



Wonder Cures

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Editorial

Making Medicine

Many factors contribute toward a conducive environment in which the pharmaceutical industry will invest in a country or partner with community members," says GlaxoSmithKline in its April 2011 Global Public Policy Issues. "Key amongst these factors are appropriate economic, scientific and market conditions. A robust legal framework is also important. Businesses will migrate naturally to where these conditions exist and are sustainable."

Manufacturers of pharmaceuticals seem to have left West Africa in agreement with GlaxoSmithKline, thus leaving medical services in the lurch. Counterfeit drugs are now the norm, averaging more than 30% of the medicines on sale. Coupled with self-medication, and high incidences of drug resistance, poor people are seeking alternatives to orthodox medicines, many of which border on the fantastic.

Claims to having found cures for ailments in West Africa can be categorised into three: the spiritual claims, the herbal and the pseudo-scientific. A massive industry has emerged against the grain of established medical and pharmaceutical sciences, claiming cures that orthodox medicine is either unable to or national medical establishments are ill-equipped to handle.

This edition of our newsletter examines the various 'advances' being made in the search for alternative cures and treatments. In Benin Republic, witchcraft and sorcery have received official state recognition and play significant roles in the response to disease. Traditional bonesetters in Nigeria have a feast as only three orthopaedic hospitals are saddled with the task of treating many fracture patients from ever-growing vehicular accidents. The new approaches being adopted by Pentecostal churches in the face of infertility and terminal diseases like cancer are forcing mainline churches to change their styles. What will mainline medicine do?

The cost of and access to medicines have proved to be major challenges, especially in respect of the search for alternatives to antiretroviral drugs used in the management of HIV and AIDS. On the average, the monthly cost of treating HIV infections with proprietary antiretroviral drugs exceeds the monthly minimum wage. Local production is therefore not only a recommended next step but such arrangements must allow for production of cheap, generic versions as well, as has happened in Brazil. From Nigeria, we run an interview with the CEO of the government's pharmaceutical research institute, revealing that the government is resuming production of Niprisan, a locally discovered drug for managing sickle cell disease. This step contains every ingredient of stardom on any scale of what is desirable: local research, solving a local problem, local production, and feeding a local market.

--Odoh Diego Okenyodo

Miracles as Medicine

Medicine in Sub-Saharan Africa is facing a huge challenge. A belief system that sees medication, diseases and health in general as spiritual rather than biological processes is becoming hegemonic. Every night in Accra and Lagos thousands seek out evening Pentecostal prayer camps: most are women who are suffering from infertility. There is an empirical basis for this transformation.

The first element is the growing inefficacy of modern medicine that has built up the resistance of microbes to drugs. In Nigeria, more than 500 patients, predominantly children, are known to have died from the use of the toxin diethylene glycol in the manufacture of fake paracetamol; fake tuberculosis and malaria drugs alone are estimated to have killed 700,000 people a year. The second element is the amplification of this process due to the massive importation of fake and sub-standard drugs. Africa and Asia import fake drugs that exceed 50%. The third is the withdrawal of state from subsidising health facilities, the growing cost of medication within a context of growing poverty and the subsequent search for cheaper alternative medication. Ciprofloxacin, which is classified by the WHO as an



essential medicine, is widely used in treating diarrhoeal diseases, sexually transmitted infections and opportunistic infections in people living with AIDS, but due to the high cost of it, many patients on the continent could not access the drug. The outcome is that modern medicine is becoming something to avoid since it is found to be fake, expensive and beyond the reach of the common man.

Recourse to religious beliefs and practices is a large part of the problematic and one key element is the growth of Pentecostalism. Pentecostalism as a form of Christianity has shown a high capacity to relate effectively to discourses about traditional African religions and cultural practices as there is general scarcity of references to African Traditional Religion among the Orthodox churches. Orthodox Christian Missions simply condemn traditional religions and do

not respond to the issue of the reality of the forces contending in the African cosmology expressed through such cultural practices. What is novel about Pentecostalism is that it directly addresses the problem of the forces of evil and incites public testimony about the workings of evil forces, producing discourses, which expose these forces and shows the individual how to overcome their perceived dangerous and destructive influence. Ghanaian and Nigerian churches set aside a special night vigil days for 'deliverance' for those that are being attacked by the forces of witches and wizards. These narratives enable the individual to constitute himself as an historical agent who is empowered in their personal life and, together with the community of

believers, has the strength to do battle with "powers and principalities."

Pentecostalism provides analysis based on the action of enemies using spiritual forces. It also provides a response of God's angels intervening to counter the dark forces by providing health and wealth, and also adding heaven, success and happy family life into the bargain. This combination of a gain-all and lose-nothing cocktail has produced a new dynamic impacting strongly on health practices.

Countless Africans join Pentecostalism as a result of tribulations they face with expectation of miraculous healing and promises of breaking away from poverty. In a Line of Fire Revolution Radio interview, preacher Reinhard Bonnke said nearly 6 million Nigerians jammed a park in Lagos for a healing service he conducted. By emphasising its claim to solve problems of daily life, Pentecostal religious leaders seduce people that are faced by challenges of life such as diseases, bareness and abject poverty. Pentecostal churches become the last resort after having tried "everything else".

Among Muslims, the belief that sickness is spiritual and its healing is also spiritual, that Allah brings sickness and in all disease Allah has created, he has also created remedy for them all, is prevalent. For instance, President Jammeh of Gambia who has shown the world that he has cured many HIV/Aids,

asthma and diabetes patients lays claim that this ability comes from Allah.

Testimonies are eloquent in this regard:

Tsholofelo Setshiro from Botswana: I had been healed from extremely poor vision. I was wearing glasses and if I remove them, I could not see more than two metres. Diagnosed with shortsightedness, the only solution from medical professionals were the glasses and medications for the eyes but to no avail. After receiving prayer from Prophet T.B. Joshua, the next morning I woke up and as I was leaving the room, I left my glasses. When I finally realised that my healing had been perfected, I was already outside walking around without them. I then noticed that I could see details of things quite a distance.

January 18, 2007, hundreds of patients have benefited from his cure. Nine patients started the treatment at State House in Banjul. The patients included Lamin Ceesay of Santa Yalla support society, Ousman Sowe of the Nyaniya Killing in Brikama, six female and two and a half-year-old boy who were all diagnosed as HIV/Aids positive. Out of the nine patients who were treated, seven had great improvement in their CD4 counts. This was confirmed by the lab results and by Dr Mbowe, SoS for Health and Social Welfare. The test was carried out by the Bacteriology-Virology laboratory of the university teaching hospital, Dakar Senegal and it was shown that, for the patients with HIV 2, such as Adama Manneh, Fatou Fadera, and Fatou Kaw had unde-

tectable HIV virus, whilst Dado Jawo, had a low viral load. Similarly, the test also showed that Ousman Sowe who was diagnosed with HIV 1 also showed an undetectable viral load level.

The trend is that many of the Pentecostal churches in Africa have pastors who urge their members not to take drugs; they push the line that taking drugs negates the fulfillment of word of God in their lives as God is capable of healing them of any disease. Some worshippers died of HIV/Aids-related illnesses as their churches discourage them from taking anti-retroviral drugs and other related medication. Apostolic and Pentecostal churches in Zimbabwe have been cited as the major culprits. Tambudzai Mazvihwa from Banga Village in Shurugwi died as a result of this. Church elders prescribed holy water instead of the pills for her. In a related development Sky News has it that at least six people have died in Britain after been told by evangelical churches in London, Manchester, Birmingham and Glasgow that they had been healed of HIV, and could stop taking their medication. Many of the Pentecostal churches have established healing schools where the only form of

medication is prayers. Christ Embassy Church has a healing school in Lagos State, Nigeria.

Hardly any Pentecostal church service passes without testimonies about healing, and increasingly, other Orthodox churches such as Anglican, Methodist and Catholics are engaging the same path.

Health policy makers in West Africa must devise strategies to address this phenomenon. At one level, the struggle to improve the efficacy of modern medicine through combating the importation of fake drugs and discouraging self medication must continue. And this must be done by giving more power and support to institutions who fight this as we have seen in the case of Nigeria's food and drugs regulator NAFDAC, and professional associations, such as those of pharmacists, doctors, and local pharmaceutical manufacturers. At the same time, organisations like Health Aid in Ghana, must improve their efforts at educating communities in the North of Ghana on hygiene and health problems in general. The Catholic Institute for International Relations and Action Partners Ministries which provides healthcare to around eleven developing countries in Africa, South America, the Caribbean and the Middle East must become more engaged in understanding the reasons for the trend of moving away from modern

medicine and carrying out advocacy for science made modern medicine. Governments in sub-Saharan Africa must take good pay for health workers in the region seriously as doctor brain drain costs Africa \$2 billion due to doctors' migration to Britain and US in search of better pay for their services. It might also be useful to engage the clergy and encourage them not to present spiritual and medical cures as mutually exclusive as people die in crusades and rallies because of too much crowd.

-Dr Jibrin Ibrahim & Liberty Oseni

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The Voodoo Renaissance

The list of reasons to employ and summon a voodoo (or Vodou or Vaudou) god is endless, but increasingly prominent among them is the search for cure and healing. The worshippers believe that voodoo is their natural medicine¹.

Voodoo cure is of two kinds: healing and cleansing of an individual or an entire city. While healing could involve mineral, herbal and animal and spiritual rituals, cleansing on the other hand passes through acknowledgement of a wrong deed and subsequent appeasement of the relevant(s) spirit(s) and the offended. To this point, and to mainstream voodoo healing practice into peace, stability and harmony, an NGO headed by one Prof Beatrice Aguessy, the Institute of Development and Endogenous Exchanges (IDEE) in 1998 led the officials of the city of Ouidah in Benin Republic on a 3km long trek and kneeling for forgiveness on the 'Route de l'Esclave' (Slave Route) and repentance from the sins committed against their brothers and sisters who were sold by the Chiefs of the city during the slave trade.

The process of cleansing was immortalised by a set of monuments to which the stability and social progress ever since obtainable in the land are attributed. The cleansing is thus replicated every third Sunday of the month of January.²

Cities are increasingly becoming voodoo fiefdoms.



In the neighbouring capital Lome, Togo, a renowned market serves as the regional voodoo medicine market where merchants sell basics of life; all kinds of materials are purchased for rituals, protection and cure from all kinds of diseases. About 30 miles from Lome is another city called Glidji where the Ewe tribes, particularly the Guen, gather every year for the Ekpe Ekpe or Kpesoso Festival in which the priest is to seek, find and show to the gathered crowd the Ekpe (sacred Stone) picked from a walled sacred forest of the city. The features of the Ekpe is the colour and inscriptions thereon which are a set to be unveiled by the priest. The 2011 Ekpe is white and portends happiness, health and accident-free year. The health implication is that difficult diseases will be cured that year, and that the adherent will survive challenging and risky modern surgery. If the Ekpe portends otherwise, people would be found resisting surgery, orthopaedic services for fear of amputation and other life saving treatments. Patient behaviour will be completely strange to health

service providers who are not part of or do not understand voodoo society.

Voodoo easily syncretised with the orthodox faiths and those believers intrinsically think and act first as a member of voodoo society. Therefore health choice and behaviour of millions of people are being shaped by Ekpe or other divinities. Health awareness and education has to take into consideration these peculiar realities of the people.

Many other festivals across West Africa celebrate new yam, new grains in which food is dedicated to voodoo first and foremost before humans begin consumption. This is believed to guarantee good health, cleansing from diseases related to nutrition, and plenty harvest the year to come.

Although voodoo is deep seated and rooted in these societies, the recrudescence in voodoo can be also explained by objective

Setting the Bones of Traditional Bonesetting

Although the deficiencies of traditional bonesetters have been shown, with adequate training in the basic of orthopaedic care, they can be utilised to provide useful health services at the primary care level (Agarwal & Agarwal, 2010:1)

Bone-setting as an alternative health service¹, is an old practice in African societies that is available and accessible to people in both rural and urban centres. From a non-western standpoint, bone-setting as practice of joint manipulation of sprains, dislocations and simple to complex fractures, by manipulating the bones by applying splints to the area around the fracture or wound. In some instances, incantations are made on the affected area as a way of invoking the spirit of the ancestors for divine intervention and healing (Darimani, 2007:3). Within the realm of primary fracture care where both traditional and orthodox co-exists, there is a strong belief that the bone-setting is better at fracture treatment than orthodox or westernised

orthopaedic services².

The issue of cost effectiveness in terms of access for both lower and middle classes accounts for the prominence and prevalence of traditional bone-setting services in the region (Memon et.al, 2009:62). In fact, it was estimated that between 10 to 40 percent of patients with fractures and dislocations in the world are managed by bone-setters that are

specialists in the practice of traditional medicine³. Unlike orthodox medicine where there are prescribed fees, the situation is different with traditional bone-setters. In most situations, patients give what they can afford as an offering because there is a strong conviction and belief that the spirits will desert the treatment centres and make



Continued from page 6

circumstances of life such as the declining living standard, poverty, ineffective and incompatible modern health delivery system.

Patronage for religious and wonder cure will continue to be on the increase as long as the orthodox and modern health delivery

remain underdeveloped and inefficient. And this is likely to be so for the many decades to come, as indeed, there is no trustworthy revolutionary modern health development plan in the horizon.

-Paul Yao Ahiave

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the medicine powerless, and in some cases, make the practitioners go mad or die when monetary rewards become the primary driver (Darimani, 2007:82).

In the case of Nigeria, there are presently three specialised National Orthopaedic Hospitals (NOH) in Enugu, Lagos and Kano. Notwithstanding the setting up of these hospitals, it is widely accepted that there are traditional bone-setting centres located in both rural and areas than westernised orthodox medical services. Under this framework, efforts towards integrating the traditional and orthodox methods in the medical curriculum have been on ground in the last two decades (Tahzib & Daniel, 1986).

Experiences within the region shows that a significant number of patients see traditional bone-setters as a first resort, before seeking orthodox treatment. While they are patronised largely due to the fact that they offer cheaper and faster healing methods, ignorance and poverty are viewed as the basis for the continued patronage despite the complications associated with the practice (Udosen, 2009:1). On the whole, people still resort to Orthodox bone-setting services largely as a result of the failure of traditional bone-setting to meet acceptable results, with attendant complications arising from the low literacy rate among

practitioners of traditional bone-setting.

While practitioners of traditional bone-setting recognise the fact that advances in medical research and science requires more formal education, they also accept the idea of access to regular training under medical supervision. Despite all these, it was observed that orthodox practitioners are against the promotion of traditional bone-setting and medicine, as well as their integration with modern healthcare delivery system. This accounts for the climate of mistrust that exists between the two forms of health care delivery (Agarwal & Agarwal, 2010:4).

A fundamental health challenge posed by the growing influence of tradition bone-setters in West Africa lies in the lack of modern medical facilities such as wheel chairs, ventilated wards and beds for patients. In most cases, the practitioners lack safety gloves as they use their bare hands in examining and treating patients. This poses a greater health risk for both the patient and the practitioners.

Nevertheless there is a sense in which traditional bonesetters will still remain critical providers of health care. The challenge lies in the provision of adequate and effective training in basic and modern orthopaedic care as a way of reversing the deficits that characterise their activities. In the final analysis, while it is difficult to stop traditional bone-setting in West Africa due to the complications associated with their activities, it is easier to contain the complications associated with the activities of their practitioners.

Chris, M.A. Kwaja

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Asthmaton Bears Hope for Asthma Patients

A herbal preparation with potential for treating the over 20 million sufferers of asthma has been given provisional license by the Nigerian National Agency for Food and Drugs Administration and Control, NAFDAC. With registration number 04-9954L, Asthmaton is its trademark name. It is sold as a two-sachet pack of coarse powdered wood.

According to its compounder, Dr Abbas Waziri, who holds a PhD in geology, the product is made from folk traditional northern Nigerian medicine and has been used to treat over 1000 patients since 1991 when he started administering it informally. It is carefully assembled from the plants *Calotropis procera* (known in Hausa as *Tumfafiya*) and *acacia* (Hausa: *Karo*). Patients are directed to take a sachet of the drug four hours before breakfast by mixing the powder with a cup of custard powder or similar local beverages. The second sachet is taken in the same manner three days after. Often, the drug causes nausea or vomiting for a very short time.

But, Dr Waziri is not keeping the innovation to himself. He has tried to form alliances with pharmaceutical scientists in order to stand-

ardise his claims and build a more rational and acceptable basis for Asthmaton. Before getting a provisional approval from NAFDAC and patented in 2007, he had submitted his drug to the National Institute for Pharmaceutical Research and Development and to

NAFDAC's laboratories. Subsequently, he has collaborated with academics at the Faculty of Pharmaceutical Sciences at the Ahmadu Bello University Zaria for pharmacological studies and opportunities to formulate the product as pills.

Speaking to West Africa Insight, Dr MS Abubakar, an Associate Professor of Pharmacognosy and Drug Development at the Faculty of Pharmaceutical Sciences, who conducted acute and sub acute studies on the product, says there is a strong lead for finding an asthma cure in the herbal drug. In his words: "It [Asthmaton] is effective. It has got some scientific basis and can be developed as drug for people who are poor and have asthma. It [the raw materials] can be found even in your backyard!" He affirms that the formulation of the drug is safe in decreasing excessive stimulation by histamines in the trachea of guinea pigs.



Dr Abbas Waziri is pleased with the steps taken so far. On his own, he has enrolled for a new diploma in drug development at the Ahmadu Bello University. His vision for the drug is to set up a highly ethical US\$250,000-factory in Nigeria's second most populous city of Kano. "You know, because of the encroachment of the desert and the heavy industrial pollution in Kano, asthma is very serious there," he says. At the moment, makes Asthmaton available at the pharmaceuticals section of the mammoth-sized Sabon Gari market in Kano and via personal delivery. It's an apparently surefooted step towards the end for asthma.

Odoh Diego Okenyodo

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Niprisan: Pains of a Sickle Cell Remedy

Sickle-cell disorder (SDC) originates from Africa, Asia, Arabian and Mediterranean countries as a result of its advantage against malaria but increased outward migration from these countries promotes global spread to about 5% of the world's population and 25% of the population of Sub-Saharan Africa. In Nigeria and Ghana, the frequency of carriers is 30% and 15%, respectively. Nigeria has the highest rate of sickle-cell sufferers in the entire world. There are about 4 million patients in the country with 150,000 babies born with the disease out of the

200,000 born annually on the African continent. Furthermore, 100,000 Nigerian children are lost to the disease annually and 8% of the nation's child mortality deaths stem from sickle cell disease. Being the main victim-country of the ailment, it was thus not surprising that the first known anti-sickling drug, Niprisan, was developed in Nigeria. But, disappointingly commercial production of the life-saving product is still constrained by funds and legal tussles.

When the National Institute for Pharmaceutical Research and Development (NIPRD), established in the late 1980s, signaled efforts to advance trado-medical research in a bid to tackle the prevalence of SDC, it entered into benefit-sharing agreements with traditional herbal healers. This led to the late Rev. Paul Ogunyale sharing the traditional recipe for the management of the disorder in



1992. This later culminated into the development of the drug called Niprisan. Niprisan is said to be a non-toxic, natural anti-sickling agent for the treatment of sickle cell disorder produced out of four botanical species indigenous to Nigeria: *Piper guineenses* seeds, *Pterocapsus osum* stems, *Eugenia caryophyllum* fruit, and *Sorghum bicolor* leaves. The efficacy of Niprisan was confirmed through several scientific experiments¹ but the government of Nigeria lacked the industrial and financial capacity to take the medicament to the next level of

production.

Thus, on July 18th 2002, the Ministry of Health, acting on behalf of the Federal Government of Nigeria, exclusively granted license to a subsidiary of XeChem International in Nigeria (XeChem Pharmaceutical Company) to develop, market and distribute Niprisan for the treatment of sickle cell anemia under a brand name, Nicosan. To foster effective production and commercialisation of the product, the government created Sheda Science and Technology Complex (SHESTCO). In exchange, NIPRD reportedly received a 7.5% royalty rate

of gross sales, and an upfront cash payment of \$115,000 from XeChem, Nigeria. In all, the partnership marked the beginning of commercial production of Nicosan in Nigeria.

Nevertheless, it wasn't long before XeChem Pharmaceutical Company ran into bankruptcy. Following the bankruptcy of the facilities that produced Nicosan and lack of support by the government, the Director of TEAM sickle-cell once observed that, thousands of

people have started feeling the frequency and severity of the sickle-cell crisis.

The inadequacy of both parties to effectively manage and consolidate the potentials of Niprisan led to increase suffering of patients and many lives were lost in the process. Beyond bankruptcy and government insincerity are, amongst others; the steep increase in the price of Niprisan (US\$4 to US\$20-25) following the issuance of license for commercial production to XeChem denied majority of the population access to the drug; and poor quality control which arises from lack of data to document the influence of raw materials (i.e. plant material quality, age, time of harvest, location, soil quality, preparation, handling, etc.) on the production of Niprisan. Similarly, greed and corruption was also identified as a contending issue. It was evident in 2008 that the state-owned company in partnership with XeChem, SHESTCO, was alleged of fraud to the tune of N400 million. More so, instead of Nigeria to bolster the production of Nicosan, there was plan to give money to Astra Zeneca, a British-Swedish pharmaceutical company that manufactures Proguanil, to improve the lives of the people. What can be discerned therefore is the reinforcement of egocentric interest of the ruling class at the expense of the generality of poor peoples, especially those in the cities suffering

from asthma stimulated by industrial pollutants. All these conform with Nigeria's ranking on the 2011 Ease of Doing Business Index released by the World Bank. Nigeria was ranked 133 out of 183.

The Nigerian government halted the manufacturing and sale of Nicosan two years ago and the license was thus in limbo. As the effort to reinvigorate commercial production of Niprisan recommences, the Nigerian government needs to seek broader policies aimed at providing incentives for the private sector and entrepreneurs, improving regulatory capacity, facilitating international partnerships for technology transfer, address broad health coverage in Nigeria. Moreover, the government needs to promote policies aimed at the stabilisation of Niprisan's price, and to broker benefit sharing agreements between traditional medical healers and conventional scientists in order to effectively capitalise on the knowledge of traditional medical healers and researchers alike.

-Shamsudeen Yusuf

¹In one of the clinical trials conducted by NIPRD between 1996 and 1997 at Military Hospital, Yaba, XeChem reported that "73% of the 30 patients who participated in the study experienced no crisis during the 12 month trial period and the remaining 27% experienced less frequent and less severe crises." Similarly, Dr. Toshio Asakura, Iyamu E. W, and Turner E.A from Children's Hospital of Philadelphia (CHOP), USA studied the effects of the anti-sickling agent in transgenic mice. The histological

examination of the lungs of the control mice showed entrapment of massive numbers of sickled cells in the alveolar capillaries, although the degree of such entrapment decreased with the increased dose of Nix-0699 (Niprisan).

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“Why the Nigerian Govt is Producing Sickle Cell Drug”

Professor Karniyus S. Gamaniel (OON), PhD, FPSN, FPCPharm, the Director General/Chief Executive Officer of the National Institute for Pharmaceutical Research and Development has shown readiness to introduce a new life to the Institute. One testimony of this zeal is seen in his desire to resume skeletal production of the sickle cell management drug known as Niprisan, discovered by the institute in the mid 1990s. The neuropharmacologist speaks with Odoh Diego Okenyodo. Excerpts:



The Nigerian government recently announced its commitment to resume production of Niprisan again. What is the status of this pronouncement?

I just left the Federal Ministry of Health where we held a meeting of the Committee on the Production of Niprisan set up by the Ministry. Membership of this committee encompasses the Health Ministry, NIPRD, Nigerian Export and Import (NEXIM) Bank, NOTAP, commercial banks like Keystone and Diamond, and stakeholders like the Federal Ministry of Science and Technology. So that confirms the Federal Government's seriousness about commencement of production.

Was it just Xechem Pharmaceutical's bankruptcy that led to the collapse of the previous

production agreement or what else?

Xechem had a management difficulty sometime in 2008, their capacity to continue production had been dwindling and by December 2008 production of the drug fully stopped. They declared bankruptcy, NIPRD got wind of it and, following that, referred to the MOU that covered the licence and decided that the licence should be recovered. Their action was in clear breach of the agreement. The licence was returned to NIPRD after representations were made on the Institute's behalf through a lawyer resident in the United States where the case was instituted. The courts affirmed that the licence stood withdrawn. Since then, there have been attempts by Government to resume production but there were a number of difficulties, including funding. But, in view of the fact that this product is essential to the lives of many persons in and outside the country, Government took a bold step to see a way out, and that's why we are having the meetings, one of which I just came from.

Is another private firm taking over production or is Government still going to be involved in running this, given that the argument has always been that Government cannot

run a business?

As it is now, Government is looking at this situation from the angle of a social responsibility to get the drug out by all means. Profit is not uppermost on its mind at the moment; we are just saying, Let production resume and subsequently when that happens then we can hand it to a commercial entity that has the competence. So, this stage is going to be achieved through a cooperation between Government and the banks.

Has a specific amount been earmarked for this?

We have developed a production plan and there is an amount tagged to it, but that is an interim arrangement, the social responsibility arrangement that will provide medicine for just about 30,000 patients in a year. Once that is achieved then we can scale up or give full commercial licence to private entrepreneurs. From the researcher's angle, we are not set up to do commercial-scale production. For our own social-scale production, with about 500,000 or even less, we can have enough of Niprisan to make impact in the interim.