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**MICHEL DUMAS AND PIERRE-MARIE PREUX: PROMOTING TROPICAL NEUROLOGY
SILENTLY - THE GIST OF THEIR CONTRIBUTIONS**

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ABSTRACT

This article presents the contribution by two senior French Neurologists over the past three decades in building, developing and promoting 'tropical neurology' in a number of neglected countries of Asia, Africa and Latin America. It talks about the 'human, dedicational and contributive value' of these two experts who do not come from an English-speaking world. It highlights meaningful changes that have been achieved in different tropical countries as a result of their direct contribution. This overview may likely be a cause for learning and motivation to others to really work in and for tropical countries, where a large proportion of global health burden is to be found.

"To our shame, neglected diseases have not received the attention they deserve from European Union for actions". Such tell-tale statements in support of neglected diseases (NDs) have appeared time and again, yet little groundwork on NDs has made such statements and acknowledgments, a decorative one.

Despite a restrictive and unsupportive environment around NDs [1], Institut d'épidémiologie neurologique et de Neurologie tropicale" of Limoges (France) has been actively working on a number of NDs in a number of "less visible (neglected)" tropical countries. This institute was established in 1982 by Prof Michel Dumas (figure 1) and is run by Prof Pierre-Marie Preux (figure 2). Since then, the institute has been the only organization in Europe, and one of the very few in the world, which has brought together two neglected themes: "neurological disorders" and "tropical countries".

By establishing this institute, Prof. Michel Dumas provided an apt platform to conduct "real" ground work for addressing the neurological needs of those living in the tropical countries.

Although the term "neglected" is frequently used in the literature, there has been nearly no attempt to precisely define what exactly is "neglected". The current list of NDs includes only infections, while chronic conditions, such as epilepsy, seizures, dementia, amyotrophic lateral sclerosis (ALS), stroke, multiple sclerosis (MS), etc. have been subjected to a similar neglect in developing/tropical countries. These chronic conditions also inflict severe burden in the poorest regions and have a known association with several neglected infections that are endemic in these regions. Chronic conditions do not cause dramatic outbreaks but rather exact their toll over a longer period of time, leading to crippling complications, severe disabilities and/or relatively slow deaths. For some of these chronic conditions, therapeutic and preventive solutions are available, but are nearly not being utilised, that further adds to the irony of them being labelled as "non-neglected". With respect to some of these neglected (infectious and chronic) conditions, we discuss some aspects of the contributions made by Prof Michel Dumas and Prof Pierre-Marie Preux towards advancement of epidemiology and neurology, development of scientific acumen and clinical capacity, and in turn improvement of the state of public health in various tropical regions (table 1).

Dementia: Dementia is an important public health problem in tropical countries. They initiated and developed long-term research-action programs on dementia in several central African

countries, despite periodic bouts of civil unrest here [2-4]. They also identified a tool to determine accurate age of dementia subjects, an extremely important problem in dementia research [5]; as well as certain psychosocial factors important in the survival of demential subjects [2].

Human T-lymphotropic virus type I (HTLV-1): HTLV-1 is a retrovirus implicated in a number of disorders and were one of the first groups to have conducted several surveys in West Africa to determine the seroprevalence and incidence of HTLV-1, and to have demonstrated a familial transmission and clustering of this viral disease in this sub-region [6,7]. They had also demonstrated a correlation of HTLV-1 with spastic paraparesis, as well as with lifestyle, environmental and geographic factors, and concomitant infections such as filariasis. For the first time, they had validated Lot quality assurance sampling method for field application to detect small clusters of infection.

Central nervous system infections (CNSIs): Their surveys and projects have helped to fill "knowledge-gaps" on several CNSIs in tropical Africa. Particularly, these CNSIs included onchocerciasis and cysticercosis [8], among other CNSIs. Interest of other research agencies on sleeping sickness (SS) has long declined in favor of other popular infections. However, they conducted several research-action programs on SS in tropical Africa, that particularly helped to determine: appropriate trypanocidal (mono and combination) therapies for second stage SS, regulatory role of several antibodies [9] and cytokines, as well as development of validated models for carrying out immunopathological, neurohistological and therapeutic studies on SS [10]. Development of chronic experimental models for SS in animals with cerebral lesions and neurological disorders had been a matter of difficulty then [10].

Epilepsy: Their research-action programs have recently demonstrated epileptogenic role of malaria in Mali [11] and Gabon [12]. For this, a Bruce S. Schoenberg international Award in Neuroepidemiology for 2009 was given to the principal investigator from Gabon (Prof Edgard Ngoungou. This was the first time that someone from tropical Africa became an awardee. He is an ex-student of Prof Pierre-Marie Preux, and interestingly received a "letter of appreciation" from the President of Gabon as well (read: recognition of tropical experts through organized research).

Their estimates of the prevalence of epilepsy in Asia and sub-Saharan Africa are considered authoritative and are widely used. Their Limoges epilepsy screening questionnaire is also widely

used in tropical countries and has helped to standardise data collection on epilepsy. They have recently demonstrated a greater benefit of using individual, rather than household, questionnaires for determining the burden of neurological disorders in low-income countries [13].

Their recent activities on epilepsy in Asia have culminated in numerous first-timer results, for instance (a) validated epidemiological tools on self-esteem, fear, social support, discrimination, coping strategies, patient-derived quality of life, etc. [14]; (b) an estimate on the annual requirement of two anti-epileptic drugs in an Asian country (i.e. Cambodia); (c) validation of reproductive causality of epilepsy and precise estimation of the preventability of epilepsy [15]. Besides this, they are one of the first researchers that have shown in Asia that not all epilepsy populations are stigmatized, although stigma is nearly always accorded to epilepsy "by default" [15]. Besides this, they have also long demonstrated a two-way correlation of epilepsy with malnutrition in Africa [16].

Recently, experts of a parent body on epilepsy had repeatedly recommended that their activities on epilepsy in Asia (particularly Cambodia) are a "model for investigation of epilepsy in developing countries". Several activities are ongoing on epilepsy in a neighboring country, Laos where they were the first and only to determine the true burden of epilepsy in Laos, as well as several other aspects of epilepsy, particularly treatment-related [17,18].

Although training of local staffs is often recommended as a means to bridge manpower and consequently treatment gap of epilepsy [19]. However, little thought has been given to which of them should be trained since not just doctors, but also neurologists, psychiatrists, nurses, pharmacists, midwives are insufficient in number and are also inequitably distributed. Very recently, they have been instrumental in identifying a "new" service provider (i.e. primary health center staff) for providing trained epilepsy care at a primary-care level. For many reasons, this strategy is extremely suitable, especially for rural populations [19]. Based on this strategy, a provincial program on epilepsy has very recently been started in two Asian countries [19]. This is one of the rare achievements since there aren't many countries where a formal provincial/national program on epilepsy has been, or is, running. Interestingly, in case of Cambodia, it took merely three years to progress from conducting a first-ever prevalence survey to starting a formal provincial program on epilepsy. Also, for the first time, a new strategy named "domestic health

visiting” has been devised and is also being tested to reach epilepsy patient population in a standard, organized, professional and a regular manner in two Asian countries [19].

Capacity-building: This is one of their most important contributions towards improvement of the healthcare system of recipient countries. Apart from extensive teaching activities at various home institutions, they have raised a whole new generation of researchers, neurologists, and epidemiologists in the last three decades; most of whom are working in their home countries. As an example, where none of the neurologists existed in Cambodia fifteen years ago, today seven neurologists and one neuro-rehabilitation specialist are available in Cambodia [20]. Besides this, they have also trained several provincial practitioners (primary health-center staff and general practitioners) in several African and Asian countries; many of such training programs are currently ongoing as well [20].

Miscellaneous: In another valuable contribution, they were instrumental in conducting a three-country survey on multiple sclerosis (MS) that came out with extremely novel findings on the risk and prevention of MS [21]. In particular, outdoor leisure activities, in addition to sun exposure was for the first-time found to be associated with a reduced risk of MS, with an evidence of dose response. This survey had received much appreciation from the experts working in the field of MS.

Low-income countries are rarely taken as a priority location for conducting events of advocacy and professional and academic exchange. As an example, a parent body on epilepsy has conducted only four congresses in a low-income location since 1909 and none at a low-income location in the last ten years. In contrast, due to their efforts, low-income locations have been taken “as a priority” to conduct such events; such as the ones in Cambodia, Vietnam and recently in Paris, France in which experts from 16 low-income countries (Asia, Africa, Latin America) were specifically invited and given travel bursaries to participate. Another such event is currently being organized in Varetz, France and experts from several low-income countries have been specifically given travel bursaries to participate. Such events are important for advocacy, direct participation of public and private stakeholders, and motivation as well as encouragement of local expertise.

They have also been extremely active on Amyotrophic lateral sclerosis (ALS), created a first-ever register in France, and one of the only three such efforts in Europe [22]. Their institute is also France’s sole ALS expert center. They have been one of the few research groups to have actively

utilized geoepidemiological tools in ALS research to identify aggregate zones of ALS in France. They have been one of the few sources of generating knowledge on ALS from Africa and have, since long, established an active consortium of African neurologists and researchers working on ALS, called TROPALS (Study of ALS under the tropics; www.tropals.unilim.fr/). Several nutritional factors and environmental toxins have been identified that serve as risk, prognostic and diagnostic factors for ALS.

Due to space constraint, many of their contributions are not discussed here in details, for instance (a) facilitating programs of professional and academic exchange [20], (b) prioritizing silent diseases and silent countries mostly (e.g. ALS in Africa, MS in Cuba and Martinique, countries like Mali, Martinique, Burundi, Cambodia, etc.), (c) contribution in the development of “early neurology” in Africa (in 1960s), (d) development of time-tested public-private partnerships that are often crucial for sustaining research-action programs, (e) treatment programs on epilepsy that continues to contribute to bring people out of epilepsy shadow in many African and Asian countries.

Conflicts of interest statements

No conflicts of interest to declare.

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Ethics committee approval

Not applicable. I also confirm that I have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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Table 1: Summary of all relevant contributions

Dementia	<p>Only source of knowledge on dementia from central African countries</p> <p>Tool to determine accurate age of dementia subjects identified</p> <p>Psychosocial factors important in the survival of demential subjects identified</p>
Human T-lymphotropic virus type-1	<p>Fill "knowledge gaps" on epidemiological aspects of HTLV-1 in West Africa; correlation of HTLV-1 with spastic paraparesis, concomitant infections, as well as with lifestyle, environmental and geographic factors.</p> <p>Validation of a simple model to detect small clusters of infection</p>
Central Nervous System infections	<p>Fill "knowledge gaps" on burden, epidemiology, and their correlation with epilepsy, particularly onchocerciasis, cysticercosis and appropriate trypanocidal therapies for sleeping sickness (SS), regulatory role of several antibodies and cytokines, as well as development of validated models for SS.</p>
Epilepsy	<p>Correlation with malaria and malnutrition</p> <p>Screening of epilepsy questionnaire for tropical populations</p> <p>Authoritative estimate of the prevalence of epilepsy in Asia and sub-Saharan Africa</p> <p>"Progression" from a prevalence survey to a provincial program on epilepsy in Cambodia, in merely three calendar years</p> <p>Design and validation of epidemiological tools on many psychosocial parameters, which didn't exist before</p> <p>A reliable estimation of the annual requirement of two anti-epileptic drugs in a country</p> <p>Validation of reproductive causality of epilepsy</p> <p>Estimation of the preventability of epilepsy, for first-time in Asia,</p> <p>Recognition of activities on epilepsy in Asia "as a model for the investigation of epilepsy in developing countries"</p>
Capacity building	<p>Neurologists and neurorehabilitation specialists, where none existed</p> <p>Epidemiologists, neuroepidemiologists, Public Health specialists,</p>

	<p>where none or little existed</p> <p>Long-term training programs for general practitioners, medical students (many are ongoing)</p> <p>Very recently, introduction of "new" epilepsy service providers (i.e. primary health center staff) in Asia</p>
Giving scientific platform and international visibility	<p>An international award for principal investigator from Gabon (for the first time in Africa)</p> <p>Appreciation of local tropical expert by the President of his country</p> <p>As a priority, conduct/organize several international manifestations in low-income locations, with particular participation of tropical experts from Africa, Asia and Latin America.</p>

Figure 1: Photo (Prof Michel Dumas, permission obtained to use and publish photo)

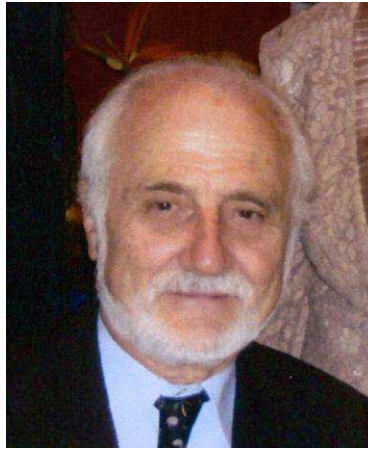


Figure 2: Photo (Prof Pierre-Marie Preux, permission obtained to use and publish photo)

