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Europe & Africa Issue

Inside:



- Focus on:
The Republic of Tatarstan



- **Market Overview:**
Mental Healthcare In Morocco



- Special Report: **Radiology**



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Editorial

Improving Radiotherapy Access Around the World



Just like every year Infomedix 3/2015 (October-December) is our special issue with focus on radiology. This time, I'd like to make a quick reflection on radiotherapy, an essential branch of radiology.

Figures suggest that as many as nine out of ten people in low-income countries cannot access radiotherapy treatment. Even in high-income countries where facilities exist, experts warn that there are shortages of equipment and trained staff. Millions of people globally have died unnecessarily from cancers that could have been treated by radiotherapy.

In low-income countries access is limited, particularly in Africa, where 40 countries have no radiotherapy facilities at all but even in high-income countries, including the UK, Canada and Australia, numbers of radiotherapy facilities, equipment and trained staff are inadequate. The data was presented at the European Cancer Congress in Vienna last September.

Often general practitioners and the public see drugs and surgery as better options also because anti-cancer drugs, backed by the pharmaceutical industry, are better promoted than radiotherapy.

In the public, fewer than one in ten consider radiotherapy to be a modern form of cancer treatment with 40% describing the procedure as frightening. Patients often have misconceptions about the therapy such as becoming radioactive during the treatment.

Twenty years ago the public was told that radiotherapy was a treatment of the past and would be superseded by a magic bullet, but radiotherapy is still a magic bullet. Even people in the profession didn't realize it could become a modern medicine with the use of computer imagery. **New technologies, such as Intensity Modulated Radiotherapy (IMRT), are more effective** at targeting the radiation at the tumor, minimizing damage to nearby tissues and reducing side effects. One of the newest forms of treatment, proton beam therapy, fires particles at a tumor rather than using radiation waves.

International experts are working to expand global access to radiotherapy. Making radiotherapy more accessible for all classes and countries will result in positive health benefits to save and improve the lives of cancer patients and positive economic benefits for low and middle-income populations around the world. Infomedix's goal is to inform and lead our reader to a reflection, with the hope that we might all be part of its expansion.

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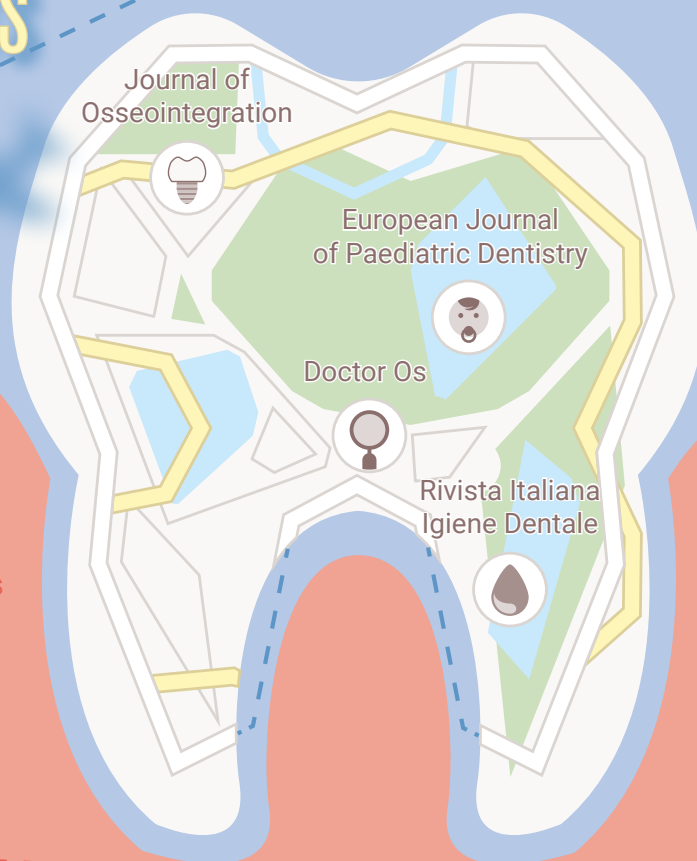
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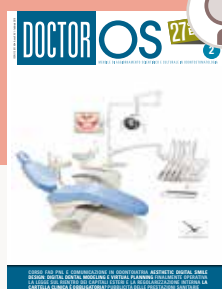
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EARLY CANCER DETECTION

"Pathway Genomics, a privately held diagnostics company based in San Diego, began marketing a blood test in mid-September that it says can detect DNA fragments linked to 10 common cancers in otherwise healthy people..."

Contents

Europe & Africa Issue

Highlights

6-18 Learn more about our Advertiser's Products...

Focus

20-29 Focus on The Republic of Tatarstan

Market Overview

30-39 Mental Healthcare In Morocco

Market Trends

42-44 Early Cancer Detection Blood Test Raising Concern Among Cancer Experts

Hot Topic

46-57 Special Report:
Radiology from the beginning

Flash News

58 Malaysia – The World's No. 1 in Medical Glove, Condoms and Catheters

Exhibition Pre & Post Show Reports

60 Exposanità 2015
61 ECR 2015
62 Medica 2015
64 Zdravooohraneniye 2015

Market Trends

66 Supplying Medical Equipment to Africa

Non-Profit

70 Democratic Republic Of Congo: A Device Designed to Treat Sleep Apnea in Adults Saves Newborns

71 MALI: DECLIC Provides Additional Support in the Field of Mental Health

72 Business Opportunities

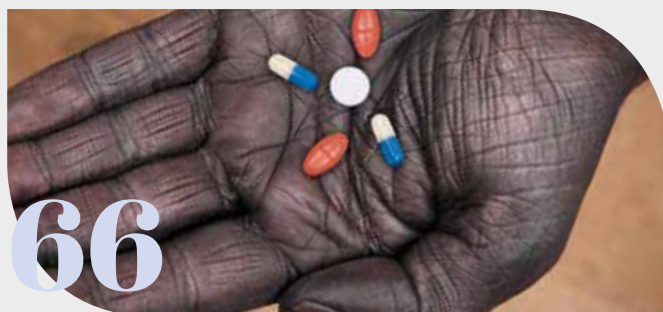
75/79 Exhibition & Congress Calendar

80 What's Next



RADIOLOGY FROM THE BEGINNING

"The development of diagnostic imaging has been the result of a fruitful relationship between doctors, radiographers, physicists and equipment manufacturers. New apparatus has stimulated the introduction of new techniques..."



SUPPLYING MEDICAL EQUIPMENT TO AFRICA

"Healthcare personnel in developing countries mostly complains about the lack of adequate and well functioning medical equipment. Obviously, this shortage affects the quality of care provided and the healthcare workers' spirits..."

Cover page

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ActiveFunCompanyLimited.....	33	IAE.....	III cover	North-SouthernElectronicsLimited.....	69
ALVIOfficineMeccaniche.....	73	IEC Innovative Endoscopy Components.....	II cover	ORSpecific.....	67
Biegler.....	1	J.D. Honigberg International, Inc.....	8-9	Printex Srl.....	35
Bioservice.....	29	KIMESexhibition.....	17	RFMedical.....	13
BMI Biomedical Int'l.....	53	Kugel Medical GmbH & Co. KG.....	71	SHDItaliaS.r.l.....	37
Calze G.T.....	75	Malaysian Rubber Exp.....	IV cover	ITE.....	15
Careray Digital Med.....	56	MedicalJapanexhibition.....	45	THISexhibitions.....	63
ECRexhibition.....	7	Metaltronica Spa.....	57	VillaSistemiMedicaliS.p.A.....	55
Expomed Eurasia exhibition.....	11	Metaltronica Spa.....	10	Zdravookhraneniyeexhibition.....	65
GeneralMedicalMerateS.p.A.....	68	Mocom.....	40 - 41		
HandokMedical.....	18	MyanmarPhar-Medexhibition.....	19		

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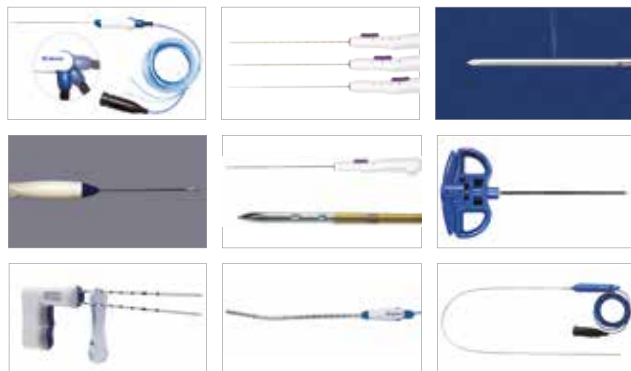
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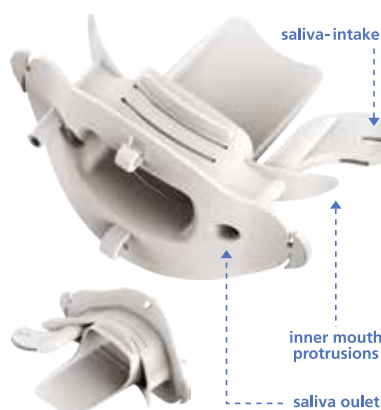
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FOCUS

Republic of Tatarstan

Business Opportunities in a Thriving Russian Region

The Republic's reputation for dynamic development, political stability, low bureaucratic barriers, open dialogue with the government, a well-developed infrastructure and tax preferences are the major reasons to invest in Tatarstan.

Author: Silvia Boriello



The Republic of Tatarstan is one of the biggest and most dynamically developing regions of the Russian Federation with tremendous potential for attracting foreign direct investment. Thanks to the effective work of the Government of Tatarstan in raising the attractiveness for investment and setting up support for investors, the republic holds a leading position among Russia's regions in terms of economic growth and ease of doing business.

The Republic of Tatarstan, a constituent republic of the Russian Federation, is one of Russia's most economically well-developed regions, located in the centre of a large industrial zone, 800 km east of Moscow, at the place where two biggest European rivers, the Volga and Kama, collide together. Located within the Volga Federal District, bordering eight Russian regions, the total area of the republic is 67,836.2 square km. Its territory stretches 290 km north to south and 460 km west to east.

The population of the republic is 3.8 million people: people younger than 30 years old represent 39.2% of the total population while people above 60 amount 17.2%. In the Republic of Tatarstan there are 7 of 11 largest cities in Russia.

The Republic is one of the most multinational territories of Russia, hosting more than 115 nationalities, eight of which over ten thousand people: Tatars (52.9%), Russians (39.5%), Chuvashes (3.4%), Mordvinians, Udmurts, Mari and Bashkirs. The educational level is relatively high, there are 435 people with at least secondary vocational education for every thousand. Its strategic location is enhanced with a developed logistics system. The Republic is situated at the intersection of several major transport routes: rail, air, water and overland transport corridors linking not only Russia but also Europe and Asia.

The capital is the city of Kazan, officially named the Third Capital of the Russian Federation and one of the largest economic, industrial, scientific and cultural centres in Russia. Kazan is 614.2 sq km in area with a population of 1.161 million people. 40.7% of the population is under the age of 30.

One of Russia's major educational center, Kazan's student population is the third largest in Russia after Moscow and St Petersburg. The Academy of Sciences of the Republic of Tatarstan and Kazan Scientific Center of Russian Academy of Sciences, chain of scientific and research institutes work in the city. In the

last five years, Kazan has ranked first in investment per capita among Russian cities with populations of over one million.

Among other main cities of the republic, Nizhnekamsk city, is one of Russia's largest petrochemical centres. While Almetyevsk city is the largest centre for crude oil production in Tatarstan. The "Druzhba" Oil Pipeline through which Tatarstan exports crude oil comes from this city and Elabuga city one of Tatarstan's most promising cities with its Alabuga special economic zone (SEZ) for industry and manufacturing.

Dynamic economic growth

The economy of the Republic of Tatarstan is based on industry and agriculture. The industrial sectors make up the bulk of the gross regional product (about 40%). Oil predominates in Tatarstan's subsoil resources. In 2013, its Gross Regional Product (GRP) was \$47.2 billion, representing a 2% growth rate; the region's per capita GRP was at \$12,322. In 2012 the total value of shipped goods reached RUB 2,038.1 billion.

More data (2013)

- Inflation 6.40% VAT 18%
- Corporate Tax 20%
- Personal Tax 13%
- Social Taxes 30%
- Land Tax 0,3-1,5%
- Property Tax 2,2%

Over the past several years, Tatarstan has been the most attractive Russian region for investment with one of the lowest levels of risk from the perspective of foreign investors. The flow of investment into Tatarstan in 2013 was \$894 million and accounted from 22 different countries, amongst them major investors from the UK and Germany. While Foreign Direct Investment accounted to \$408 million in 2013. Over 1,300 businesses with foreign investment are registered in the Republic of Tatarstan, of which 600 businesses are wholly owned by foreign investors.

Russia's ascension to the World Trade Organization (WTO) has opened new possibilities. 50% of Tatarstan's industrial output is sold as exports, 90% of which is towards WTO countries. Tatarstan Export Corporation established in 2013. Its foreign trade turnover in 2013 was estimated at \$27 billion, an increase of 72% from previous years. The most active trade partners are Germany, Italy, Turkey, Czech Re-

FOCUS ON Tatarstan

Cover Photo

Qol Sharif
mosque in Kazan

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public and Poland. Goods worth \$ 22.1 billion were exported, which is 74% higher than previous years. Imports increased by 75% and totaled \$ 5.0 billion.

Human capital plays a crucial role in the economic prosperity of Tatarstan. According to 2013 statistics, the economically active population is 2.05 million people (53.7% of the total population) and the average monthly salary is RUB 26,012 (749 USD). Unemployment rate in 2013 was just below 4%.

World-class investment infrastructures

Tatarstan has taken a number of steps to raise awareness of its brand internationally and improve its investment climate. By creating a rock-solid regulatory framework, the Republic has passed a series of laws and cabinet resolutions enhancing legal protection that Russian law already provides to foreign financial holdings. At the same time, Tatarstan **Government has set out on a plan to diversify and modernize its economy**. Simultaneously, the Republic focused on building the necessary infrastructure to support an increased flow of foreign capital. A wide range of industrial, business and high tech parks spread in the Republic make entering the market to foreign investors hassle-free. **Tax benefits, free customs zone are just few of the advantages.**

Among the most important parks:

The Alabuga Special Economic Zone (SEZ) for industrial production within the Elabuga municipality, established in 2005. One of the most effective examples of public-private partnership in Tatarstan, playing a leading role among Tatarstan's development institutions. It serves as centre of attracting foreign and domestic investors and carrying out promising high-tech projects. Alabuga SEZ residents include major Russian and international companies. Specifically, investment projects in the medicine & pharmaceuticals sector include the construction of a plant for the production of pharmaceuticals and other consumables where the production of sterilized medical materials (infusion solutions) conforming to international standards (GMP) will be organized. The total budget for the project comes to RUB 7.5 million. Also, the creation of a facility for the production of ointments will be another investment with an overall project budgeted of 7.5 millions RUB. All essential industrial infrastructure is already in place at the Alabuga SEZ, also the "one-window" system combines the offices of 16 regulatory agencies under one roof within the SEZ's administrative and business centre, letting residents interact with governmental authorities without leaving the SEZ.

Kazan Smart City a groundbreaking urban development project of the Government of the Republic of Tatarstan designed to spur investment into high technology, medicine, education and tourism attracting major multinational companies, transforming Tatarstan's capital into an international business hub with ideal conditions for working and living. The medical cluster will cultivate an ecosystem of cutting-edge medicine and innovation

in the private sector through internationally operated teaching hospitals, diagnostic and research centers, a medical techno park and medical equipment and biomedical manufacturing. It will focus on establishing a center of excellence in education, research, manufacturing and care. The establishment of the medical cluster comes as the Russian Federation has launched a strategic initiative to encourage the localization of the production of medical products within the country, providing an excellent platform for foreign companies that need to meet these requirements. Russia has a growing pharmaceutical market which is fueled by both rising purchasing power of the people and aging population. The volume of the demand for medicine products will double within the next 10 years from the current 21 billion to 45 billion USD (estimated). Moreover, Russia has launched a strategic initiative designed to encourage the localization of production into Russia.

The Innopolis Innovation Centre (still under construction) is a project of a new city in Russia, specializing in IT business and training, bringing together young, highly qualified specialists from all over Russia to help in the development of innovation projects.

Healthcare, a general overview

Tatarstan's medical institutions provide increasingly high quality medical treatment and diagnostic services. The republic is always introducing new state-of-the-art medical technologies, diagnostics methods, and hi-tech medical support systems, including transplants of human organs and tissues.

There are just over 124 hospitals, 163 polyclinics, 6 dispensaries, 201 independent outpatient facilities, 15 dental clinics, 5 preventive medical centers and 18,000 doctors in Tatarstan. According to the Ministry of Public Health and Social Development of the Russian Federation, the republic has a highly effective system of public health services and is named the best as far as medical aid is concerned. According to the Ministry of Regional Development of the Russian Federation, 45.5 % of the population in Tatarstan is satisfied with the quality of medical aid and it is one of the best indicators in the Russian Federation (average across the Russian Federation being 33 %).

The capital Kazan has entered the top three Russian cities ranking, where most residents are fully satisfied with medical service. According to a research of the Sociology Department of Financial University under the Government of the Russian Federation, 11 % of Kazan residents had to seek medical care in another region. 17 % (the lowest among other Russian cities) of the population had occasion to sue a doctor or a medical facility for negligence, errors and other omissions. At the same time, every fourth resident of Kazan is repeatedly faced with the unavailability of medicines due to their high cost.

The non-commercial public-private partnership Educational Centre for Higher Medical Technology was formed in Tatarstan, the only organization of its kind in Russia. Tatarstan has 9 medical centres offering high-technology medical treatment. According to 2009 statistics, 19,216 patients received high technology medical care (14,761 people received it in 2008), 15,759 of which attended at the expense of the state budget of the Republic of Tatarstan. 1,321 people at the expense of the federal budget, with 2,136 patients having been transferred to federal clinics. The financing of high technology medical care is at the expense of the budget of the Republic of Tatarstan (727 million rubles) and federal budget (162 million rubles).

Newly implemented technologies and a successfully functioning Clinical Cancer Detection Centre, Republic Clinical Hospital, Republic Children's Clinical Hospital and Restorative Traumatology and Orthopedics Research Centre allowed to implement a number of worldwide known high-tech medical interventions in cardio surgery, blood-vascular surgery, neurosurgery, oncology, oncohematology, transplantation, traumatic surgery and other spheres. In 2006 the list of major medical establishments expanded to include the Interregional Clinics and Diagnostics Centre offering high-tech medical treatment to people from Tatarstan and neighbouring regions.

In addition to government-owned medical facilities, Tatarstan has numerous private clinics offering services in a wide variety of areas. Nevertheless, the private sector is still very limited. According to Russia's government "Health 2020" initiative, the role of private healthcare services should increase through more public-private partnerships.

In 2008-2009 the Republic worked on creating 8 blood-vascular centers, becoming part of the federal blood-vascular program in 2010 and receiving financial support from the federal budget amounting to 236 million rubles. In 2010 the 9th blood-vascular centre started to operate in the Republican Clinical Hospital and other opened in 2011. In a short space of time more than 8,000 patients with acute cerebrovascular accident have received treatment in blood-vascular centers. The death rate from strokes has decreased by 17%.

The Republic has created a continuous training system for healthcare professionals, starting from educating professionally oriented youth in comprehensive schools to postgraduate training of specialists in continuing education institutions. Doctors take courses in professional retraining, general and the-

matic improvement according to the governmental program and an increasing number of them are educated and trained in the leading medical centers of Europe. The training programs are implemented both by inviting Russian and foreign luminaries in medicine for the purpose of carrying out master classes and delivering training seminars on the basis of leading medical institutions and the Educational Centre.

Tatarstan has 7 large medical clinics that serve as bases for clinical research and training. Training and retraining of medical personnel is carried out in two of the oldest education institutions of Russia, Kazan State Medical University (KSMU), one of the most respected medical schools in the country and Kazan State Medical Academy (KSMA).

In 2009, the launch of the national project "Health" with a total financing amounting to 2.4 billion rubles was carried out with the aim to work on prevention and to further modernize the healthcare system by equipping hospitals and clinics and building new ones, conducting vaccination and health checkups programs and reforming the medical technology and devices sector. As a consequence, the depopulation rate plummeted to the lowest degree and, in the last few months, a growth of the population has been documented. Birth growth has reached 5.0%, the highest level of birth rate for the last 20 years with death rate going down to 2.3 %. The number of deaths from cardiovascular diseases, traumas, intoxications and casualties, tuberculosis has decreased hitting the lowest point for the last 20 years. The indicator of infantile death rate has remained at the level of 2008 making 6.0 on 1000 live births. As stated by the Federal Ministry, the infant mortality rate in Tatarstan is comparable to those indicators of the developed countries. Expected life expectancy of the people living in Tatarstan has approached the age of 71.

Additional prophylactic medical examination of 83,000 citizens is held. 15 million rubles have been allocated to promote a healthy lifestyle and 14 health centers opened in the Republic.

Much was also accomplished with regard to the perfection of medical care so far as car accidents were concerned. 9 traumatic centers have been set up, in addition to the purchase of 228 units of medical equipment and 26 emergency intensive care unit cars.

The non-commercial public-private partnership Educational Centre for Higher Medical Technology was formed in Tatarstan, the only organization of its kind in Russia. Tatarstan has 9 medical centres offering high-technology medical treatment.

Key Facts

Climate:
**moderate
continental
climate**

Capital:
Kazan

Population:
**3.8 million
people**

Official languages:
**Tatar &
Russian**

75.4%
of Tatarstan's
residents
live in urban
areas

Area:
**67,836.2
sq. km**

Predominant
religions:
**Islam &
Russian
Orthodox**

Extractable resources: oil (around 0.8 billion tonnes); limestone and dolomite (66 million tonnes); building stone (35.3 million cubic metres); peat (over 35,000 ha); gypsum (72 million tonnes), brick earth (73.5 cubic metres), petroleum bitumen (12.5 billion tonnes)

Internet: there are over 2.6 million Internet users and over 8,000 users of 4G network service. 70% broadband Internet penetration, 68.4% of population Internet users.

Medicine and pharmaceuticals in Tatarstan include production of medical equipment and pharmaceuticals, provision of health care services, and pharmacy retail. The main local players in the market include Kazan Medical Instrument Plant, one of Russia's largest medical instrument companies and Tatkhimfarmpreparaty, a major pharmaceutical company with a chemical and pharmaceutical plant and the only catgut producer in Russia. Foreign investors in the industry include Saria Bio-Industries Alabuga and FAVEA (Czech Republic).

Volume of the Tatarstan pharmaceuticals market,

Year	RUB billion
2010	15.1
2011	16.3
2012	18.4

Healthcare system – present, problems and future perspectives

Although attention of the Russian government to the problems of social welfare and health is rising every year, the current level of financing and management of the healthcare system is not enough to cover the needs of the country.

Since 1991 the program of obligatory medical insurance (OMI) is the form of social protection of citizen's rights in the sphere of healthcare.

There are two different kinds of medical insurance – obligatory and voluntary. OMI provides free basic healthcare services giving equal possibilities to all citizens in getting medical and medicaments securing, in the volume and on the conditions defined by the OMI program. The list of available drugs and services to which citizens are entitled depends on the decision of each single region. Voluntary medical insurance (VMI) provides citizens with supplementary medical services not included in the program of OMI of Tatarstan (e.g. plastic surgery, gestalt therapy etc.).

OMI is carried out according to the "Program of Government Guarantees for Providing Free of Charge Medical Help for Citizens of Russian Federation", confirmed by the government of Russia and Cabinet of Ministers of Tatarstan in 2000. According to the law of Tatarstan "Medical Insurance of Citizens in Tatarstan", citizens can count on medical help and services in the volume pointed out in the OMI Basic Program. On the basis of this program administrations of cities and regions confirm territorial programs of OMI that cannot be of less volume than that of the Basic Program.

Insurers in the OMI are: for not working citizens

– local administration; for working citizens – employers; for individual workers, farmers – the state. There are special organizations working as insurance companies in the OMI system – hospital funds; while voluntary medical insurance is carried out by other insurance companies possessing a state license for this kind of work. Cabinet of Ministers of Tatarstan, local administrations of cities and regions and trade unions are responsible for the protection of the citizen's rights in the system of medical insurance.

Sources of financing the system of public health in Tatarstan are:

- **republic and local budgets**
- **means of state and public organizations, enterprises**
- **personal means of citizens and charity payments**
- **bank credits**
- **income from securities**
- **other sources that are not restricted by law**

The healthcare system of Tatarstan is an interaction of different ministries, departments and organizations. The Ministry of Public Health of Tatarstan (MPHT) founded in 1922 is the main department that provides government policy in the sphere of healthcare and directs public health in the Republic of Tatarstan. The Ministry of Public Health is directly submitted to the Ministry of Public Health of Russia (MPHR) and the Cabinet of Ministers of Tatarstan. Kazan State Medical University and Kazan State Medical Academy carry out training and retraining of medical personnel according to the universal plan defined by the Ministry of Public Health of Russia.

Organizations interact with the Ministry of Public Health of Tatarstan on commercial basis (supplying of medical equipment, medicaments, technologies etc.).

The Ministry of Public Health of Tatarstan directs and coordinates the work of the following departments:

- **Medical Schools, Medical Colleges that train medical personnel with secondary education**
- **Territorial Management of Health Care System, responsible for public health management in big cities**
- **Territorial Departments of Health Care System, regulate the work of local medical institutions**
- **Republic Medical Institutions, the largest medical institutions which provide highly specialized high quality medical services.**

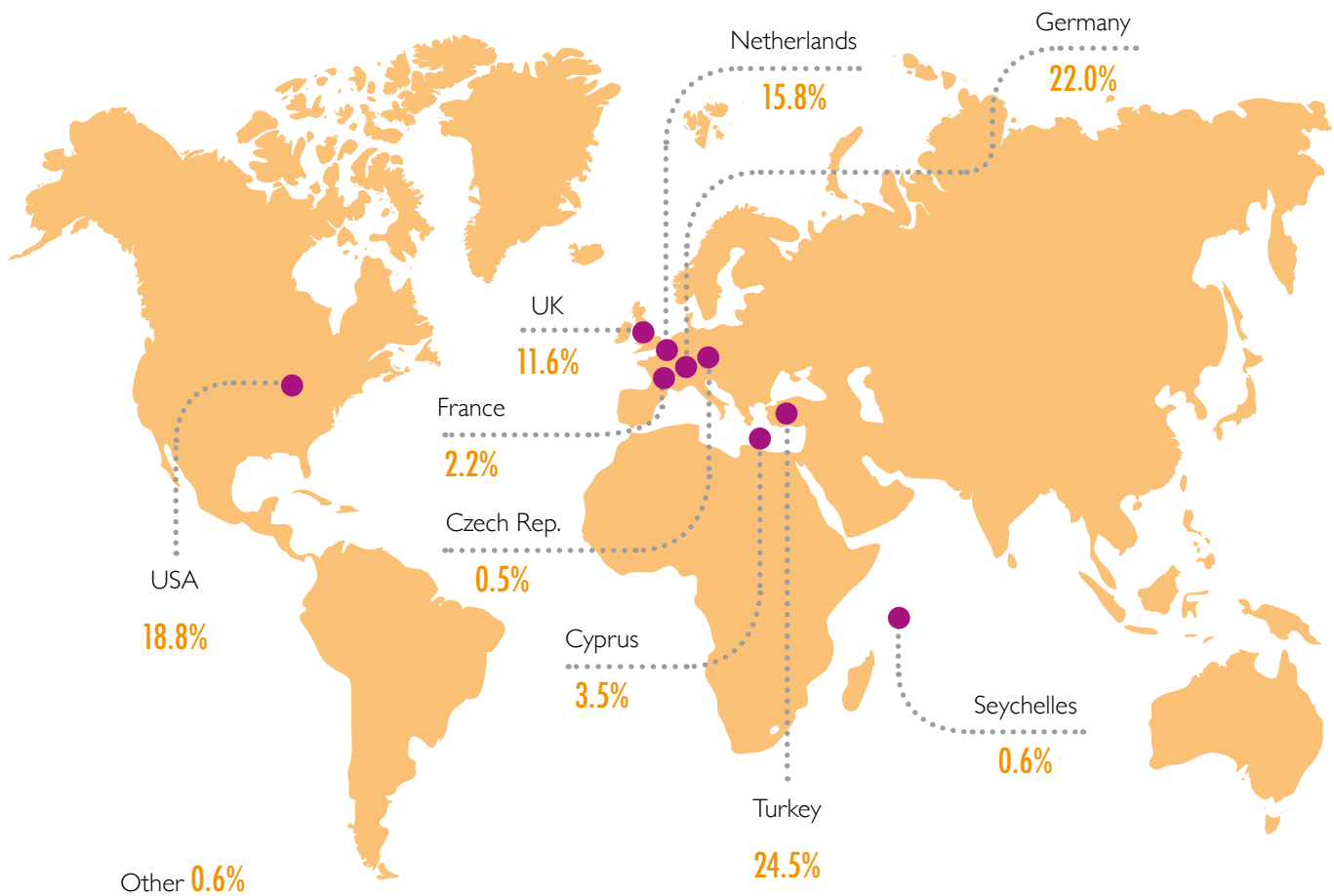
The healthcare system of Tatarstan is an interaction of different ministries, departments and organizations.

Political status:

THE REPUBLIC OF TATARSTAN is a constituent republic of the Russian Federation. Most of the Russian federal subjects are tied with the Russian federal government by the uniform Federal Treaty, but relations between the government of Tatarstan and the Russian federal government are more complex, and are precisely defined in the Constitution of the Republic of Tatarstan. The following passage from the Constitution defines the republic's status without contradicting the Constitution of the Russian Federation: "The Republic of Tatarstan is a democratic constitutional State associated with the Russian Federation by the Constitution of the Russian Federation, the Constitution of the Republic of Tatarstan and the Treaty between the Russian Federation and the Republic of Tatarstan On Delimitation of Jurisdictional Subjects and Mutual Delegation of Powers between the State Bodies of the Russian Federation and the State Bodies of the Republic of Tatarstan, and a subject of the Russian Federation. The sovereignty of the Republic of Tatarstan shall consist in full possession of the State authority (legislative, executive and judicial) beyond the competence of the Russian Federation and powers of the Russian Federation in the sphere of shared competence of the Russian Federation and the Republic of Tatarstan and shall be an inalienable qualitative status of the Republic of Tatarstan." Constitution of the Republic of Tatarstan, Article 1.

"The Republic of Tatarstan within the sphere of its competence shall enter into international and external economic relations with subjects and administrative-territorial units of foreign states, foreign states, conclude international treaties, exchange representatives, participate in international organizations."

Foreign Investments by Country (2013)



Financing of medical institutions is realized through hospital funds that are departments of the Ministry of Finance of Tatarstan. Means for obligatory medical insurance that come from a social tax are then used by hospital funds for covering the bills given by medical institutions. So, first medical institutions provide medical help to the citizens according to the program of obligatory medical insurance. Then medical institutions pass the bills for their services to hospital funds that have to cover these bills. Hospital funds use the money from a social tax for covering the bills. One more responsibility of hospital funds is to control the rational use of financial means in the system of obligatory medical insurance.

Up to 1991 financing of the healthcare system in Russia was carried out by means of federal budget. All managers had clear instructions about distribution of financial means, everything was defined by government instructions. In 1991 with the introduction of obligatory medical insurance, the transition to the new system of financing became the reason of a serious crisis in the healthcare system. At present the situation is not so tense but the transition to the insurance principle of payment is not yet totally completed. The system of medical insurance that exists today is not effective in many aspects. There is no clear definition of "free of charge" medical services. A list of medical services covered by public money also does not exist, leading to the situation that all of the regions feel the lack of financial means. As statistics show, the deficit of means in the program is 30-40 %. All these facts shake the trust of the citizens to the government and to the institutions of social defense.

Another problem on federal level is that medical science and research are suffering from lack of financing. Although some of the institutes are trying to maintain their basic functions through grants from foreign investors, most scientific structures are in a difficult situation, as such connected to bad reputation. Government departments in the healthcare system on federal and republic levels should further support medical research institutions involving them into restructuring the healthcare system.

Another issue on federal level is the situation with medicaments provision. Due to little control in this area, a great part of financial means is spent not on important medicaments (for treatment) but for generics. Also, lack of government control is one of the reasons of a developing "hidden" pharmaceuticals market. The Russian pharmaceutical industry cannot provide citizens with the necessary volume of medicaments, as such the need to buy very expensive imported medicaments.

On the republic level too much attention is paid to inpatient medical help, being more expensive than outpatient medical help. In Russia 60-70% of financial means of the healthcare system is spent for inpatient medical help comparing to 30-35% in Western countries. 75-80% of doctors work in inpatient hospitals comparing to 50% of doctors in Western countries. The number of inpatient beds is very high (12 on 1000 of patients), the period of stay is also very long – 17 days comparing to 8-13 days in Western countries. Every extra day of stay costs much money. It should also be mentioned that 30% of inpatient beds is given to the so called "social" patients, fulfilling not only medical functions but social functions, compensating the disadvantages of the social protection system. One of the reasons is lack of hospices, geriatric and rehabilitation centers.

The next problem deserving attention is the work in the field of prophylactics and building up citizens' health. The existing health care system is not sufficiently oriented to the propaganda of health among citizens. Although the level of expenditures in the healthcare system is relatively high, citizens' health cannot be considered as satisfactory. It is connected with the fact that the influence of the healthcare system on the health of citizens is only 10% while the remaining 90% are economic, biological and social factors.

Comparing to international standards, doctors in Russia have less authority, public attention and social prestige. It is expressed by low incomes that are only 66% of an average salary in Russia. It could help to get supplementary financial sources that could afford to get new diagnostic and medical equipment, raise the qualification of personnel and motivate them on providing high quality medical help.

According to present legislation, only specialists with higher medical education can take the leading positions within the hospitals. However, educational programs in the field of "Public Health Administration" in the republic of Tatarstan are lacking. Nowadays it is impossible to get a specific higher education (master degree) in Public Health Administration Management; it is only possible to have it as a part of general medical education or as post-graduate education in Kazan State Medical University and Kazan State Medical Academy.

Kazan State Medical University (KSMU) is one of the oldest higher educational institutions in Russia founded in 1814. It is one of the institutions among Moscow and St.-Petersburg surgical-medical academies, which was one of the founders of higher medical education in the territory of modern Russia.

Comparing to international standards, doctors in Russia have less authority, public attention and social prestige. It could help to get supplementary financial sources that could afford to get new diagnostic and medical equipment, raise the qualification of personnel and motivate them on providing high quality medical help.

The Departments are the following: medical, prophylactic medicine, pediatric, dental, pharmaceutical, department of graduate nurses. There is no department responsible for public administration management. There is only a sub-department, founded in 1985, of public health administration where all students have to take 1-3 semesters of classes. Until now only a small number of students graduated from it. The next higher educational institution providing education in the area of public health administration is Kazan State Medical Academy (KSMA) where you can have postgraduate education.

According to the law there aren't any particular requirements for taking the top manager position (except to be a doctor). Doctors with work experience and economic education have privileges. Unfortunately, it is also important to highlight the phenomenon of corruption existing in this sector. It is obligatory after becoming chief doctors to attend courses to advance the qualification in the given specialization. Attestation that takes place one time in five years is also obligatory.

Regarding managers in the Ministry of Public Health of Tatarstan, they have to attend one-month courses in the Institute of Civil Service every 3-5 years. The Institution of Civil Service, founded in 2001, is supported by the President of the Republic and gives specific education in Public Administration.

Source:

PWC- www.pwc.ru

TIDA -Tartastan Investment Development agency – www.invest.tatarstan.ru

Republic of Tatarstan- www.tatarstan.ru

FDI Magazine/FT Business- <http://www.fdiintelligence.com/>

Tatarstan State Statistics service and IFM, Federal State Statistics Service- http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/en/main/

-Studies: Chtchelkova Ioulia Alexandrovna, Ph.D. student of Kazan State Technical University Kazan, Russia. Shaydullina Leysan Fati-hovna, Kazan State Medical University Kazan, Russia



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Mental Healthcare in Morocco

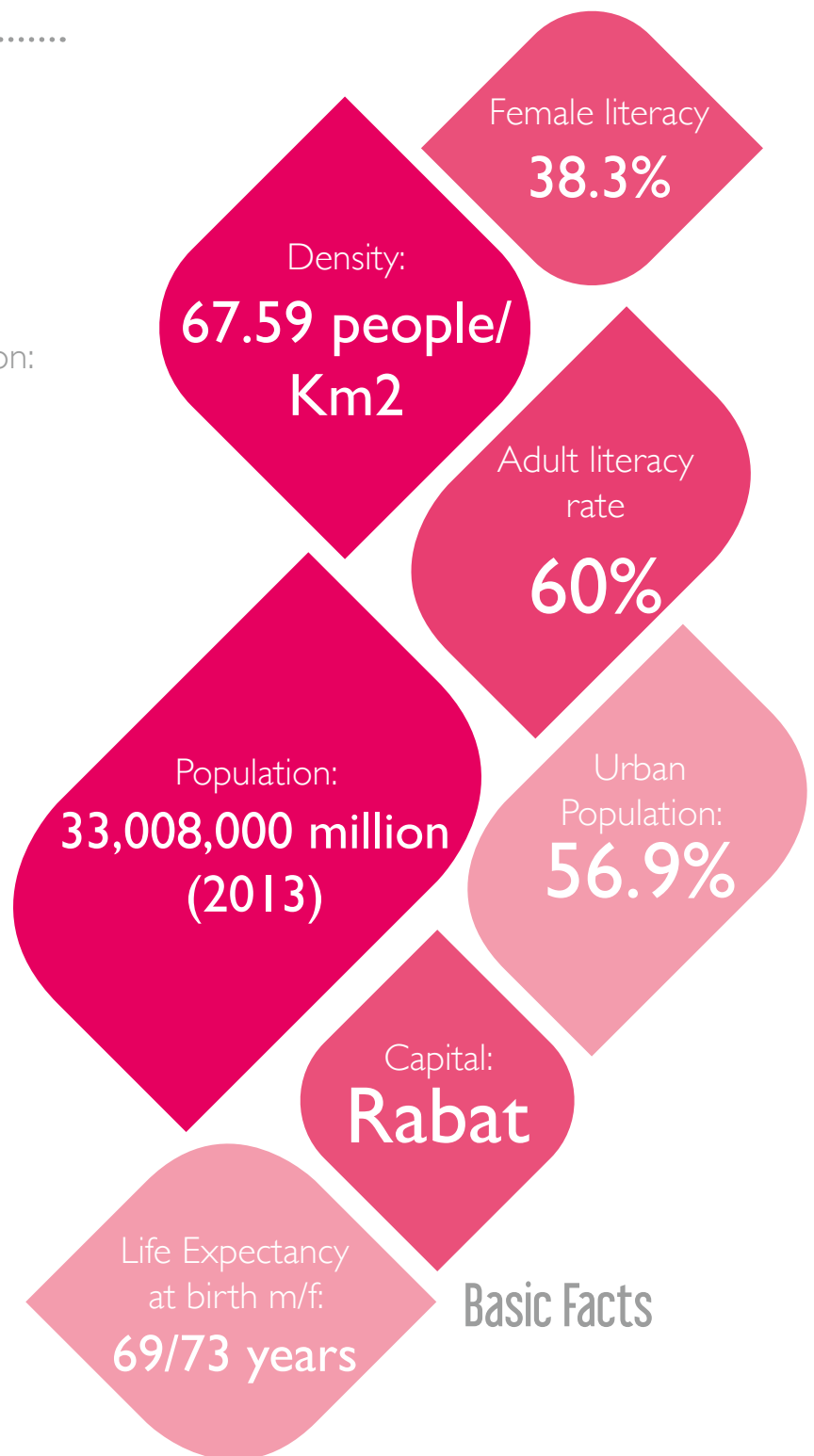
In 2005, Morocco's Ministry of Health (Ministère de la Santé) carried out its first-ever survey of mental illness in the country. The study found that about 50% of the population had suffered from at least one minor psychiatric ailment, nearly ten years after the study, a majority of Moroccans who suffer from mental illness still do not receive adequate care.

Author: Silvia Borriello



Healthcare figures

- Total expenditure on health per capita **USD 438 (2013)**
- Total expenditure on health as % of GDP: **6.0 (2013)**
- Average Medicine Consumption: **around USD 50 per inhabitant per year**
- No. of Doctors **over 8,563. 58% working in the private sector**
- Infant mortality rate (per 1000 live births) **40**
- Neonatal mortality rate (per 1,000 live births) **27**
- Child mortality rate (per 1,000 live births) **47**
- Maternal mortality ratio (per 100,000 live births) **227**
- Population per hospital bed (public sector) **1144**
- Medical consultations per inhabitant **0.5**
- Paramedical consultations per inhabitant **1**



Basic Facts

In 2005, Morocco's Ministry of Health (Ministère de la Santé) carried out its first-ever survey of mental illness in the country. The study found that about 50% of the population had suffered from at least one minor psychiatric ailment over the course of their lives, ranging from a simple nervous tic, occasional insomnia to more serious manifestations of anxiety or depression.

Ten years after the study, a majority of Moroccans who suffer from mental illness still do not receive adequate care – and many never get to see a psychiatrist at all.

Several are the reasons but, the major impediment to receiving good quality psychiatric care is lack of availability and inequality of access to the resources. Despite recent efforts made by the Ministry of Health to improve both the quality and quantity of psychiatric services, good mental healthcare in Morocco generally remains difficult to obtain unless belonging to the country's upper socio-economic classes, reflecting the fundamental inequalities present in Moroccan society.

The public healthcare system has a network of regional Etablissements de Soins de Santé de Base (ESSBs), or small basic healthcare centers. As of 2010, 2626 such centers were in operation around the country, in addition to about 147 larger public hospitals and clinics concentrated in urban areas. The ESSBs are specifically meant to constitute a decentralized system that makes basic care accessible to everyone. In practice, however, the distribution of these ESSBs across the country remains uneven: as much as 70% of Morocco's rural population must travel more than five kilometers to reach the nearest healthcare facility, often little more than a dispensary that may not always have a doctor on site. Consequently, healthcare utilization in the public sector remains very limited, with a rate of use of curative services of 0.5 consultations per inhabitant per year, a figure that can be considered low in relation to the needs of the population.

The distribution of mental healthcare facilities is even more sparse and uneven. The total number of practicing psychiatrists in Morocco is estimated at a little over 350 (about one specialist per 100,000 people)

COVER PHOTO

Hassan II mosque at night

Morocco,
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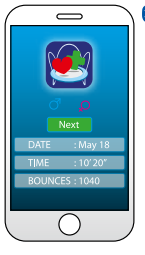


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and the vast majority of these doctors practice in the larger Rabat-Casablanca region. Some of them run private practices, while others are connected to one of the 27 public institutions for mental health-care: a combination of psychiatric wards within general hospitals, specialized mental health facilities and psychiatric teaching hospitals. Following a strategic policy to decentralize the nation's network of mental health resources, favoring regional community treatment over large urban institutions, the number of beds available at each of these institutions has been deliberately limited or even reduced. At the same time, the Health Ministry has not had the resources to couple this with an expansion of mental health-care facilities around the country.

As a result, these 27 institutions together offer no more than about 1,900 beds for mental healthcare nationwide (less than one per 17,000 people). Most of these beds are concentrated in Morocco's main cities, leaving the country's rural regions without local access to any mental health resources. The proportion of psychiatry beds located in or near the largest city is 9.23 times greater than in the whole country. Further human resources include 60 clinical

psychologists, about 400 nurses specializing in psychiatry and social workers. Several NGOs also work in psychiatry and mental health, including the League for Mental Health and five patient associations. **Morocco is one of the 57 countries listed by WHO as suffering from an acute shortage of health personnel.**

This uneven access to care is exacerbated by the fact that Morocco's rural population mostly belongs to the lower socio-economic classes. For such reasons residents of rural areas often tend to wait longer before seeking help and therefore tend to be in worse condition by the time they enter a psychiatrist's office.

The urban poor are not better off. In the early 2000s, the government established a system of basic universal coverage: the Assurance de Maladie Obligatoire (AMO) covers anyone employed in the public or private sector, while a supplementary Régime d'Assistance Médicale aux Personnes Economiquement Démunies (RAMED) is available to anyone who cannot pay for healthcare and is ineligible for the AMO. Especially with the recent expansion of

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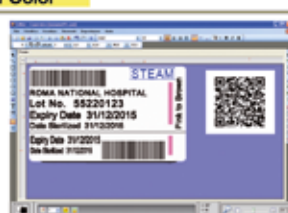


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RAMED coverage, this new system has significantly improved healthcare access for Morocco's poor populations. **However, only severe mental disorders are covered by social insurance schemes while coverage for most psychiatric services would require payment of an insurance policy.** In terms of affordability, 30% of the population has free access to essential psychotropic medicines. For those who have to pay for their medicines out of pocket, the cost of antipsychotic medication is approximately 1.35 dollars per day, and the cost of antidepressant medication is around 1.8 dollars per day, both costing roughly 2% of the daily minimum wage.

Aware of barriers to getting patients to psychiatric care, efforts are being made to improve both the quality and quantity of psychiatric resources in Morocco. Funds are being dedicated to the improvement of existing mental healthcare facilities as well as the construction of new ones. In 2013, Majesty King Mohammed VI inaugurated a new psychiatric center (Psychiatric Diseases Center At Mohammed VI University Hospital in Oujda) that would include 108 beds, consultation services and programs for children and the elderly as well as an addiction center.

Furthermore, for a number of years now, psychiatrists have been engaged in a campaign to educate

both the public and policymakers about the importance of good mental health. The Ministry of Health has in recent years declared psychiatry a national priority and dedicated a growing budget share to the specialty. Psychiatric training has been expanded. Research activity has also progressed since the early 1980s, as reflected by the number and quality of publications in the different fields, including epidemiology, biological psychiatry, social psychiatry, psychopharmacology and clinical psychopathology. International university collaboration has been especially important for Moroccan research. **Cultural aspects are a special research focus (suicide and religion, cannabis use, traditional treatments, etc.).** However, despite major progress over the last three decades much remains to be done, notably to bolster child and adolescent psychiatry and to manage mental illness in small towns and villages, including in the remotest regions.

Traditional Perspectives on Mental Illness

It is important to briefly consider psychiatry's place within the larger landscape of healing practices in Morocco. Throughout the country, there is a lively practice of so-called "traditional" or "religious" healing methods. Belief in the supernatural presents a

PHOTO

Sahara desert

Gavin D /

shutterstock



The advertisement features a large image of a male doctor in blue scrubs with a stethoscope, holding a clipboard. To his right is a vertical strip of four icons representing different hospital units: Surgical Unit (green), I.C.U. (red), Dialysis Unit (orange), and C.S.S.D. (blue). The background of the ad shows a modern hospital corridor with blue walls and doors. At the bottom, the text 'YOU SAVE LIVES, WE CARE FOR YOU.' is prominently displayed in green. Below this, a paragraph describes SHD ITALIA's 30-year history in designing and installing hospital units. The SHD ITALIA logo is shown on the right, along with the text 'SORIMA HOSPITAL DEVELOPMENT' and 'Made in Italy'. At the bottom, there is a call to follow the company on their website, a hand cursor icon, and the website address 'WWW.SHD.IT'.

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challenge to providing care for the mentally ill. Signs of psychosis are frequently attributed to possession by bad spirits called "jinn." **People often seek help, voluntarily or otherwise, at "marabouts", holy shrines run by spiritual healers well versed in negotiating with jinn.**

If the marabout represents the physical institution of traditional healing for mental illness, the "fqih" is its living practitioner. Literally translated as "religious scholar," the fqih fulfills the role of holy man, sage, seer and sorcerer. **Marabouts and healers can be found throughout the country and easily fill both the geographic and economic gaps left uncovered by psychiatric providers.**

For people suffering from mental illness, the marabout of Bouya (Father) Omar, close to Marrakesh, holds particular interest. It has recently become famous on world news for allegedly shackling and beating people who seek help from possession. For the believers, its healers cast out jinn from possessed bodies. For the skeptics, it's a center of fraud and abuse where unholy men are eager to cash in on the suffering of the mentally ill.

Damning reports about mistreatment, including one presented by a human rights organization to the UN group on arbitrary detention visiting Morocco, prompted the Health Minister to announce that he would close Bouya Omar immediately - if only he could. "I'm going to do everything I can to get this centre closed. Unfortunately the decision is not for the ministry of health," Hossein El Ouardi said.

Such issue touches a sensitive nerve running through Moroccan society. A source at the Ministry of Religious Affairs admitted Bouya Omar is a "very complex and sensitive subject." "The patient is imprisoned in a way to protect him, and to restrain this force, which is a kind of blind force, to exorcise the spirit," he said, speaking on condition of anonymity. "We leave people there because we can't look after them. But it's a traditional system and it has to change."

Although possession by a jinn might be a more familiar concept to many local communities than schizophrenia, a person possessed is often no less shamed or marginalized than a psychiatric patient is. The difficulty of properly looking after the patients, by getting them treatment at psychiatric facilities run by qualified personnel, stems from the backward state of Morocco's mental health sector after decades of neglect, medical experts say.

Jallal Toufiq, head doctor at the Arrazi Mental Hospital in Rabat's twin city Sale, says there are only 400 psychiatrists in a country of 33 million people, while some of the psychiatric institutions are in a "very advanced state of disrepair". The doctor laments the "extremely negative attitude towards mental illness" in Morocco, "The level of awareness in the general population is so low that a lot of people tend to interpret their syndromes, their delusions and anxieties, as a curse, as something that has nothing to do with medicine. So they seek healings in marabouts, and the problem is that they come to see us long after, when they're in bad shape."

Moroccan physicians have certainly shown an interest in traditional therapies but, on the whole, psychiatry (and medicine in general) has kept its distance from traditional modes of healing. Strongly rooted in Western medicine, Moroccan psychiatry views mental illness as a medical condition amenable to medical intervention. Almost all patients encountered in psychiatric centers appear to have a great deal of confidence in their psychiatrists and medications and many have abandoned the "traditional symbolic" in favour of a medical or psychodynamic interpretation of their symptoms. However, it would be misleading to suggest that the beliefs and practices described are confined to the fringes of Moroccan society. Many Moroccans are faced with the challenge of finding a middle ground between two powerful symbolic frameworks.

Source:

WHO - COUNTRIES- www.who.int/countries/en

"World Health organization Assessment Instrument for Mental Health Systems"- http://www.who.int/mental_health/evidence/AIMS_WHO_2_2.pdf

"The Economy of Mental Health: Inequalities in Access to Care in Morocco"-http://www.jadaliyya.com/pages/index/21241/the-economy-of-mental-health_inequalities-in-access

"Morocco's mental dilemma"- <http://stream.aljazeera.com/story/201405122324-0023720>

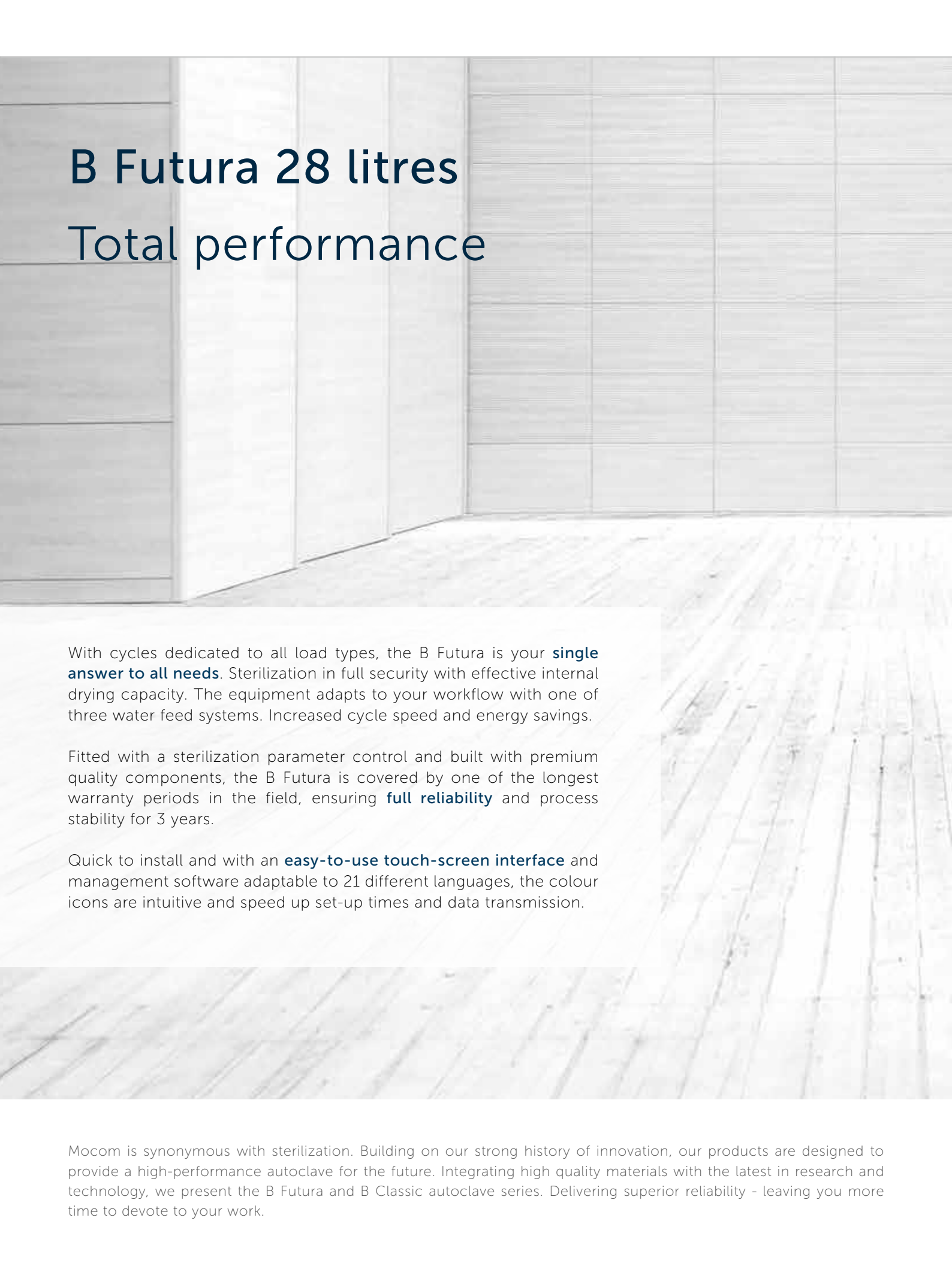
"Morocco's 'possessed' seek healing in Bouya Omar"- <http://www.middle-east-online.com/english>

"Views of mental illness in Morocco: Western medicine meets the traditional symbolic"- <http://www.cmaj.ca/content/163/11/1468.full>

**PHOTO
Zither.**

Hands playing a popular Moroccan Guitar called Zither. Marrakech, Morocco.

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Early Cancer Detection Blood Test Raising Concern Among Cancer Experts

Pathway Genomics, a privately held diagnostics company based in San Diego, began marketing a blood test in mid-September that it says can detect DNA fragments linked to 10 common cancers in otherwise healthy people. Consumers can order the test directly from the company's website by consulting with Pathway physicians and completing a questionnaire. But many cancer experts—and competitors—say the test is far from scientifically proven and could cause unnecessary alarm.

The Food and Drug Administration has raised concerns, too. The agency has sent a letter to Pathway's CEO saying: "We believe you are offering a high risk test that has not received adequate clinical validation and may harm the public health."

Pathway officials say the company's test is designed for people who are at high risk for cancer due to family history, an inherited genetic mutation or exposure to known carcinogens, such as years of heavy smoking. They also say it isn't meant to diagnose cancer but as a screening test to indicate whether more tests are warranted. The test, called CancerIntercept Detect, should be classified as a laboratory developed test that it contends requires no FDA approval.

Other biotech firms are also racing to develop tests that can look for fragments of abnormal DNA shed by cancer cells into blood, urine, saliva and other body fluids. Most such "liquid biopsies" are being used in patients already diagnosed with cancer. They can help doctors assess whether a treatment is working or if a tumor has metastasized, without subjecting patients to extensive imaging or more surgery.

Using liquid biopsies to detect cancers before they cause symptoms is more controversial—in part because it's unclear what the results mean. There is growing recognition in the medical community that not all cancers are destined to be deadly and that many people may be undergoing debilitating treatments unnecessarily for abnormalities that might never cause harm. Cancers diagnosed early are easier to defeat than those found later and larger, but they are also more likely not to have required treatment at all.

CancerIntercept Detect scans the patient's blood sample, looking for the absence or presence of 96 different mutations in nine specific genes that have been associated with several common cancers. Still, it's unclear what finding those mutations means. The test can't distinguish which kind of cancer the abnormal DNA came from. Mutations in the KRAS gene, for example, are found in 57% of pancreatic cancers, 36% of colon cancers and in smaller amounts in lung, endometrial, ovarian, gastric, prostate, testicular and thyroid cancer, according to published research.

What's more, the presence of such mutations does not necessarily indicate cancer. They could be associated with benign conditions or a temporary error in cell replication that the body's immune system gets rid of before it causes problems. And a negative test doesn't insure that the patient is cancer-free.

Pathway officials say that's why the company insists on sending the results to patients' physicians, who can interpret the results for them. "If the test finds abnormal DNA, the next step is to perform an imaging study and look hard to find a lesion," says Glenn Braunstein, Pathway's chief medical officer. "I wouldn't advise treating anybody on the basis of this test alone."





But some cancer doctors say they would be stumped by such test results. "If it's not an obvious cancer, do we order a full body CT scan? Where do we even start to look?" asks the American Cancer Society's Dr. Lichtenfeld.

Interpreting the results is also challenging because there is little published data to evaluate how the test performs with large groups of people. Pathway cites external research showing that the mutations it checks for are present in varying percentages of people with cancer. But there are no large studies showing how often those mutations are found in the general population, and how often they eventually correlate with a cancer diagnosis.

Cancer experts, academic researchers and biotech firms hold out great hope that sampling tumor fragments in body fluids can help understand and treat cancer.

The technology is advancing rapidly. A company called Trova-gene Inc. has developed a urine-based test that allows doctors to track how lung cancers respond to treatment. A new blood test from Personal Genome Diagnostics can detect a specific mutation that predicts whether a pancreatic cancer is likely to respond to treatment.

"There's a lot of excitement around what kinds of questions we can answer with this technology that we couldn't answer before," says Luis Diaz, a physician and cancer researcher at Johns Hopkins University who founded Personal Genome Diagnostics. "Now, we have to do the heavy lifting to prove that it's safe and effective and will make a difference in people's lives."

Source:

Extract from an article by Melinda Beck, September 2015, The Wall Street Journal

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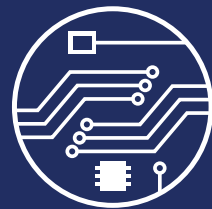
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Radiology from the Beginning

Author: Silvia Borriello

The development of diagnostic imaging has been the result of a fruitful relationship between doctors, radiographers, physicists and equipment manufacturers. New apparatus has stimulated the introduction of new techniques and medical needs have in their turn stimulated new developments in equipment.



The story began in 1895, when a German physicist discovered a new kind of rays. Wilhelm Conrad Roentgen, professor and head of the department of physics at the Julius-Maximillan University at Wurzburg in Germany, while experimenting with electric currents passing through a tube, realized that a nearby fluorescent screen began glowing as the current passed through. When he switched the current off, the screen ceased to glow. Because the glowing could be attributed to unknown rays, he appropriately named them "X" rays, which is the origin of the term we still use today. One of the first x-rays taken was of his wife's hand, where he could see her hand and wedding ring on the image. The implications of the technology were huge and the medical community recognized its worth in diagnosis of various broken bones, fractures, and ailments. Within a few months of the discovery, machines were produced to be used in the medical community and it wasn't long before they were a widespread, commonly used technology. Rontgen was awarded the first Nobel Prize for physics in 1901.

The apparatus gradually improved and hospitals started to acquire the equipment. Many hospital

X-ray departments were located in the cellars and basements and were often poorly ventilated and damp. The dampness made it difficult to work with apparatus and made it more difficult to pass the current across the glass tube. The first hour of the day was often spent in drying the apparatus. Even at the Royal London Hospital in 1897 there was no electric current in the hospital and the accumulator of Grove cells was taken out of the hospital by a porter to a nearby establishment to charge it. The equipment was usually mounted on a trolley with the accumulator on the lower level and the induction coil and contact breaker on the upper level. The tube was held in a wooden clamp and was a bare bulb with no protection for the operator. The trolley could then be taken around the hospital.

The absence of protection around the early X-ray tubes resulted in considerable injury to the operators. The problem was compounded by the common practice of looking at the operator's own hand with a fluorescent screen to test the apparatus. These dangers were gradually recognised and standards for exposure and protection were gradually introduced.

COVER PHOTO X-Ray's of a Wounded Soldier

Vintage engraving of a scene from the Boer War, wounded from the front, locating a Mauser bullet be X-Ray in a London Hospital. The Graphic, 1900

duncan1890 /
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The radiographs were initially made onto glass photographic plates which had to be placed into light tight cassettes or envelopes. The photographic plates were coated with emulsion on one side only. The emulsion had a habit of slipping off during developing and the job of a junior was to wax the edges of the plates to help to keep the emulsion in place. Film was introduced by Eastman in 1918 but it came into general use from about 1923. The image quality on glass was excellent and it took some time for film to replace the older technique. Unlike the glass plates, the film could be coated on two surfaces emulsion ("Dupli-Tized"). The base was made of celluloid nitrate and was highly inflammable. This high risk property was tragically shown in the infamous Cleveland Clinic fire when the X-ray film store caught fire and 129 people died. In 1924 Eastman introduced the cellulose acetate base as safety film. This innovation was more expensive and it was only the accidents with the previous film that forced its introduction.

Most of the early X-ray work was performed by doctors and the departments were often combined with electro-therapeutic departments. However from about 1903, lay x-ray operators, as they were then called, were appointed to assist in the work. They had no special training and learnt on the job. Gradually more and more of these lay X-ray operators were appointed and training courses were set up. **The culmination was in the formation of the Society of Radiographers in 1920.**

It was only following the introduction of the Coolidge tube in 1913 that predictable results were obtained. In the Coolidge tube, the bulb could be completely evacuated and the electrons were liberated from a heated spiral cathode. The results were far more uniform and it was possible to vary the current and voltage independently. In the early tubes the high-tension cables were attached to the ends of the tube producing a considerable risk of electrocution. Sealed and electrically insulated "shock-proof" apparatus was gradually introduced from the 1930s. The self protected Metalix tube was designed by Bouwers of Philips in 1924 and this tube also incorporated the principal of line focus. Bouwers also designed the first rotating anode tube, the Rotalix, which was first marketed in 1929.

X-rays were used for therapy from the earliest times. Skin lesions were easily treated and gradually techniques evolved to treat deeper lesions. These techniques depended on the development of more powerful apparatus, the use of multiple therapy beams and in the use of radium. The doctors working in the X-ray department were involved in both therapy and diagnosis. It was only from the 1930s that doctors were appointed with specific interests in diagnosis or therapy.

Chest radiography –The initial apparatus was of low power and therefore fluoroscopy was superior to radiography. It was only with the development of higher powered apparatus with large induction coils and electrolytic interrupters that instantaneous radiograph could be developed. By 1905 better quality films could be obtained. A cultural change was also needed in physi-

cians who initially found it hard to accept that an abnormality could exist when it was not clinically apparent and could only be demonstrated radiographically.

The initial chest films were of rather poor quality, however they were of diagnostic quality. Additional techniques were gradually introduced. Although earlier workers had used various contrast agents in the bronchial tree it was Sickard and Forestier in the early 1920s who injected mixture of iodine and poppy seed oil (lipiodol) into the lungs and enabled the production of good quality images of the airways (bronchography). The use of plain tomography to obtain sections of the body was invented in the 1930s by Bernard Ziedses des Plantes. Plain tomography continues to this day although the introduction of computed tomography (CT) scanning has considerably reduced the number of applications.

The techniques used reflected the pathology encountered at the time. Fluoroscopy was extensively used in the treatment of TB to assist in the diagnosis and in the performance of artificial pneumothorax and dedicated chest fluoroscopic apparatus was used in many chest clinics. In a similar way to the current use of screening mammography, the introduction of mobile miniature-film apparatus in the 1930s by Russell Reynolds and Watsons Ltd enabled the development of mass radiography for the early diagnosis of pulmonary tuberculosis (TB). Mass radiography became important when effective drug treatments for TB were introduced in the 1950. The apparatus for miniature radiograph has gradually been taken out of use.

The introduction of agents that could safely be injected into the circulation allowed the lung vessels to be demonstrated. More recently nuclear medicine, computed tomography (CT) scanning and magnetic resonance imaging (MRI) have been introduced. These techniques enable detailed anatomy to be demonstrated non-invasively. Pulmonary secondary deposits from cancer were first demonstrated on CT by Louis Kreel in 1976. Nuclear medicine involves the administration of a radioactive compound. In 1955 there was the first use of a radioactive tracer in the lungs with the introduction of inhaled xenon-133 and external counting. In 1964 pulmonary blood flow was demonstrated with injected albumen particles labelled with iodine-131 and in 1975 Fanzio and Jones described the use of inhaled krypton-81M for lung ventilation scanning. The plain radiograph however remains central and is being developed by the use of digital computed radiography and other techniques. Percutaneous fine needle biopsy techniques have been introduced for pulmonary and pleural masses.

The abdomen –Distinguishing calcified lymph glands, gallstones, kidney and bladder stones and other shadows on an abdominal radiograph was a major problem. In the renal tract Hurry Fenwick of the Royal London Hospital introduced catheters to identify the course of the ureters and retrograde studies with injected agents soon followed to demonstrate the kidneys. Intravascular (injectable) contrast agents were introduced in the

1930s and transformed the examination producing the intravenous urogram. Liquid contrast was introduced into the stomach as the bismuth meal and later using the less toxic barium sulphate. The opaque meal to diagnose ulcers and cancers of the stomach and duodenum was developed in Vienna in 1904 by Reider. Rectally administered the colon could be filled with bismuth or barium to assist in the diagnosis of large bowel disease such as cancer or diverticulosis. The diagnosis of gallstones was difficult since most stones are not opaque to the X-rays. The lack of contrast of the unopacified biliary tract therefore was a difficulty until the development of iodine containing oral contrast agents introduced as the Graham test in 1924. Direct opacification of the biliary tree by large needle injection obstruction is now often done as a team effort between radiologist and endoscopist.

In the 1950s came the development of the image intensifier and X-ray television. The initial systems produced a brightness gain of about 1000 and meant that the red goggles needed for dark adaptation when viewing a simple fluoroscopic screen could be dispensed with. The result was also that the operator looked at the television and not at the patient. The use of image intensification has stimulated the flowering of techniques in the last 20 years, including the associated development of catheters, needles and contrast media.

Many new techniques have been introduced in recent years. The principles of CT scanning were first described by Godfrey Hounsfield and the first prototype EMI scanner was installed in 1972 at Atkinson Morley's Hospital. Work was progressing on Magnetic Resonance Imaging (MRI) in the 1970 and the first human image was obtained at Aberdeen in 1977. Ultrasound started in the 1950s and gained popularity in the 1960s. "Real-time" ultrasound machines were introduced in the late 1970s.

In recent years the widespread use of percutaneous biopsy techniques and ultrasound and CT scanning have considerably reduced the need for exploratory surgery. There have been many changes in medicine which influence radiological practices; for example, the increasing use of endoscopy has considerably reduced the need for barium meals. The recent developments in diagnostic imaging have considerably facilitated the recent trend to investigate and treat patients as day cases or as outpatients with considerably less disruption to the patients' life.

Until the 1980s the techniques needed to store reports and films had changed little since the 1920s. Modern technology is transforming departments with the introduction of computer management systems and digital image storage. This last technique has dramatically altered the use of images with studies being transferred via links between different institutions and offices; dramatic changes will continue in the near future.

Source:

The International Society for the History of Radiology- www.ishrad.org

One Hundred Years of Medical Radiology- <http://www.bshr.org.uk/SummHist.html>

Self-Service in Healthcare: Diagnostic Reports Delivered by Totem System

Summary

The following presentation briefly describes the general functioning of the Totem self-service system, focusing attention on its features and advantages, identifying it more as a resource rather than an instrument, as it contributes to the distribution of radiologic diagnostic documentation in a fast and automatic way.

Project Aim

The following pilot project, invented and experimented by the Diagnostic Imaging Department of the A.O.U. "Maggiore della Carità" in Novara, with the participation of 3Bsrl and in collaboration with El.Co Srl, is aimed at fulfilling the need of the mentioned hospital department to distribute radiologic documentation in a fast and automatic way. Specifically, delivery to the patient of a CD/DVD containing radiologic diagnostic results by optimizing the resources available and canalizing the distribution process in two different solutions, making the therapeutic diagnostic process smoother and efficient. Within the IT process of the entire hospital, in which the implementation of a unified system is managed by a dedicated Information System network, the best technical solution to fulfill such need is the implementation of a "Self-Service" system.

At present, the work flow of the Diagnostic Imaging Department is managed through two IT applications that, as well as managing the main phases of the operative process (Booking, Front office, Service Provision; Medical Reports, Digital Signature on Medical Reports), they have other annexed functionalities such as medical CD/DVD writing to deliver to patients.

What is Totem?

The device is an integrated Front-Office IT station with a connection, synchronized to the radiologic IT system applications, with the possibility to write CDs/DVDs and print medical reports. Totem is always active and located in a strategic position according to the needs of the Hospital's flexible organization. At present it can be used from 8,00 a.m. to 8,00 p.m. according to the activities of the Novara A.O.U. Maggiore della Carità Radiologic Institute.

The patients needing to collect the result of the radiologic visit (CD/DVD or report), can bring the health card barcode near to the device, as well as the code of the withdrawal sheet, to have access to the relevant service and collect the report which is immediately copied from the on-line archive on the CD/DVD (images) and on paper (report) in about 4-5 minutes.

Radiology History Timeline

Totem is equipped with only one chassis containing the following components:

- CD/DVD writing unit connected to a semi-transparent tray to collect written CDs
- Barcode and/QR Code reader
- CD/DVD cover case container
- Touch-screen monitor
- Integrated inkjet printer located by the opening of the paper pickup.

The device is bi-color; yellow and blue, for its better identification and to give it a more sober and professional look. It is made of three front openings with a side lock to unblock the system. The keys are handed out to the different operators according to their responsibilities and skills (generics, specialized).

How does it work?

The patient can use the Totem following the instructions on the withdrawal sheet as follows:

- On day of withdrawal the patient should locate the totem station of interest
- Select the function "Collect CD"
- Pass the personal health card barcode by the reader
- Pass the withdrawal sheet barcode by the reader
- On the Touch Screen monitor the provided service associated to the patient's personal data will be displayed, if there is medical documentation to print
- Digitalization of the documentation printing function (confirmation)
- Waiting for the CD/DVD copy, containing the diagnostic report and medical images.
- Positioning of the CD and printed copy of the report in the relevant cover case

The withdrawal sheet is given to the patient at the Front Office on the day in which the radiologic service is provided to the patient.

On the sheet the following information is highlighted:

- First available date and time of radiologic report withdrawal
- Personal barcode, identifying the patient with the associated service/services offered
- Details on standard withdrawal of



1896

Konrad Roentgen discovered the x-ray.



1950's

A major development was the application of contrast agents for a better image contrast and organ visualization using special gamma cameras.



1955

The first x-ray image intensifier allowed the pick up and display of x-ray movies.

radiologic report and on the automatic withdrawal using Totem

The system guarantees that the documentation collected belongs exclusively to the user in question as the code on the user's health card is confirmed by the code on the withdrawal sheet identifying only one possibility. Any incoherence between the two codes will result as Error and the procedure cannot be completed, as guarantee of the user's privacy.

Operators Intervention:

The implemented system is totally autonomous. The operator comes into action only to recharge consumer items such as paper and CDs/DVDs.

Organizational Advantages

- Elimination of manual handling of envelopes, reports and CDs/DVDs with consequent reduction/elimination of errors
- Reduction of work load for personnel that needs to prepare and deliver diagnostic reports with consequent time saving to use for other activities
- Reduction of consumer items waste and equipment damage



1960's

The principles of sonar were applied to diagnostic imaging. Ultrasonic waves generated by a quartz crystal were reflected at the interfaces between different tissues, received by the ultrasound machine and turned into pictures using computers and reconstruction software. Challenges include targeted contrast imaging, real time 3D or 4D ultrasound and molecular imaging.

1968

The use of targeted contrast agents began.

1970

The digital imaging techniques were implemented into conventional fluoroscopic image intensifier with the first computed tomography, digital images are electronic snapshots sampled and mapped as a grid of dots and pixels. The multi-slice spiral CT technology has expanded the clinical applications dramatically.

1980's

The first MRI (Magnetic Resonance Imaging) device was tested on clinical patients.



PHOTO

Wilhelm Conrad Röntgen.
Lithograph.

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IAE

IAE history started in 1955 as manufacturer of electronic valves but very soon this production was abandoned and the company focussed 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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More traditional techniques like mammography screening can also take advantage from the high energy dissipation of this unit, consenting a substantial increase in patients throughput.

Finally, for any equipment, the small size, particularly on the side that faces the patient, increases the patient comfort.

Two separate focal tracks, small focus on 10° and large focus on 16°, complete the features of this device.

IAE SpA

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Metaltronica x-ray devices

Metaltronica has been established in 1977 for development, production, and distribution of medical x-ray devices. The first product developed by Metaltronica has been a vertical bucky stand with cassette size up to 120 cm and due to some peculiarity making it unique at that time is still requested today after 34 years.

Since the early years 80 Metaltronica started to develop Mammo units and in 1988 Metaltronica has developed Compact Mammo HF a revolutionary milestone not only for the Company but for the European market being the first European product with High Frequency High Voltage generator.

Since the introduction of Compact Mammo HF, Metaltronica has produced over 7000 units.

For Technology transition between Analog and Digital, Metaltronica has developed and introduced Helianthus in the year 2008 based on direct conversion Amorphous Selenium detector with performances able to compete at the same level of other products from Multinational Companies as demonstrated by several public tender results.

Metaltronica production philosophy is based on a flexible strategy by which production has been doubled with a reaction time of 60 days only reaching peaks of 140 units per month and more than 700 per year.

In 2015 Metaltronica launches its Tomosynthesis system Helianthus DBT optimized for digital imaging (2D and 3D) in breast cancer screening and diagnostic procedures. Metaltronica has chosen for its DBT System a technology that allows to gather sufficient information on larger volumes of tissue with low noise and high image quality.

Helianthus DBT uses an anti-scatter grid specifically designed for tomosynthesis and this makes it a complete solution to obtain excellent diagnostic images in 2D screening, 3D tomosynthesis and stereotactic biopsy.

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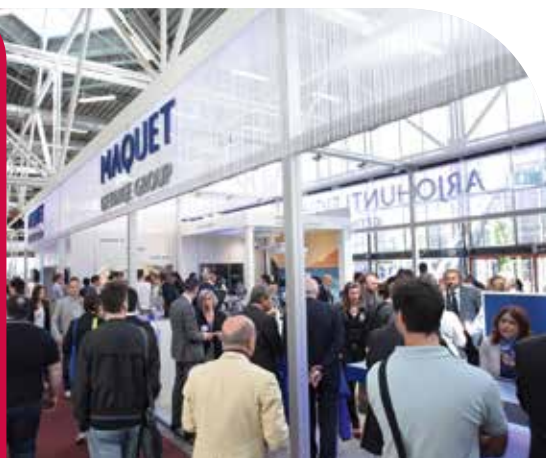
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Exposanita



The XX edition of Exposanita, International Health Care Exhibition, took place in Bologna, Italy, from 18th to 21st May 2015.

The figures of last edition confirmed the role of Exposanita as international exhibition. A fact evidenced by the growing number of foreign visitors and exhibitors who chose to attend the event.

With **29,215 visitors** and **713 exhibitors** in the last edition, Exposanita is **Italy's unique exhibition and Europe's second largest event** dedicated to health care and assistance, a must-attend appointment for international manufacturers willing to enter or strengthen their presence in the **Italian market**.

Being the main health care exhibition in the **Mediterranean area**, Exposanita also represents a handy getaway for reaching **Eastern European countries** and for those belonging to **Northern Africa and Middle East**, where the demand for health care is supposed to grow more and more.

Italian health care market saw a **growth in expenditures of 28% in the last 9 years** and represents one of the most appealing markets in Europe. The supply system presents a variety of players involved and Exposanita is the best place to meet them all: public health care managers (33%), medical professionals (10%), non medical professionals (27%) and international distributors (20%). According to the customer satisfaction survey carried out in 2014, 96% of them were satisfied with their visit and 85% of them will come back in 2016.

The exhibiting area at Exposanita has two main focuses: Hospital, on hospital products and technologies and Horus, on handicap and rehabilitation devices. The last edition will hosted a large number of special events to enhance the visitor experience. In the area dedicated to hospital, a latest generation operating room for cardiac surgery and neurology with adjoining sterilization center was set up and wide importance was given to the topic of hospital buildings. In the halls dedicated to disability, visitors with special needs tried Paralympic sports, test accessible vehicles, found solutions for accessible tourism and participated in a platform for job integration. Teachers and therapists found new ideas to teach disabled children in the new "Playground for all".

Leading international manufacturers have already confirmed their participation at 2016 edition. Austria, Finland, Spain and Turkey will take part with their national pavilions and other countries are now applying. To enlarge the number of international exhibitors, all of them (even those who take part individually) will be granted special economic conditions to participate, discounted hotel rates and B2B meetings with selected Italian buyers.

As in the past editions, commercial delegations of wholesalers, distributors, importers, agents and general contractors coming from Brazil, Turkey and India will attend the exhibition to get in contact with the best manufacturers. Exhibitors interested in exporting their products outside Europe will book for free their 1-2-1 meetings with delegates, in order to present their products and possibly establish new partnerships. In the last edition, 70 exhibitors met 52 buyers in over 200 B2B meetings, and more than 40 new agreements were signed.

Apart from these international delegations organized with the major economic chambers, consulates and private bodies supporting international exchanges, all international visitors are welcomed to Exposanita. They will be offered free admission to the exhibition and to the international welcome lounge, discounted hotel rates and workshops to get to know the Italian health care market.

For further information about exhibiting or visiting, please contact Mrs Isabella Baricchi - isabella.baricchi@senaf.it or visit www.exposanita.it/promoestero_infomedix



ECR 2015 marks 10 years of the ESR with record participation

The European Congress of Radiology (ECR), Europe's largest medical imaging conference, took place on March 4–8 in Vienna, Austria, with an all-time high number of participants and various innovations. ECR 2015 also marked the 10th anniversary of its organiser, the European Society of Radiology (ESR).

More than 25,000 people took part in the meeting this year; 2,000 more than in 2014. A total of 19,569 participants from all over the world poured into the Austria Center Vienna, home of the ECR for the past 21 years, led by 1,010 Italian and 920

German delegates, and hundreds of attendees from 120 other countries. Participation was boosted further by ECR Live, the meeting's free online streaming service, which enabled almost 6,000 viewers to watch more than 1,500 lectures in real time on every continent.

Audience sizes in the lecture rooms increased by 4% compared with last year, hitting a peak on Thursday, the second day of the congress.

The Opening Ceremony on Wednesday filled Room A almost to its full capacity, with 1,900 participants, 34% more than last year. As many as 1,300 delegates attended the Nikola Tesla Honorary Lecture on brain cancer imaging given by leading neuro-radiologist Prof. Anne Osborn, from Salt Lake City, USA.

The two Image Interpretation Quizzes proved as popular as ever, both attracting large crowds. The 'Beauty of Basic Knowledge' programme on skeletal radiology and the 'Joint Course on Emergency Radiology' organised by the ESR and the RSNA also ranked among the most popular sessions.

Increased attendance may also be the result of the newly introduced session formats, believes ECR 2015 Congress President Prof. Bernd Hamm, from Berlin. The changes, which aimed to help delegates navigate the meeting's educational programme, grouped educational sessions into five branches, according to the different educational levels defined by the European Training Curriculum for Radiology.

"Efforts have been made to improve the visibility of the meeting's dense range of educational sessions.

Like its predecessors, ECR 2015 covered the whole range of educational issues from undergraduate medical education to subspecialised continuing professional development, but it was easier to identify which sessions were suitable for you," Hamm said.

For the first time, the ECR also featured two sessions with patient organisations to reinforce the dialogue between radiologists and patients. The ESR Patient Advisory Group (ESR-PAG) invited both radiologists and patient representatives to discuss the challenges of providing true patient-centred care and communicating the results of radiological studies to patients.

The 'ESR meets' programme welcomed Germany, the Republic of Korea and Turkey, who each hosted their own sessions, as well as the European Association of Urology for a joint session with radiologists on prostate cancer. As in previous years, the European Federation of Radiographer Societies also hosted their own 'meets' session, this time inviting their colleagues from Germany, who held a session focusing on high-end and hybrid technology in the clinical and research work of radiographers.

Another highlight of this year's meeting were the celebrations marking the 10th anniversary of the ESR. Delegates soon spotted the Walk of Fame, a trail of golden stars around the entrance hall, featuring the names of the ESR presidents from 2005 to 2017 as well as 50 of the society's major milestones. In addition, the Wall of Fame gave every ESR member the opportunity to leave their mark at ECR 2015 in the shape of a golden star.

"We are pleased delegates took part in these actions so enthusiastically. Seeing the venue covered in stars was a poetic way to celebrate our anniversary, and it made everyone feel a part of the society," said ESR Past President Prof. Lorenzo Bonomo, from Rome.

The next European Congress of Radiology (ECR 2016) will take place in March 2–6, 2016 at the Austria Center Vienna.

The ECR is the annual meeting of the European Society of Radiology (ESR), which represents more than 60,000 radiologists worldwide. The ECR is one of the largest medical congresses in the world, attracting more than 20,000 congress participants. With 300 companies exhibiting across more than 26,000m², its technical exhibition is also the largest in Europe.

For further information, please contact:

European Society of Radiology | ESR

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MEDICA and COMPAMED from 16 – 19 November 2015 with a new set of dates (Monday to Thursday)

Unique innovation variety for the fields of diagnosis and therapy - Wanka and Gröhe are at the starting line.

Being a significant change, from 16 to 19 November Düsseldorf 2015, the world's largest medical trade fair, MEDICA, and the international leading supplier specialist trade fair, COMPAMED, which is taking place at the same time, are going to start. From this year on, both events will run over the course of four days in parallel to each other, being held on the new weekdays from Monday to Thursdays.

"Focusing on the normal working days of the week – instead of Wednesday to Saturday as has been the case up until now – will make it possible in the future to provide better guest distribution of the professional audience across the entire running time," explained Joachim Schäfer, the managing director of Messe Düsseldorf.

In November, once again, around 4,800 exhibitors from 70 nations will use the MEDICA in order to present the entire range of new products, services and processes for inpatient and outpatient care. No other event worldwide even offers close to this abundance of innovations.

Being clearly structured according to hall, focuses of the MEDICA trade fair include: Electromedicine / medical technology (more than 2,500 exhibitors), laboratory technology / diagnostics, physiotherapy / orthopaedic technology, commodities and consumables, information and communication technology, medical furniture and specialist furnishings, and building technology for hospitals and doctors' offices.

In parallel to this, at the COMPAMED 2015 in halls 8a and 8b, more than 700 exhibitors are going to be presenting their technology solutions and services that suppliers from the medical technology industry have to offer.

The networked patient Regardless of an overall high orientation for innovation, MEDICA exhibitors currently see themselves facing a market in the state of upheaval. In hospitals, investment decisions are primarily made by medical boards, in which, in addition to doctors, those responsible for commercial aspects also have a heavy say. The latest equipment is only in demand if it truly signifies optimum benefit for patients within the scope of the treatment process. In general, patients are assuming an increasingly active role.

What started as mini-programs for smartphones and fitness armbands has developed into a mega-trend and will considerably shape treatment in the future, for example, following inpatient care at home. More and more physical data, which is becoming relevant on a medical level, can literally be collected, processed and transmitted in the twinkling of an eye. The number of medical apps is rising on an almost daily basis. Experts currently assume that there are around 55,000 such mini-programs.

The trendsetter, MEDICA, with highlights within the supporting programme Medical technology providers are taking up such trends. They will present an abundance of innovations to collect and further process various physical data in an uncomplicated manner – as an application for the doctors performing treatment or designed as a way to check vital data from the very beginning in the hands of the patient. Here, the MEDICA is also meeting the requirements of its role as a trendsetter. The MEDICA CONNECTED HEALTHCARE FORUM, which celebrated its highly prestigious premier during the previous year, is now going to be continued. The subject matter under focus will be the networking of various healthcare players as well as patients with related technology solutions (in hall 15). Thereby, mobile health applications form a primary focus, whereby, this year as well, the MEDICA App Competition will be providing exciting ideas with regard to helpful programs for mobile devices.

The MEDICA HEALTH IT FORUM is also reflecting trend topics in the field of Health IT (also in hall 15). Here, telemedicine is the primary focus. For example, the federal education and research minister, Professor Johanna Wanka will use this IT forum on the day of its grand opening to present the new promotional concept for the federal government's medical data technology to a widespread audience of specialists. The objective of the development concept is to improve patient care and research possibilities by means of innovative IT systems.

Other forums integrated into the MEDICA specialist trade fair include the MEDICA TECH FORUM (product innovations in the medical technology industry as well as political, economic and legal framework conditions for high-tech medicine / hall 12) as well as the MEDICA ECON FORUM (hall 15) initiated as a joint effort by Messe Düsseldorf and the "Techniker Krankenkasse" (TK), a German health insurance company, on issues of benefit assessment and financing innovations – from the perspective of patients and health insurance companies.

Conferences closely associated with the trade fair Also this year again, the MEDICA EDUCATION CONFERENCE, which is organised by the German Society for Internal Medicine (DGIM), is offering a diverse programme. The four daily topics have been selected in such a way that they result in close integration with the trade fair's medical technological innovations: Surgery and new operational techniques (16/11), imaging, endoscopy and interventions (17/11), geriatrics, nutritional medicine and palliative care (18/11) as well as infectiology, infection and laboratory medicine (19/11).

With reference to the MEDICA conference programme, other highlights include the 38th German Hospital Conference, being a leading event for the management of German hospitals, and the European Hospital Conference, which is the meeting point of top decision-makers from European hospitals held every two years, promoting the exchange of information at an expert level. The top speaker at the grand opening of the German Hospital Day (16 November) is the federal health minister, Hermann Gröhe.

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- SPA & Wellness. Treatment abroad
- Pharmaceuticals

NEW! Section Medbuild held as part of the Russian Health Care Week

MedBuildExpo will cover all sectors of medical property development, i.e. all stages of design and construction of health care facilities from creating a project to installation and start-up work.

Topics

- Conceptualisation and design of health care facilities
- Technological concept design
- Electrical supply design
- Ventilation and air conditioning design
- Optimal equipment for various units and departments
- Health care facilities construction (from paperwork to final equipment supply)

Visitors

- Investors
- Public authorities
- Architects/designers
- Project managers of health care facilities construction

We invite design, construction and fitting companies working in the medical industry to become the event's exhibitors.

The Russian Health Care Week is organized by the State Duma of the Russian Federal Assembly, Russian Ministry of Health Care, Expocentre ZAO Supported by the Council of the Federation of the Russian Federal Assembly, Russian Ministry of Industry and Trade, Moscow City Government, Russian Academy of Sciences, Russian Chamber of Commerce and Industry, Russian Office of the World Health Organization.

Visitor profile

- 33% State-run health care facility/ministry/municipal health care/ design and construction of medical facilities
- 17% Wholesale of medical equipment/medical products
- 13% Production of medical equipment/medical products/pharmaceuticals/IT solutions
- 12% Retail of medical equipment/medical products/pharmacy chains
- 10% Private clinic
- 7% Rehabilitation/sports medicine/sport, fitness club
- 3% Logistic services (shipments, deliveries, etc.)
- 3% Advertising/consulting
- 2% Medical equipment maintenance

Visitor job function

- 37% • Head/head doctor of state-run health care facility
- 22% • Doctor/medical professional
- 16% • Owner/head manager/head doctor of private clinic/hospital
- 11% • Head/employee of wholesale company
- 7% • Head/employee of retail company
- 5% • Personnel of research, medical institute/student
- 2% • Engineer/developer

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Supplying Medical Equipment To Africa

Lights and shadows of medical equipment donations and purchase: an interview to Mr. Jean-Pierre Eudier, Dentist.

What is the real condition of medical equipment in the healthcare centres?

Healthcare personnel in developing countries mostly complains about the lack of adequate and well functioning medical equipment. Obviously, this shortage affects the quality of care provided and the healthcare workers' spirits.

In fact, in many developing countries up to 80% of medical equipment in the public sector is out of service, while in NGOs or in missions, conditions are often better. Warehouses and depots sometimes look more like cemeteries of abandoned equipment (often donations). This is due to several factors such as insolvency, inefficient technical service and untrained users and operators.

Among the healthcare centres in developing countries, we see too often medical equipment that, whether functioning or not, is inadequate and inappropriate for that country and its level of care. The basic principle is that the use of any equipment should have a positive impact on the institution's functioning and improve the health of the interested population.

All equipment will result useless if:

- Healthcare personnel isn't qualified for its use (for instance: ultrasound systems operated by an untrained medical assistant);
- The diagnosis for some diseases does not imply the possibility to treat the patient (such as a barium meal for a patient suffering cancer that cannot be effectively treated locally);
- The epidemiological context makes the use of the equipment so rare that health workers cannot maintain their expertise on it (see the use of ECG in rural Africa).

Many medical equipment companies are involved in donation programs to developing African countries. What can donors do in order to make their efforts productive in the long term?

Those donors who sincerely wish to help African people should get supported by a neutral practitioner that is able to set priority needs among the different sectors (by privileging hygiene over functionality, functionality over comfort, comfort over aesthetics). At the same time, the beneficiaries should give the donors a full understanding of their policies to prevent the donation of useless equipment.

The organisations that play a concrete role in the medical or aid-related activities should also adopt a policy based on such criteria, and have all their workers informed about it.

How can decision-makers make a difference in the correct choice and management of medical equipment?

The long-term success of the introduction of new technologies and the importation of adequate equipment involves much more than the simple purchase of the devices. In order to make the best possible use of this technology, it includes:

- access to information for decision-makers to define appropriate selection criteria;
- determining the place where the equipment will be installed and the obtained authorisations (homologation, licences, etc.);
- the existing capacity of maintenance and repair;
- determining if a training program for the operator is in place;
- evaluating the costs and economic revenues: investments, functioning costs, duration and potential savings;
- allocating a operating budget to cover the costs of spare parts and consumables which is rarely estimated at the time of collecting the specifications for a tender.

The selection, use and maintenance of medical equipment should be based mainly on the national means and know-how available. This is crucial as a shortage of local resources may prevent the introduction of some technologies.

For historical reasons, the purchase and use of medical equipment is a practitioner's task, in developing countries as much as in the industrialised world. The healthcare professionals (and doctors in general) bring forward a number of reasons for this:

- being at the same time users and specialists, they know better why one devices is better suited than another for a diagnosis or treatment;
- many devices and instruments have been developed according to the requests and indications of medical personnel and in cooperation with medical practitioners;
- as a critical user, and because of her long training, a practitioner is well qualified to evaluate the performance of medical equipment.

However, it is not a secret that when it comes to technical issues, medical practitioners seldom use a prejudice-free, rational approach; they tend to choose equipment that is more sophisticated than necessary, for the treatment of rare and exceptional diseases. Important issues are generally neglected, such as:

- Economic considerations about the real cost of use and availability of resources. In developing countries, the total value of medical equipment accounts for a large share of a national budget. Few public services other than healthcare move, in proportion, similar amounts of money. Moreover, maintenance costs, which usually represent 5 to 15% of the total value of the in-

vestment in our countries, might rise dramatically when these consumables have to be shipped in remote areas or, in the case of donations or 2nd hand equipments provided by charity organisations, the spare parts do not exist anymore. Therefore, an economic analysis is essential before taking any decision on purchasing medical equipment, but doctors and nurses aren't usually specialised in this domain.

- Technical considerations: are the local people familiar with the equipment? Is the technical documentation available? Is after sales service guaranteed? Is the duration of the equipment known? How about the necessary energy supply? And so on.

- Epidemiological considerations. Not all the doctors are also epidemiologists. In fact, the majority of physicians tend to exaggerate the clinical conditions they are faced with. Very often, efforts and resources made available for diagnosis and treatment of exceptional diseases are more important of those for ordinary diseases.

- The importance of evaluation and monitoring for a rational management of the technical operations. What performance indicator should be picked? What data are available for further information and which are essential to determine the decision?

- Psychological and sociological consideration. It may be that the concept and design of some technologies aren't accepted by the patients (for instance, some pregnant women may fear the high patient chairs used in the developed countries).

Most of the newly trained physicians had the chance to access sophisticated equipment during their studies, and may consider "inferior" practicing outside that technical environment.

Medical personnel alone is rarely fit to take into proper consideration all these parameters, and often ends up opting for "inadequate" equipment. Hospital managers aren't safe from such ill-judged choices, too, since their medical competence is limited, and technicians as well do not have the necessary medical and economic expertise.

Clearly, the individual approach is not what you would recommend. Then what would you advise for a better selection of medical equipment?

Choosing the adequate equipment requires some time and a long experience, and it should be the result of a collective reflection by a multi-disciplinary team. Its members (physicians, nurses, technicians, managers, public health consultants) should all equally have their say to come to a rational decision.

Such "reflection boards" must be present at all levels of the health system, from the national to the regional and district level. They should also have clearly defined tasks and contribute to establish a controlling system.

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The board can come to rational conclusions by adhering to specific criteria, based on information that is available but hard to retrieve in developing countries. However, there are innumerable publications on this topic: scientific articles, books, professional journals, standard lists, specific medical directives, manufacturers' documentation and so on.

In order to make an effective decision, the following steps are crucial:

- Determining the minimum and maximum degree of sophistication required to reach the objective, the works to be done and safety measures.
- Collecting the available data: statistics, epidemiological information (prevalence and incidence of main diseases), particular risks of some diseases for patients and community, etc.
- Taking a census of the available personnel, their competences, roles, working load, needs and possibility of supplementary training.
- Measuring the public health system: areas to be covered, size of the population to serve, tasks assigned to the healthcare services, specific aspects of the country and so on.
- Analysing the economic situation, the budget volume and financial control as well as the global cost of the equipment, also taking into account:
 - purchasing cost
 - transportation
 - storage and logistics (facilities, water and energy supply)
 - personnel (wages and training costs)

- spare parts and consumables
- maintenance
- replacement cost at the end of use
- handover or destruction costs

- Identifying the local representatives of the manufacturer; the interested governmental or semi-public organisations, the suppliers available in the country's healthcare services. Unreliable or erratically available equipment may be worse, for the user, than none at all. The resources available for maintenance and repair determine the level of technical expertise accessible by the hospital. An effective use of these resources also depends from: the availability of after sales service, spare parts and consumables; clearly understandable instructions for use; the equipment adaptability to local climate and technological environment; (quality of water, electricity, gas, premises, ventilation etc.); compatibility with the equipment already in place; the existence of a warranty contract; the possibility to get training from the manufacturer.

What about the “vexata quaestio” of low-cost vs quality? How to deal with the need for reliable equipment in a condition of chronically limited budgets?

Acquiring medical equipment is a long and costly process. The delivery may take from 6 months to 3 years; costs involved in planning, delivery, training and installation may exceed by far the



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cost of the equipment itself. Buying “low cost” is still very common, but the transportation and installation costs of cheaper, often poorer quality equipment are also high. Moreover, the replacement of low quality products is sooner necessary, unplanned expenses rapidly pop up and users must once again wait for a new delivery.

For the majority of the developing countries, considering the transport delays, the financial constraints and the conditions of use, the purchase of higher-quality equipment eventually proves to be the best choice and the most economical, too. Quality should not always be synonym with sophistication.

Highly sophisticated equipment generally offers wide possibility of use. Digitalized procedures allow exceptional performances and technical achievements. Routine operators do not normally use all the available options. They do not have, or do not dedicate, the time necessary to familiarise with all these procedures. Most of the users usually prefer more simple equipment, rather “rustic”. According to some studies, routine operators handle efficiently equipment offering three types of procedures for use. Beyond that, such equipment may only be operated by specialists.

How would you summarise your suggestion for a more rational and efficient provision of medical equipment to the developing African countries?

In some cases, even the most elementary products are lacking, in some other, the “hyper” sophistication of the equipment leaves it largely underused. One may find the most modern radiology apparatus in hospitals of a remote district, completely unfit for the real needs of the local population, too complicated to use for the operator and too expensive to maintain. Under these conditions, it is difficult to treat population in an efficient way, even for the most skilled practitioner. By examining the technical issues of the equipment, it is clear that a deficiency occurs in the health services system, depending on a dysfunction in the information cycle and insufficient training of personnel, as well as logistics shortcomings. The implementation of a national policy for medical equipment is still too rare, as well as efforts to standardise it.

The lists of medical equipment and supplies should revolve around the health needs of the local population, and include devices that can be operated by staff with limited training and often in difficult conditions, that also have a satisfying duration in economic terms (as long as they are correctly maintained and repaired).



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Democratic Republic of Congo:

A Device Designed to Treat Sleep Apnea in Adults Saves Newborns



In recent months, the Project to Support the Health System in the Kinshasa Province (PASSKIN) introduced the Continuous Positive Airway Pressure machine (CPAP) for the first time in a hospital of the Congolese province. Under the PASSKIN Project, this device which was initially intended for the treatment of sleep apnea in adults will be used to save newborns and older children in respiratory distress.

The CPAP is commonly used for adults who have various conditions, such as sleep apnea and respiratory distress (caused by pneumonia, pulmonary edema, hyaline membrane disease or severe asthma attacks). Nevertheless, according to the promoter of this initiative, Dr. Selim Rashed, PASSKIN's Public Health Specialist in Canada and Pediatrician at the Maisonneuve-Rosemont Hospital in Montreal, it can be easily adapted and be used for children and newborns.

"The CPAP has the advantage of having very few side effects, unlike many conventional intubation techniques that are more invasive. For some years now it has been used for infants and children in developed countries", says Dr. Rashed.

The Continuous Positive Airway Pressure machine comes with small equipment such as a pulse oximeter to measure the oxygen level in the blood and a nose pump which is used to clear both the nose and nasal passages. As they ease breathing, these complementary instruments also contribute to reducing the use of oxygen, a significant cost for parents.

During a visit to Kinshasa, Dr. Rashed presented the CPAP machine to the PASSKIN team members who were immediately excited about the potential of this device. The CPAP also generated a keen interest in the hospital where the project's team members introduced it. Because it is relatively simple to use, training on how to operate it was given on site to the Senior Medical Officer of the maternity ward and the Senior Medical Officer of the pediatric department who has the responsibility of training the other physicians and nurses of his department. Pierre Tayele Mady, PASSKIN's Public Health Officer recently received a call from the Senior Medical Officer of the Bumbu Hospital. Less than a month after being introduced for the first time, he was told the CPAP machine has successfully helped a child in respiratory distress.

Considering the fact that this condition is a major cause of newborn mortality within 48 hours of birth (20 to 38 per cent of cases) and an important factor leading to mortality in the first year of life, CPAP appears to be an extremely useful tool in a country like the Democratic Republic of Congo where most hospitals only have very few devices designed to ease newborns' breathing.

CPAP cannot be used in rural health centers with no electricity and no doctors. Under these conditions, the bag-valve mask is a minimum measure that can also save lives in critical situations. Thus, in addition to continuing the experience of the CPAP machine at the Bumbu Hospital, the PASSKIN team plans to provide 60 health centers with bag-valve masks and to introduce the CPAP in the other general hospitals targeted by the project's interventions.

Reducing Newborn Mortality Rates

Under the PASSKIN Project, a special emphasis is placed on reducing the number of newborn deaths because neonatal mortality rates remain a concern and stands at 28 deaths per 1,000 live births, despite the clear improvements noted by various studies in recent years (DR Congo's Demographic and Health Surveys I and II).

During the first two years of the project, several activities were carried out in order to contribute to reducing neonatal mortality rates: capacity-building for health workers, providing medical equipment to improve the care of pregnant women and newborns in targeted hospitals (incubators, ultrasound machines, etc.), providing an ambulance to transfer emergency cases and more.

In the light of the positive results achieved with the CPAP machine at the Bumbu Hospital, PASSKIN's team members are hopeful that this device and its complementary equipment will contribute to further reducing newborn and child mortality rates and to achieving the Millennium Development Goals in the DR Congo.

MALI: DECLIC Provides Additional Support in the Field of Mental Health

In response to the lack of adequate training for general practitioners in the field of mental health in Mali, the DECLIC Project has initiated activities designed to provide additional support to the Faculty of Medicine and Dentistry (FMD) of the University of Technical Sciences and Technologies of Bamako and to the University Community Health Centres (CSCOM-U) in order to consolidate the integration of mental health into primary care services.

Under current conditions, few Malians receive psychiatric care in the formal health care system. With support from Julie Achim, Maryse Benoit and Miguel M. Terradas, members of the University of Sherbrooke's (UoS) technical assistance team for mental health, the DÉCLIC project wants to contribute to changing things.

A first field mission from the UoS team was carried out in March 2015 with the main objective of developing various mental health screening, evaluation and training tools that are adapted to the Malian context.

Professors Achim, Benoit and Terradas had the opportunity to observe therapeutic sessions between professionals and patients and to contribute to strengthening the capacity of doctors and paramedics by holding a training workshop on mental examination.

In addition, the DÉCLIC team organized an activity aimed at developing a mental illnesses inventory tool for Community Health Centres (CSCOM). This very productive activity gathered doctors, nurses and midwives, as well as marabouts, traditional healers and Donsos (traditional hunters).

"I was pleasantly surprised by the level of knowledge, practice and communication of traditional healers, marabouts and Donsos, recounts Dr. Mahamane Maïga, DÉCLIC's Director of the technical assistance.

They gave us, modern medicine practitioners, good lessons of human family and social contact to support the mentally ill."

Following the field mission, the team of experts said it was strongly motivated to stay involved, mainly because of the huge need for mental health care they observed.

The Centre for International Cooperation in Health and Development (Centre de Coopération Internationale en Santé et Développement -CCISD) is a Canadian not-for-profit corporation, developing and managing international health projects since 1987. Thanks to partners and experts in Africa, Latin America, the Caribbean and Canada, CCISD has implemented significant initiatives with lasting positive results. For over 25 years, CCISD has been leading foundation-building actions that spring from its many areas of expertise in international health. Today, it is recognized for its effective intervention strategies for the response to AIDS, epidemiological surveillance and access to primary health care, and for its ability to manage large-scale initiatives working together with local populations.

Source:

DR CONGO: A Device Designed to Treat Sleep Apnea in Adults Saves Newborns - www.ccisd.org

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(Stuttgart – Germany)

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Website: www.messe-stuttgart.de

Contact person: Manuel Kooss
Email: manuel.kooss@messe-stuttgart.de

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2016 May

• 18-21/05/2016

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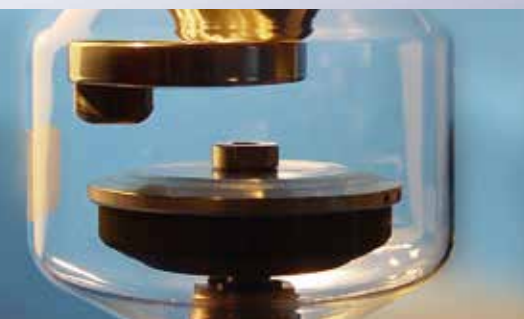


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