expected to touch US$ 160 billion by 2017 and US$ 280 billion by 2020.

Healthcare has become one of India's largest sectors - both in terms of revenue and employment. Healthcare comprises hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance and medical equipment. The Indian healthcare sector is growing at a brisk pace due to its strengthening coverage, services and increasing expenditure by public as well private players. Indian healthcare delivery system is categorized into two major components - public and private. The Government, i.e. public healthcare system comprises limited secondary and tertiary care institutions in key cities and focuses on providing basic healthcare facilities in the form of primary healthcare centers (PHCs) in rural areas. The private sector provides majority of secondary, tertiary and quaternary care institutions with a major concentration in metros, tier I and tier II cities.

India's competitive advantage lies in its large pool of well-trained medical professionals. It is also cost competitive compared to its peers in Asia and Western countries. The cost of surgery in India is about one-tenth of that in the US or Western Europe. This aspect of healthcare makes it a popular destination for medical tourists. It is also a top destination for medical tourists seeking alternative treatments, such as ayurvedic medicine and a popular destination for students of alternative medicine.

India's competitive advantage lies in its large pool of well-trained medical professionals.

Market Size - The medical devices sector is the smallest piece of India's healthcare pie. However, it is one of the fastest-growing sectors in the country like the health insurance marketplace. Till date, the industry has faced a number of regulatory challenges which has prevented its growth and development. **Recently, the government has been positive on clearing regulatory hurdles related to the import-export of medical devices and has set a few standards around clinical trials.** The overall Indian healthcare market is worth around US$ 100 billion and is expected to grow to US$ 280 billion by 2020. Healthcare delivery, which includes hospitals, nursing homes, diagnostics centers and pharmaceuticals constitutes 65 % of the overall market. The Healthcare Information

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Technology (IT) market which is valued at US$ 1 billion currently is expected to grow 1.5 times by 2020. Over 80% of the antiretroviral drugs used globally to combat AIDS (Acquired Immuno Deficiency Syndrome) are supplied by Indian pharmaceutical firms. There is a significant scope for enhancing healthcare services considering that healthcare spending as a percentage of GDP is rising. Rural India, which accounts for over 70% of the population, is set to emerge as a potential demand source. India requires 600,000 to 700,000 additional beds over the next five to six years, indicative of an investment opportunity of US$ 25-30 billion. Given this demand for capital, the number of transactions in the healthcare space is expected to witness an increase in near future. The Indian medical tourism industry is pegged at US$ 3 billion per annum, with tourist arrivals estimated at 230,000. The Indian medical tourism industry is expected to reach US$ 6 billion by 2018, with the number of people arriving in the country for medical treatment set to double over the next four years. With greater number of hospitals getting accredited and receiving recognition, and greater awareness on the need to develop their quality to meet international standards, Kerala aims to become India's healthcare hub in five years. A total of 3,598 hospitals and 25,723 dispensaries across the country offer AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy) treatment, thus ensuring availability of alternative medicine and treatment to the people. The hospital and diagnostic centers attracted Foreign Direct Investment (FDI) worth US$ 3.59 billion between April 2000 and March 2016, according to data released by the Department of Industrial Policy and Promotion (DIPP).

Pharmaceutical Sector - India is often referred to as the 'pharmacy of the global south', supplying affordable, life-saving, quality generic medicines to both developing as well as developed world, yet, fifty to sixty-five percent of people in India lack regular access to essential medicines. Around 80% of the market is composed of generic low-cost drugs which seem to be the major driver of this industry. According to the Indian Brand Equity Foundation (IBEF), India is the third-largest exporter of pharmaceutical products in terms of volume. Accordingly, most of the research budget in Indian pharmaceutical companies is oriented at developing processes for synthesizing drugs, rather than drug development. The increase in the ageing population, rising incomes of the middle class and the development of primary care facilities are expected to shape the pharmaceutical industry in the future. The government has already taken some liberal measures by allowing foreign direct investment in this area which has been a key driving force behind the growth of Indian pharma.

The Indian medical tourism industry is pegged at US$ 3 billion per annum, with tourist arrivals estimated at 230,000.

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Examples on Indian Healthcare

PREGNANCY AND CHILDBIRTH

A 23-year-old woman is pregnant.

Ms. Poonam lives in rural Uttar Pradesh, where the maternal mortality ratio is 292 per 100,000 live births (as compared with 66 in Kerala — the health outcomes of pregnancy vary widely among the Indian states). Like many people in her state, she is illiterate and part of a socially disadvantaged community. She had her first delivery at home when she was 18 years of age, with a traditional birth attendant (dai) present. She had two miscarriages in later pregnancies.

Her antenatal checkups and advice are provided at the village by an auxiliary nurse midwife at the Anganwadi Centre, which provides nutritious meals to preschoolers. As advised by an ASHA (accredited social health activist), a village woman who functions as a community health worker, and encouraged by government cash incentives, she decides to have her latest delivery at a health facility.

When Ms. Poonam's labour pain starts around 11 a.m., her family informs the ASHA, who calls for an ambulance (specifically designated for delivery cases), which takes an hour to arrive. She reaches the nearest health facility (primary health centre) 2 hours later, but the nurse who examines her informs her that the baby is in breech position and the facility is not equipped to handle her case. She is referred to the district hospital, 50 km away, which takes another hour to reach.

The maternity department at the district hospital is crowded, and it takes another hour before Ms. Poonam is examined and taken to the labour room. She is in great pain and as her condition worsens, the staff finally conducts an assisted delivery at 5:30 p.m. Her family is asked to buy medicines and cotton pads from a private pharmacy, though the government scheme theoretically provides for zero-cost care. Ms. Poonam is not charged for her hospitalization or medical care.

After discharge, she returns to her village. The ASHA visits her at home over the next 7 weeks, to inquire about her health and that of the baby.

MYOCARDIAL INFARCTION

A 45-year-old man with no known previous health conditions has a myocardial infarction *(the average age of the first myocardial infarction in India is a decade earlier than in Western countries).*

Mr. Rajesh, employed as a low-paid salesperson in a garment shop in Delhi, develops severe chest pain early in the morning. His wife, who is unaware of any emergency transport service, calls a neighbour for help. Together, they transport Mr. Rajesh by taxi to a nearby clinic. After an electrocardiogram, the doctor advises that he be taken to a large hospital because the heart attack cannot be managed in his small clinic.

Without even receiving aspirin, Mr. Rajesh is moved to a nearby private city hospital. Since he is uninsured, he is told that he will have to pay up to $8,000 (U.S.) for an admission that involves angioplasty and intensive care but that treatment with a clot-dissolving drug would bring the cost down to about $4,000. When Mr. Rajesh says he cannot afford either option, he is advised to go to a government hospital.

He is rushed to the All India Institute of Medical Sciences, where the treatment is provided free and the total cost of hospitalization is less than $100, under a special program (though he's told that even in other government hospitals, the cost usually does not exceed $1,000). Mr. Rajesh undergoes a successful angioplasty and recovers uneventfully.

He is provided free drugs while he is in the hospital, but he begins to worry about the cost he has to bear for long-term treatment with multiple drugs after discharge. He is advised that generic drugs that cost less are widely available. He responds that they, too, will cost more than his salary can bear. His doctor nods sympathetically, knowing that her ability to comfort him is constrained by a system that does not provide for universal health coverage.

Sources: *http://www.nejm.org/doi/full/10.1056/NEJMp1414214?af=R&rss=currentIssue#t=article*

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Prescribing More Exercise Instead of Medication for Patients

Exercise is known to be an effective way to reduce the risk of cardiovascular heart disease (CHD) and even some cancers, but what about exercise as a way to rehabilitate CHD and cancer patients?

As well as its proven preventative benefits there is a growing body of scientific evidence that exercise is beneficial as a treatment for those undergoing treatments for these diseases. According to a meta-study entitled Exercise in Cancer published in the Indian Journal of Medical and Paediatric Oncology, physical exercise has the ability to attenuate the effects of cancer. Exercise also helps cancer survivors cope with and recover from the side effects of treatment and may improve the health of long-term cancer survivors. There is also sufficient evidence to promote exercise in cancer survivors following careful assessment and tailoring of exercise prescription. However, in spite of increasing evidence from a multitude of studies, many healthcare providers have yet to integrate exercise as an essential part of treatment for cancer and heart disease. Organisations such as the United-States based Exercise Is Medicine (EIM) were founded to make more healthcare practitioners aware of the scientifically proven benefits of physical activity and to ensure that prescribing exercise became a standard protocol not only in the United States but also around the world. Launched in Changi General Hospital in 2011, the Singapore chapter of EIM is campaigning for healthcare providers to either prescribe physical activity to patients or to refer patients to certified health and fitness professionals to get a physical activity prescription. The Singapore chapter also aims to put in place a framework for allied health and fitness professionals to work with physicians in implementing exercise plans for their patients.

Dr Benedict Tan, Chairman (EIMS)

However, integrating medical treatment with an exercise regimen for cancer and CHD patients has its challenges. Dr Benedict Tan, Chairman for Exercise is Medicine Singapore (EIMS) reveals, "When we asked healthcare practitioners why they were reluctant to prescribe exercise to their patients in our survey, they gave two reasons: the lack of time and the lack of confidence. Most countries — whether in Asia or in the West — suffer from a shortage of doctors which means that doctors can only spend a limited amount of time per patient. Additionally, exercise prescription is not taught in undergraduate medical school curricula, so it is not surprising that doctors cite a lack of confidence in prescribing exercise to their patients. EIMS aims to address these two main barriers by training the doctors to prescribe exercise in a quick and efficient way." The framework for an integrated treatment and exercise regimen allows for doctors to prescribe exercise to their patients without having to supervise them through each workout. This is where allied health and fitness professionals can support the doctor by supervising the patients through the exercise programme based on what the doctor has prescribed. Dr Tan adds, "In that way it is no different from a doctor writing a drug prescription, and the patient taking the prescription to the pharmacist to be filled." Health and fitness professionals can opt to undertake a credentialed programme designed by the EIMS that will give them access to the medical community as well as enjoy numerous additional benefits. In addition to having a recognised credential that allows them to work with chronic disease patients cleared by physicians to embark on an exercise regimen, certified trainers will be included in a referral list circulated to healthcare practitioners such as doctors and physiotherapists who are looking for certified fitness professionals to work with their patients. To ensure patient compliance outside of workouts, Dr Benedict Tan recommends wearable tech. He says, "In addition to motivating the patient to exercise, wearable technology can help to quantify and monitor the exercise effort and measure the outcomes." With telemedicine gaining momentum in hospital management systems worldwide, it's essential that data gathered from wearable tech is fed back to caregivers so that they are able to refine the exercise programme to maximise patient benefits. Dr Benedict Tan, who gave a keynote speech at the MEDICINE + SPORTS CONFERENCE in Singapore last September said, "Conferences such as this serve as platforms where gaps in healthcare can be highlighted to relevant stakeholders, so that stakeholders can be an active part of the solution, to ultimately achieve better patient outcomes." MEDICINE + SPORTS CONFERENCE was co-located with MEDICAL FAIR ASIA, a leading medical conference and trade exhibition in the region, at Marina Bay Sands Singapore.

For more information, visit http://www.medicalfair-asia.com/

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Concentrated Growth Factors (CGF)

An important tool in regenerative medicine

Authors: Dr. Paola Pederzoli - Gregorio Martínez-Sánchez, Ph.D

Circulating progenitor cells CD34+ derived from bone marrow contribute towards remodelling and repair in tissue lesions[1]. Platelet activation enables access to autologous growth factors which by definition are neither toxic nor immunogenic, and are therefore capable of accelerating normal bone regeneration processes. In general, a great number of studies on PRP (Platelet-Rich Plasma) demonstrate that it stimulates the proliferation and differentiation of fibroblasts, osteoblasts, chondrocytes and mesenchymal stem cells[2,3]. Therefore PRP can be considered a useful tool for bolstering regenerated bone tissue quality[4] ,the healing of wounds, the healing of imperfections[6] in soft tissues associated with chronic tendon lesions which fail to heal, including lateral epicondylitis, plantar fasciitis and cartilage degeneration[2]. Concentrated Growth Factors - CGF are an autologous product which concentrates a large number of growth factors as well as CD34+ stem cells in a small volume of plasma. Blood is an optimal source in most tissue engineering techniques for the healing of large lesions. CGF (the second generation of PRP) functions as a fibrin tissue adhesive with haemostatic and tissue sealing properties, but it differs from fibrin glue and other tissue adhesives poor in platelets, because its platelets have the unique ability to promote wound healing and improve osteogenesis. CGF is an immediate haemostatic, biocompatible, safe and effective surgical agent. It accelerates endothelial, epithelial, and epidermal regeneration, stimulates angiogenesis, boosts collagen synthesis, favours soft and hard tissue healing, reduces dermal scarring, enhances the haemostatic response to lesions, and contrasts the inhibition of wound healing caused by glucocorticoids. The high concentration of leukocytes in CGF also confers an antimicrobial effect upon it. Furthermore, lipoxin A4 released by platelets confers an anti-inflammatory effect[11].

CGF ha an extremely broad range of clinical healing applications: in head and neck surgery, otolaryngology, cardiovascular surgery, in the field of burns and wound healing oral, oral and maxillofacial surgery, cosmetic surgery and periodontal ligament disease.

CGF ha an extremely broad range of clinical healing applications: in head and neck surgery, otolaryngology, cardiovascular surgery, in the field of burns and wound healing oral, oral and maxillofacial surgery, cosmetic surgery and periodontal ligament disease.

Mechanisms

Haemostatic response to injury: the initial vascular response to a lesion foresees the release of factors which attract circulating subendothelial platelets and activate coagulation proteins. Platelets respond by aggregating and adhering to the site of injury, where they release granules containing serotonin, thromboxane and adenosine, in order to initiate coagulation and the formation of fibrin. Local thrombin production improves platelet activation and the subsequent formation of a haemostatic plug, which further reduces bleeding. Thrombin production and platelet activation also initiate the wound healing process through the activation of thrombin-dependent cells and platelet-dependent angiogenesis. CGF mimics the last step of the coagulation cascade, namely the formation of a fibrin clot.

Concentrated growth factors

CGF produces a beneficial effects through the degranulation of platelet alpha granules which contain growth factors deemed to be important in the initial phase of wound healing. When thrombin-activated biphasic platelets in CGF aggregate, they release growth factors along with other substances that accelerate the wound-healing process, thus increasing cellular proliferation, matrix formation, osteoid production, connective tissue healing, angiogenesis and collagen synthesis. The first step, namely the active secretion of these growth factors, occurs within minutes from the start of the coagulation sequence, and over 90% of growth factors are secreted during the first hour over the first 3 days. After this initial burst, platelets secrete additional growth factors for the remaining 7 days of their viability. Macrophages then arrive due to platelet-stimulated vascular growth, and regulate wound healing by secreting addi-

tional quantities of some of the same growth factors. The wound healing rate is determined by the quality of platelet concentration in the blood clot within the graft or wound. CGF identifies and bolsters this initial number. CGF contains autologous osteoinductive platelet growth factors and an osteoconductive fibrin matrix[7]. The following are also present in CGF: TGF-b1, VEGF and CD34+ cells[8]. The use of CGF leads to excellent healing of critical-size bone defects in vivo[7], hair loss[9] in cases where the peripheral area is compromised, and myocardial ischemia[10].

Physiological outcome: heeling of lesions

Studies carried out on humans have shown that CGF can be advantageous and easily applicable in surgery and therapy. CGF has been used in patients undergoing cosmetic surgery, including facelifts, breast augmentation, breast reduction surgery and other types of surgery. The application of CGF with adequate haemostatic yield in case of platelet-poor plasma (PPP) was also applied in the creation of a seal to halt bleeding. PPP contains much higher quantities of fibrinogen, albumin, white cells, soluble cytokine. It was reported that bleeding capillaries were effectively sealed within three minutes after application of PRP and PPP. An advantage was noted in the possible reduction of electrocautery, thus limiting the risk of damage to adjacent nerves. Furthermore, CGF in addition to CD34+ stem cells, produced significant benefits in terms of accelerated wound healing, soft tissue repair and new bone formation.

Contra-indications

Treatment with autologous CGF is generally considered to be safe in adequately assessed patients. Potential candidates for CGF treatment should undergo a pre-treatment haematologic evaluation to rule out potential coagulopathies and platelet function disorders. Anaemic patients and those affected by thrombocytopenia may be unsuitable candidates for CGF treatment. Other potential contraindications include haemodynamic instability, severe hypovolemia, unstable angina, sepsis, anticoagulant or fibrinolytic drug therapy.

Conclusions

Autologous CGF is basically a new autograft biotechnology which has yielded promising results in the stimulation and acceleration of soft tissue, as well as the healing and formation of bone tissue. The effectiveness of this treatment consists of the local delivery of a wide range of growth factors and proteins which mime and support physiological wound healing, the tissue repair process and local infiltration therapy.

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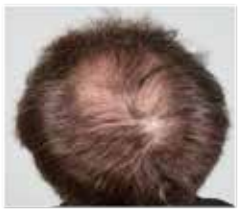

Autologous CGF is basically a new autograft biotechnology which has yielded promising results in the stimulation and acceleration of soft tissue, as well as the healing and formation of bone tissue.

Donald Trump in the White House: Implications for the Future of the TPP and Free Trade in ASEAN

US president-elect Donald Trump's opposition to the Trans-Pacific Partnership (TPP) is well-known and the future of the trade deal is now on tenterhooks. For the supporters of the TPP, Trump's victory has meant that their worst fears are now going to unfold. Opponents of the trade deal are rejoicing at their expectation that Trump will now move quickly to fulfill one of his most controversial campaign promises – to abandon the TPP. Any prospects of the US renegotiating the TPP are not only bleak but also impractical – the trade deal was seven years in the making, meticulously negotiated and involved compromises from several countries on both sides of the Pacific.

Implications for ASEAN

So now if the US does ultimately withdraw from the TPP, what implications will this have for free trade in the ASEAN region? Before analyzing this, it should be kept in mind that TPP's potential failure is unlikely to have any significant immediate economic impact on the region. It was not a trade deal in force, but only offered prospects of newer free trade rules coming into effect in the near future. Instead of being a step backwards, it is more a lack of further progress as far as development of free trade in the region is concerned. Brunei, Malaysia, Singapore and Vietnam are the four ASEAN member states who are parties to the TPP, and of them, only Singapore has a separate FTA with the US. While some of them - especially Singapore and Vietnam - acknowledge that the TPP is now in jeopardy, they have made it clear that they will move forward in negotiating their own FTAs with other countries in the Asia-Pacific region. Among the ASEAN members, Vietnam was widely considered as the country most likely to get an immediate economic boost from the TPP.

According to Vietnam's Minister of Trade and Industry Tran Tuan Anh, the country will continue reforms to improve its business and investment environment and negotiate other agreements whether US president-elect Donald Trump thwarts the TPP or not. Deputy Prime Minister and Foreign Minister Phạm Binh Minh stated that if the TPP is not ratified, it will be considered a setback, as countries spent much time and effort on the negotiation process. However, he noted that besides the TPP, Vietnam has concluded FTAs with many other partners, including the European Union (EU). Deputy Minister of Industry and Trade Do Thang Hai said that with or without the TPP, Vietnam's policy towards international economic integration will remain unchanged. An ardent supporter of the TPP, Singaporean Prime Minister Lee Hsien Loong has stated that he feels "disappointed that the TPP looks very unlikely, or will not be passed, or ratified now" as reported by The Straits Times. The newspaper quoted him referring to Trump: "He had no sympathy for the TPP at all and I think that's a disappointment to all of us who worked so hard to negotiate the TPP".
In reply to queries if the TPP could be salvaged if its terms are renegotiated or possibly changed to include countries like China, Lee said, "It's not so easy to say we change the terms, what are you going to change?… And if you bring in a new country, it would be a completely new deal altogether because a new country, particularly if it's a big one, is not going to sign on to everything which has already been agreed before they were participants".

The Road Ahead

China is likely to gain from potential US abdication of the TPP. China is the key driver behind the Regional Comprehensive Economic Partnership (RCEP), a trade agreement between the 10 members of ASEAN, as well as Australia, China, India, Japan, New Zealand and South Korea. In the event that the TPP fails, the momentum towards the RCEP is likely to gain strength as China is likely to push for a successful conclusion. Japan, a key US ally who viewed the TPP as an effective mechanism to contain China's growing economic clout in the region, has indicated willingness to turn towards the RCEP. Japanese Prime Minister Shinzo Abe has recently stated that there is now "no doubt there would be a pivot to the RCEP if the TPP doesn't go forward". He added that Japan "will shift focus to RCEP should the TPP not go ahead".
Leaders of Asia-Pacific countries, including the US, Japan, Australia and China, are scheduled to meet during the upcoming Asia-Pacific Economic Cooperation (APEC) annual summit in Lima, Peru on November 19-20. China's President Xi Jinping is expected to garner support for the RCEP from Asia-Pacific countries during the summit. Unlike most other free trade agreements, the TPP included some special provisions on areas such as labor standards, governance and transparency standards, and environmental and intellectual property protection. RCEP, on the other hand, does not include provisions that emphasize protection of intellectual property, free flow of information or the leveling the field between private businesses and state-owned enterprises.

With the dimmed prospects of the TPP, it is now possible that countries, such as Vietnam and Malaysia, which had made substantial compromises on issues such as labor rights, will now have to move on to other deals. The RCEP, for instance, could be a viable alternative for Vietnam in the event that the TPP fails to go ahead. Vietnam stands to gain from increased sourcing of production from such RCEP member countries as Japan, South Korea and China. Like Vietnam, countries involved in the TPP will have Plan B's. However, as New Zealand's ambassador to the US remarked recently, "The tragedy would be that the Plan B's we have would not include the United States".

***Source**: This article was first published on http://www.aseanbriefing.com/news/2016/11/16/donald-trump-tpp-asean.html*

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Among the ASEAN members, Vietnam was widely considered as the country most likely to get an immediate economic boost from the TPP.

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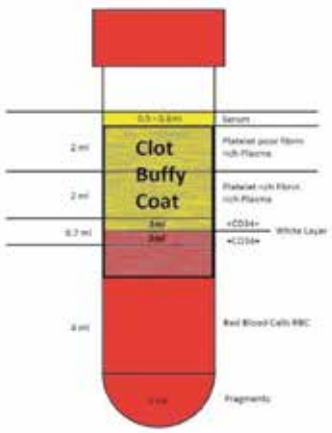

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Faraday Cage for MR: criticality and development

Authors: Ing. Marco Melfi - Dott Felice Vassallo, S.S.P Srl Saleno - Dott. Luciano Villarboito, A.O.U. "Maggiore della Carità" Novara

The Faraday Cage is a container made from electrically conductive material distributed in a continuous mode, which allows to isolate the internal environment from electromagnetic fields coming from outside.

The **Faraday Cage** is an indispensable device for the correct operation of an MR. Basically the production of useful signal of a MRI takes place through the reception of a weak RF signal coming from the subject under examination (after appropriate modification balance of the hydrogen nuclei within the static magnetic field).The Faraday Cage is a container made from electrically conductive material distributed in a continuous mode, which allows to isolate the internal environment from electromagnetic fields coming from outside. Electric *"Conductivity"* then, is the first key word detected, *"Continuity"* is the fundamental other. The term "Cage" in fact indicates that the structure is completely closed on all sides, it is continuous from the electrical point of view.

At this point it is natural to identify what are the critical issues in the design and in the construction of Faraday cages for Magnetic Resonance Imaging.

First, the material to be used, in addition to being a good conductor, must present of good processing properties to allow an easy assembly, without deformation and ensure excellent continuity and low losses due to the Joule effect.

All the opening points, or of interruption of continuity, also they represent an essential critical to consider, for the correct operation of an MR tomograph after the installation of the cage.

We illustrate in outline what are these problems, many of which will be obvious but not trivial in their management

1. Door: The cage must necessarily be equipped with a door for input and output of operators and patient. Once closed must ensure electrical continuity on that ground has the edges of beryllium copper shielding joints (finger strips) that should be periodically inspected, cleaned and if necessary replaced.

1

2

2. Patient Observation Window: is another critical, in fact constitutes a further interruption of electrical continuity of the cage. To cope with this, the observation window of the patient is generally realized with fine mesh of conductive material interposed in glass panels, in order to obtain the right compromise between visibility inside the magnet room and electrical continuity.

3. Filters Panel: is the interface between technical room, closets and magnet room, is the main point of passage of signal cables and power with the help of special electric filters and waveguides. It 'a very delicate point of opening as, if not well planned, RF noise may enter the interior of the cage "guided" by directly connecting cables.

4. Aeration lines: another point of opening of the cage mandatory for connection of lines for the regular ventilation and emergency. The interface is realized through special filters said "honey comb" which today constitute the best compromise for this type of pipeline.

5. Quench Tube: is one of the most important critical in the design and realization of a faraday cage as it allows the controlled discharge of large quantities of cryogen gas. Even the conduct of Quench be isolated from the cage, but in this case the main problem is that of an appropriate design that supports the enormous overhang of pressure and low temperatures in the case of Quench.

The challenge in the realization of increasingly powerful Cages is obviously critical in the optimization of the above but also in the search for materials with high attenuation that offer quick installation and good durability.

Too be continue…

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5

Offering Israel's Knowledge and Technologies to the World's Health and Medical Device Eco-System

Israel is well known for its innovative medical device industry and this sector has been steadily growing in the last three decades. Some 40 new companies are formed each year and today there are over 1,200 active life science companies. In a relatively short period of time, an impressive 34 percent of these companies are already generating revenues. It seems that Israel's entrepreneurial ecosystem was able to create opportunities for start-ups to become advanced, commercially viable and promising businesses, while introducing creativity and innovation into the field. Furthermore, one of Israel advantages in that field is the interdisciplinary approach that combines scientists and engineers from different fields, who have integrated advanced technologies in electronics, communications and electro-optics to develop world-class innovations in Digital Imaging, Medical Lasers, Telemedicine, Early Diagnostic and Smart Surgical equipment and more. "As proof of the industry's development, last year life science exports reached $8 billion, growing steadily since 2008", says **Angela Rabinovich**, Director of Life Science Department at the Israel Export Institute, who is the organizer of the Biennial Medical Devices & HIT Conference, to be held on March 06-09, 2017, at the Tel Aviv Convention Center in Israel. The conference is organized in cooperation with the Ministry of Economy and Industry, the Ministry of Health and the Ministry of Foreign Affairs. "There is no other country in the world that can display such a concentration of medical device and healthcare information technology companies", she adds. "We are talking about companies rooted in top international academic and research institutions; staffed by highly educated and skilled teams; operating within entrepreneurial and audacious goals offering a variety of innovative medical solutions and technologies that answer today's healthcare challenges such as: lowering the overall healthcare costs and meeting the world's evolving needs of aging populations, while creating significant investor value. "The issue of aging population, for example, imposes a heavy burden on the health systems in the West since the treatment of chronic and degenerative diseases is a long-term and costly challenge. The issue also weighs heavily on developing countries that are in the midst of transition from a focus on infectious diseases that were characteristic of the developed world in the past to modern health services and infrastructures in the present time. In many places of the world, such as Africa, we are talking about improving the infrastructure of basic medical service providers, while dealing with the lack of professionals in the field. It is clear that the world needs better health services and that modern and computerized equipment can support that end". "In a broader sense, we are talking also about Wearable devices and mApps to gather Data Assets and Artificial Intelligence to make sense of it; Sensitive Data Protection by the Israeli Cyber community known as the best in the world; amazing Point of Care Diagnostic tools; Virtual and Augmented Reality for Training, Treatment & Rehabilitation; technologies to improve Hospital Efficiency; power of multi-disciplinary advances Manufacturing Solutions and more".

What is the Main Purpose of the Upcoming Conference?

"We would like to exhibit our strengths and capabilities in the various sub-sectors of medical device and HealthCare IT field to HealthCare IT providers and integrators, hospital directors and managers who are responsible for the procurement and purchase of medical supply, from all over the world, and to all of those who engage in the health and medical device industry. I believe we have much to offer them since many of our technologies can provide solutions to the challenges facing the health systems today, such as the longevity of a population, the growing demand for personal medicine, the need for better efficiency of hospital management and the streamlining of the functioning of hospitals, the need for precise and early diagnosis, etc."

The last day of the conference is devoted to Professional Tours at leading Israeli Hospitals with cutting edge of Medical Excellence!

What are the Main Markets you are Targeting?

The US, of course, is a dominant market for us, mainly in the fields of medical computing and software that can collect and analyze information from various sources and also in the field of cybersecurity solutions. Vis-à-vis Europe, we would like to focus on solutions for the aging population and also on services that apply for the developing market of Participatory Medicine / Hyper Connected Patient and Consummation of HealthCare services, in which the patient himself decides on the proper medical treatment. For Latin America we would like to offer means that provide accessibility to modern health services for verity of degenerative and chronic diseases. With reference to Asia Pacific region, we would like to focus also on personalized medicine".

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The international exhibition BULMEDICA / BULDENTAL will be held from 17 to 19 May 2017 at Inter Expo Center

Until 30 January the exhibitors will enjoy a 10 % discount on unbuilt exhibition space

The specialized international exhibition BULMEDICA / BULDENTAL will be held from 17 to 19 May 2017 at Inter Expo Center - Sofia. During the 51th edition of the forum Bulgarian and foreign companies will build their booths, presenting the latest technologies, equipments, products and methods of medical treatments. The format of the exhibition suggests an increase in the number of companies and visitors in 2017, while the exhibitors can benefit from a 10% reduction for unbuilt exhibition space until 30 January 2017.
In the course of its operation within more than half a century, the forum BULMEDICA / BULDENTAL has became a leader in this sector. Each year within three days the exhibition attracts hundreds of exhibitors and thousands of visitors. The event is unique for its comprehensive character, bringing together manufacturers of technologies, products and software for the medical and specialized audiences. Bulgarian and international experts organize conferences, company presentations and seminars, while the physicians and researchers have the opportunity to make their first professional steps, conducting workshops and free consultations.
Due to all these features, BULMEDICA / BULDENTAL is said to have made a significant contribution to the quality of healthcare in Bulgaria and for the novelties in the sector, which is directly related to the activities of all physicians and healthcare professionals. The event is organized under the patronage of the Ministry of Health in Bulgaria with the support of professional organizations such as Bulgarian Medical Association, Bulgarian Dental Association, Bulgarian Union of Dental Technician, the Association of Dental Dealers in Bulgaria and Bulgarian Pharmaceutical Union.

In 2016, there were presented 150 innovative products
More than 13,000 visitors have attended the 50th jubilee edition of the exhibition in 2016. Experts in the field of healthcare and dental medicine had the opportunity to review products by more than 800 companies from 40 countries. Among the direct exhibitors who outnumbered 200, there were companies from Bulgaria, Germany, Russia, Greece, Israel, Italy, China, Pakistan, Romania, Poland, Slovenia, Taiwan, Turkey. The highlights also included demonstrations of mini-invasive and non-invasive technologies. There were demonstrated over 150 innovative solutions for the healthcare sector.
The exhibition annually undergoes dynamic development – for yet another year it was attended 24 Bulgarian and 22 foreign companies, taking part for the first time. During the forum, there was organized a training by Dr. Arthur Krigsman, who is among the world's best pediatric gastroenterologists and students from the "Skin Care" specialty at the Medical College "Y. Filaretova "- Medical University - Sofia, that hold free consultations for cosmetic care. The young researchers held a two-day satellite symposium, related to clinical evidence of the relationship between the condition of the gastrointestinal system and the development of autistic children.

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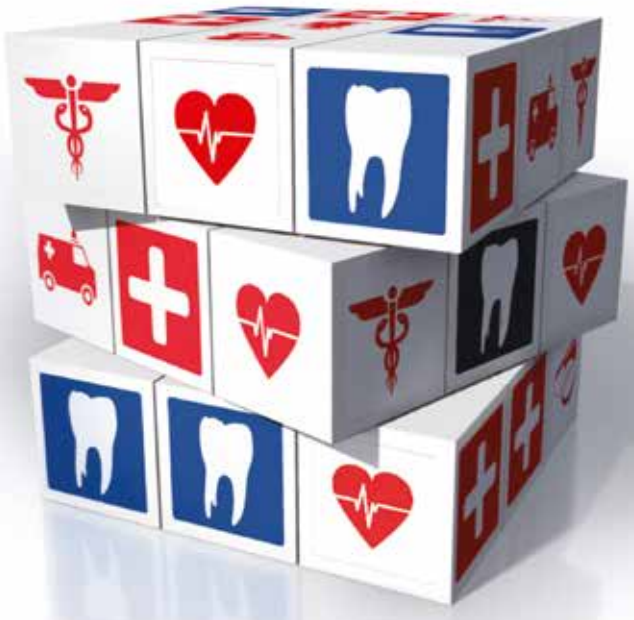

INTER EXPO CENTER • IEC

HIMSS is the global not-for-profit association transforming healthcare through the effective use of information technology and the strategic partnership is being undertaken in order to bring together expertise to provide solutions and boost the use of technology throughout the medical/hospital sector Brazil

UBM Brazil, a division the British group UBM, a global leader in business media and the second-largest events organizer in the world; and HIMSS - Healthcare Information and Management Systems Society, a global non-profit organization, based in the USA and whose focus is to improve health through Information Technology (IT), today (11/30) announced the signing of a cooperation agreement for the organizations to work together in Brazil.

The agreement is with a view to the organization of the HIMSS@Hospitalar summit, during Hospitalar. This collaboration anticipates the provision of specialized content in advanced technology applied to the healthcare sector, a subject that is becoming ever more dominant in the day to day life of hospitals and medical, laboratory and diagnostic service providers, as well as in relationships between patients and their doctors, determining significant changes throughout the healthcare services sector.

The first results of this partnership will be visible at **Hospitalar 2017** (16th to 19th May, 2017, in São Paulo), an event organized by UBM Brazil and a benchmark for Brazil and the entire Latin American market in the supply of solutions, products, services, technology, innovations and equipment for the healthcare supply chain.

"It is with great enthusiasm that we announce this strategic partnership with HIMSS, an organization recognized across the world in the IT sector for healthcare. This cooperation agreement gives is the possibility to offer our attendees and exhibitors an even greater amount of high-quality technology content, as this is what Hospitalar has been doing over the years", said the CEO of UBM Brazil, Jean-François Quentin.

The intention of this cooperation agreement is to add to the initiatives the fair is already promoting. "We are always seeking to broaden opportunities for strengthening relationships and improving business in the technology sector with healthcare sector decision makers. Proof of this was in the launch last year of our Digital Healthcare International Forum", pointed out Mônica Araújo, Event Director. The area of eHealth is one of the sectors where Hospitalar is going to continue to invest, "We believe that technology is changing, and is going to continue to change, the relationship the patient has with the doctor, and this relationship with the whole healthcare sector will also change, which will make improvements possible in the quality of care and bring about reduction in cost for the key players in the sector", said the event director.

"HIMSS global content and expertise will reach the largest possible audience through our partnership with Hospitalar. we are please to bring unique HIMSS programs such as the HIMSS Electronic Medical Records Adoption Model (EMRAM), Healthcare Leadership Training and Personal Connected Health programming to Brazil and Latin America. Attendees should expect to see the best healthcare innovation and practice showcased at the HIMSS@Hospitalar Summit," added Jeremy Bonfini, Executive Vice President of HIMSS International.

About HIMSS

HIMSS is a global voice, advisor, convener, and thought leader of health transformation through the best use of IT with a unique breadth and depth of expertise and capabilities to improve the quality, safety, and cost-effectiveness of health and healthcare. Through its network of over 1 million professionals, including 64,000-plus members, HIMSS advises leaders, stakeholders and influencers globally on IT best practices to ensure decision-makers have the right information at the right time to make the right decisions. HIMSS North America, HIMSS Analytics, Personal Connected Health Alliance, HIMSS Media and HIMSS International (HIMSS Europe, HIMSS Asia and HIMSS Middle East) are the five business units of HIMSS. A not-for-profit headquartered in Chicago, Illinois, HIMSS has additional offices in North America, Europe, United Kingdom, and Asia.

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About the Organiser

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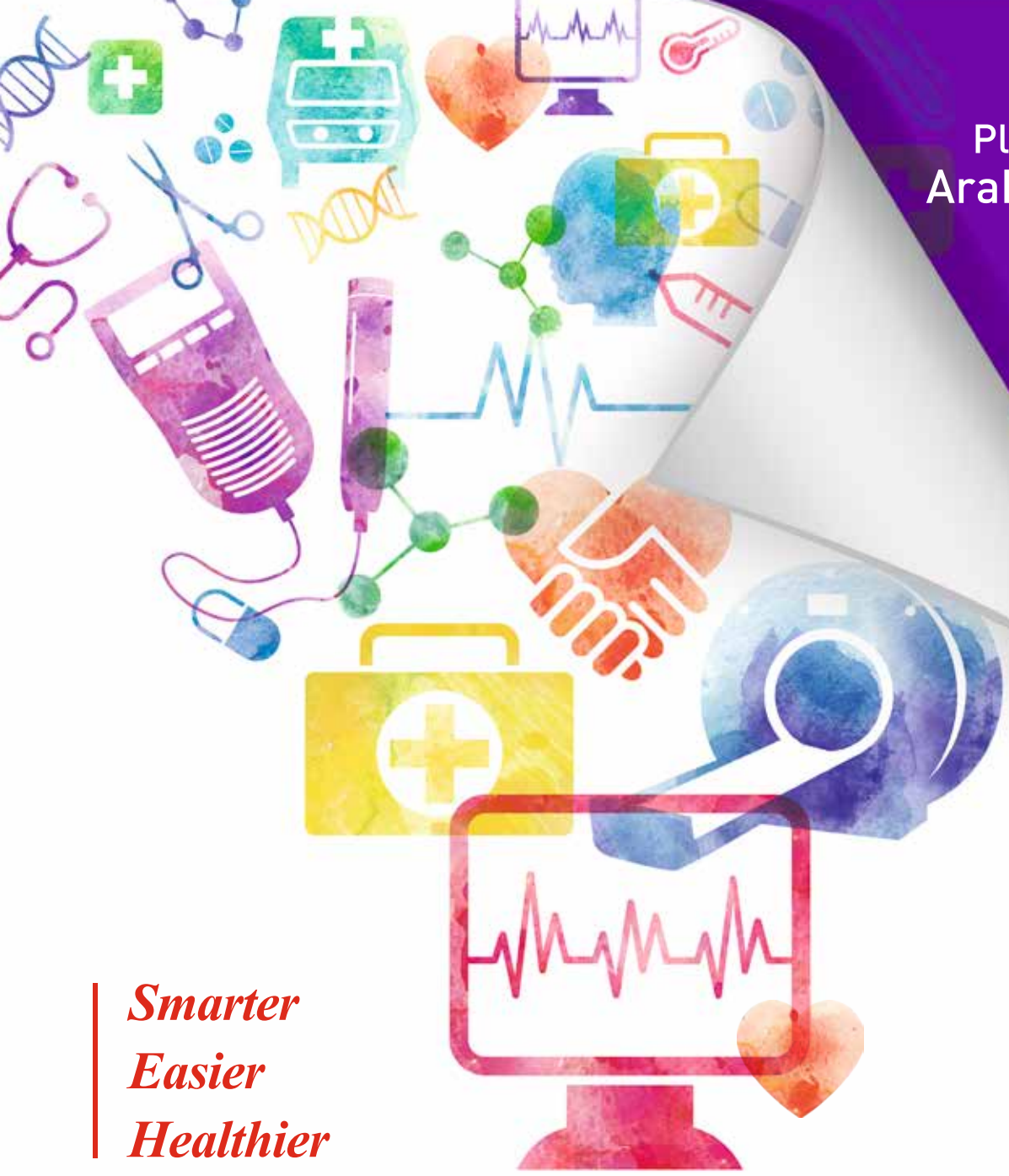
Part of MEDICA – World Forum for Medicine, a global series of medical events, MEDICAL FAIR THAILAND's contribution and growing relevance to the region and its associated industries is further underlined by the endorsement and continued support it receives from hospitals and medical associations all across Asia as well as from the Ministry of Public Health Thailand and the Thailand Convention and Exhibition Bureau.

For more information, please visit *mda.messe-dusseldorf.com*



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January - February

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• **30/01 - 02/02/2017**

Arab Health 2017

(Dubai - United Arab Emirates)

Organized by:
Informa Life Sciences
Gubelstrasse 11,
CH-6300, Zug, Switzerland
Phone: +971 4 3365161

Email:
info@lifesciences-exhibitions.com
Website:
www.informalifesciences.com

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

www.arabhealthonline.com

Infomedix Booth:
Za'abeel Hall Stand Z2 K70

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• **06-09/02/2017**

Medlab 2017 - The World's Largest Attended Laboratory Exhibition and Conference

(Dubai - United Arab Emirates)

Organized by:
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CH-6300, Zug, Switzerland
Phone: +971 4 3365161
Email: info@lifesciences-exhibitions.com
Website: www.informalifesciences.com

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

www.medlabme.com

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• **15-17/02/2017**

Medical Japan 2017 - Medix Osaka 2017 - 3rd International Medical Expo and Conference - 7th Medical Device Development Expo

(Osaka - Japan)

Reed Exhibitions Japan Ltd.
18F Shinjuku-Nomura Bldg.,1-26-2
Nishishinjuku - Shinjuku-ku
Tokyo 163-0570 - Japan
Phone: +81 3 3349 8519
Fax: +81 3 3349 8530
Email: medical-japan@reedexpo.co.jp
Website: www.reedexpo.co.jp
Venue: Intex Osaka
Osaka - Japan

www.medical-jpn.jp/en/

Infomedix Booth: 21-18

24

• **24/26 - 02/2017**

MedHealth Kenya 2017 10th International Trade Exhibition

(Nairobi - Kenya)

Organized by:
Grow Exhibitions
P.O.Box 103574
Dubai - UAE
Phone: +971 4 3964906
Fax: +9714 3964904
Eamil: event@intlexpos.com
Website: www.growexh.com

Contact Person (Exhibiting):
Ms. Maggie Z
Email: maggie.z@growexh.com

Venue: Sarit Expo Centre
Nairobi
Kenya

www.growexh.com/medhealth

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• **27/02-01/03/2017**

Medtrade Spring 2017

(Las Vegas - USA)

Emerald Expositions
31910 Del Obispo, Suite 200
San Juan Capistrano, CA 92675 - USA
Email: info@emeraldexpo.com
Website: www.emeraldexpositions.com

Contacts:
Group Show Director:
Kevin Gaffney, CEM
Phone: +1 770 291 5446
Email: kevin.gaffney@emeraldexpo.com
Marketing Director: Sarah Varner
Email: sarah.varner@emeraldexpo.com

Venue: Mandalay Bay Convention Center
Las Vegas, NV
USA

www.medtrade.com

March

1

• **01-05/03/2017**

ECR 2017 - European Congress of Radiology

(Vienna - Austria)

Organized by:
ESR OFFICE
Neutorgasse 9
1010 Vienna, Austria
Phone: +43 1 533 40 64 - 0
Fax: +43 1 533 40 64 - 448
Email: communications@myesr.org
Website: www.myesr.org

Venue: Austria Center Vienna
Add: Bruno-Kreisky-Platz 1
1220 Vienna - Austria

www.myesr.org/congress/about-ecr/past-congresses/ecr-2015

6

• **06-09/03/2017**

MedinIsrael 2017 - Medical Devices and HIT International Conference

(Tel Aviv - Israel)

Organised by:
The Israel Export & International Cooperation Institute
29 Hamered St.
68125 Tel Aviv, Israel
Phone: +972 3 5142830 / +972 3 5142882
Fax: +972 54 4578668

Sara Sanditen
Email: sara@export.gov.il

Venue: The Israel Trade Fairs Center - Hall 10
Israel

www.medinisraelconf.com

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• **16-19/03/2017**

Kimes 33rd Korea International Medical & Hospital Equipment Show

(Seoul - Korea, South)

Organized by: Korea E & Ex Inc
Rm. 2001, TradeTower, 159-1,
Samsung-dong,
Gangnam-gu, Seoul 135-729, Korea
Phone: +82 2 551 0102
Fax: +82 2 551 0103
Email: kimes@kimes.kr
Website: www.kimes.kr

Venue: COEX (Convention & Exhibition Center)
Add: 159 Samsung-dong,
Gangnam-gu
Seoul - Korea

www.kimes.kr/eng/

Infomedix Booth: D 911

27

• **27-29/03/2017**

Dubai Derma 2017 - The 17th Dubai World Dermatology and Laser Conference & Exhibition, in conjunction with the International Society of Dermatology

(Dubai - United Arab Emirates)

Organized by:
INDEX Conferences and
Exhibitions Org. Est
P.O. Box: 13636, Dubai, UAE
Ibn Sina Medical Complex #27,
Block B
Office 203, Dubai Healthcare City
Phone +971 4 362 4717
Fax +971 4 362 4718
Email: index@emirates.net.ae
Website www.index.ae
Exhibition Booking & Advertisement:
Dr Matios Tcholakian
E-mail: matios.tcholakian@index.ae
Venue: Sheikh Maktoum Hall, Dubai
World Trade Centre
Dubai - UAE

www.dubaiderma.com

30

• **30-03/02/04/2017**

ExpoMED Eurasia 2017

(Istanbul - Turkey)

Organised by:
Reed Tuyap Head Office
E5 Karayolu Uzeri,
Gurpinar Kavsagi
Buyukcekmece
Istanbul - Turkey
Phone: +90 212 867 11 12
Email: expomed@reedtuyap.com.tr
Website: www.expomedistanbul.com

Venue: Tuyap Fair Convention
and Congress Center
Istanbul - Turkey

www.expomedistanbul.com/en/

April

3

• **03-05/04/2017**

Asia Health 2017 - Suntec Singapore Convention & Exhibition Centre

(Singapore - Singapore)

Organized by:
Informa Life Sciences Exhibition
30-32 Mortimer Street, London,
W1W 7RE, UK
Head Office Contact
Phone: +971.4.3365161
Email: info@lifesciences-exhibitions.com

Management Team:

Simon Page (Managing Director)
Email: simon.page@informa.com

Lisa Stephens (Executive Director)
Email: lisa.stephens@informa.com

Venue: Suntec Convention & Exhibition Centre
Singapore

www.asiahealthexhibition.com

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• **06-08/04/2017**

Medical Fair India 2017 - 23rd International Exhibition and Conference

(New Delhi - India)

Organized by:
Messe Duesseldorf GmbH
P.O. Box 10 10 06, D-40001 Duesseldorf
StockumerKirchstraÃŸe 61, D-40474
Duesseldorf
Germany

Email: infoservice@messe-duesseldorf.de
Website: www.messe-duesseldorf.com

Contact person: Mr. Udo Wiemann
Phone: +49 211 4560 7756
Email:
WiemannU@messe-duesseldorf.de

Venue: Pragati Maidan, New Delhi, India

www.medicalfair-india.com

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• **25-27/04/2017**

IMF 2017 - 8th International Medical Forum

(Kiev - Ukraine)

Organized by: LMT Company
Ukraine, 03680
67, Peremohy Ave., Bldg. B, office 322,
03062, Kyiv, Ukraine
Phone: +380442061015
Email: expo@lmt.kiev.ua

For international companies participation in the Forum:
Phone: +380 44 206 1015
Email: expo@lmt.kiev.ua

Venue: KievExpoPlaza Exhibition Center
Add: Salyutna str., 2 B
04111, Kiev, Ukraine

www.medforum.in.ua

May

16

• 16-19/05/2017

Hospitalar 2017 - 24th International event of solutions, products, services, technology, innovation and equipment for the healthcare sector

(São Paulo - Brazil)

Organized by: Hospitalar Fair and Congress
Rua Padre Joao Manuel, 923 - 6Â° andar - 01411-001
Sao Paulo - Brazil
Phone: +55 11 3897 6100
Fax: +55 11 3897 6161
Email: international@hospitalar.com.br

Venue: Expo Center Norte Exhibition Center
Add: Rua Jose Bernardo Pinto, 333, Vila Guilherme
Sao Paulo
Brazil

www.hospitalar.com/pt/

Infomedix Booth: L 84 Green Pavillion

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• 17-19/05/2017

Bulmedica - Buldental 2017 - 51st International Specialized Exhibition for human and dental medicine

(New Delhi - India)

Organized by:
nter Expo Center - Sofia, Bulgaria
Tel: +359 2 9655 220 //
+359 2 9655 279
Fax: +359 2 9655 231
Email: iec@iec.bg
Website: http://bulmedica.bg/en

Project Manager: Gabriela Lubenova
Email: glubenova@iec.bg
Tel: +359 2 4013 279
Fax: +359 2 9655 231
+359 2 4013 231

Venue: Inter Expo Center
Add: 147,Tsarigradsko shose blvd
Sofia - Bulgaria

www. bulmedica.bg/en

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