



Cover Story

Chained Globalisation

702 **Prof. Johan G. (Hans) Blickman:**
On the Threats to Imaging...Should We
Be Worried?

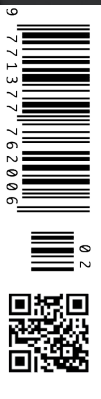
706 **Dr Christina Åkerman:**
Restoring Healthcare to Its Purpose

712 **Prof Henrique MG Martins:**
Digital Health Diplomacy in Chained
Globalised Health Context

716 **Prof. Arch. Simona Agger Ganassi:**
From Globalisation to a Health
Supportive Global Planet

728 **Dr Susan Henshall:**
Elevating Cancer Care to Global Level

746 **Dr Teresa Perillo, Dr Lorenzo
Ugga, Dr Renato Cuocolo:**
Radiomics in the Imaging of Brain
Gliomas: Current Role and Future
Perspectives





Radiology Resources in Timor-Leste: Limited Imaging Choices in a Small Yet Poor Country

◆ Author: [Prof. Stephen R. Baker](#) | Member of the Editorial Board IMAGING | Professor and Former Chair of the Department of Radiology | Rutgers New Jersey Medical School | USA

◆ Author: [Barent M. Gordinier](#) | East Asian Medical Practitioner | Timor-Leste

An evaluation of the imaging profile of Timor-Leste's territory consisting of the eastern half of the Southeast Asian Island of Timor, Atauro, Dili, Oecusse, bordered by West Timor and an assessment of the region's imaging resources, radiology capabilities and barriers to the provision of imaging care.



Key Points

- Timor-Leste has a population of 1,318,445 people.
- 90% of its population is rural and most of them are subsistence farmers.
- 75% of all healthcare expenses in this region are borne by the government while private support is available in the capital city of Dili.
- Government funding in healthcare is paltry compared to other Southeast Asian countries.
- It is a lower-level middle income country with minimum investment in healthcare and even poorer resources in imaging and radiology.

In most assessments of a nation's radiology capabilities, both the country to be examined and the members of the investigative team share socioeconomic similarities. Typically, the presumption is that there are sufficient financial resources to enable purchase of all up-to-date, clinically established imaging modalities. Hence, critical evaluations tend to focus on isolating equipment deficiencies, specific means of deployment or assignment of payment. However, when attention is turned to analyses of conditions in countries of limited means, the presumption should be that the full panoply of imaging technologies is unavailable to patients at present. Rather, a realistic standard of assessment should be how well the roster of in-place radiological devices has diffused across the country and how well the means of access to them accords with the other needs of the health-care system. This evaluation of Timor-Leste's imaging profile attempts to follow this guide.

Timor-Leste's territory consists of the eastern half of the Southeast Asian island of Timor, a nearby small island, Atauro, situated to the north of the capital, Dili, and a coastal exclave, Oecusse, bordered landward by the Indonesian province of West Timor. In the prolonged contest between

European colonial powers, the Dutch established overlordship of Indonesia, displacing the Portuguese who were able to hold on to eastern Timor, for which it functioned as an entrepôt for them but otherwise remained largely undeveloped. In 1975 the Portuguese withdrew from its far-flung empire and the Indonesian army invaded East Timor. A protracted rebellion ensued with much hardship. In fact, it has been labeled a genocidal campaign of suppression by the Indonesian military. The U.N. along with the Portuguese sought to convince the Indonesian government to allow an independence referendum. Despite persistent violence and with the presence of the U.N. peacekeeping force an affirmative decision by the voters led the way for a declaration of independence and the establishment of a government in 2002. This process engendered great loss of life and severe property destruction. For example, about seventy percent of its existing health infrastructure was destroyed in the struggle for autonomy. Moreover, in 2005 – 2006 civil discord led to further casualties and dislocations. And yet, these dislocations have not prevented the nation's founders from instituting a system of free healthcare for all, characterised by no payment at the site of care.

Timor-Leste's area is 5,794 square miles. Its population is 1,318,445. It has one major city, its capital Dili, which has 137,959 inhabitants. Most of the population (90%) is rural and most of them are subsistence farmers. Its main agricultural export crops are coffee, cinnamon and cocoa but the country's wealth is derived almost exclusively from oil and gas deposits located just offshore. The country contains many ethnic groups. One native language, Tetum, is spoken by 60% and Portuguese by 75%. English is understood by 31% yet only 60% of adults can read, with a wide discrepancy in literacy between city-dwellers and country folk. Life expectancy has increased by ten years since independence and is now 67 years for men and 70 years for women. The median age is 20.8; respecting that youthfulness, less than 6% of the population is over 65 years of age. Average completed fertility is 4.5 children per female. The neonatal mortality rate is 27%, but the under-five mortality rate is 60% reflecting the prevalence of pneumonia and diarrhea in young children. In fact, a study from 2013 revealed that 50% of those under five were stunted, placing Timor-Leste at 110 out of 117 in the 2019 Global Health Index. And an undernourishment percentage of 36 applies to adults, especially those residing in rural areas which are subject to recurrent food shortages. One further glaring statistic is a maternal mortality rate of 215 per 100,000 which is actually an improvement from 928 per 100,000 fifteen years ago.

While improvement has occurred since the period of internal conflict in 2006, these health statistics are still dire. The array and dispersal of radiological devices reflects a relative lack of investment but, nonetheless, focuses on basic devices disseminated widely. There is one tertiary care center in the capital, the Guido Valadares National Hospital, which has two fixed multipurpose 150kvp radiography units and three mobile units. It has the one MR machine in the country, a recently installed 0.5T unit. Since at least 2014, the hospital has had one CT unit, a 64 slice machine, also the only one in the country. It has two 4D ultrasound devices. But, there is no nuclear medicine facility in Timor-Leste. There are four radiologists, all located in Dili, up from two, seven years ago - two native to Timor-Leste and one each from China and Cuba. All are general radiologists and presumably do not have subspecialty expertise in interventional radiology.

In Dili, as well, there are six private clinics each with functional radiography and ultrasonography. There are five regional hospitals well-placed in various sites in the country each has both radiography and ultrasonography equipment. All-told, there are 87 radiographers utilising these pieces of equipment.

In addition to this seeming meager array of devices, there are other profound barriers to the provision of imaging care that stand out starkly. Seventy-five percent of all health-care expenses are borne by the government with most private support expended in the capital city. Yet, compared

with other Southeast Asian countries, government funding at approximately \$100 per capita is paltry. This funding is secured by contributions from the Sovereign Wealth Fund generated by oil revenues, whose prospects are encouraging yet subject to uncertainty. Oil and gas production expansion depends on the completion of an undersea line which must cross a 3,300ft trench.

Social factors are a relative impediment to optimal care. Recent studies have pointed out the insensitivity to patient needs by health staff at clinics related to differing ethnic groups and wide levels of educational attainment between professionals and patients, in as much as the rural population remains largely illiterate. But, probably most important, are infrastructural deficiencies. There is no postal service for many non-urban areas; electricity is not available in many locations. Roads are poor leading to the decision by the Health Minister to procure motorbikes for doctors to be able to do rounds rather than purchasing ambulances to bring patients to clinical facilities. Moreover, three-fourths of births occur at home which accords with the significantly high infant mortality rate in the countryside (over 50 per 1,000) compared with Dili (31 per 1,000).

Until Timor-Leste improves in each of these areas the further dissemination and implementation of enhanced radiological services, especially in the countryside, may now not be a worthwhile initiative. For example, portable ultrasonography deployed at the bedside at home will be subject to frequent breakdowns because of the poor roads the machines must travel. Likely as well the need for improved service oversight would be hindered because of insufficient personnel. The relatively low percentage of elderly in the population suggests that expensive imaging equipment germane to their needs may now not be high on the government's spending list.

Timor-Leste's GNP per capita of over \$5,000 according to one index suggests that it is now a lower-level middle income country. But the wealth engendered by petroleum production has not been widely distributed. Infrastructure needs must be addressed before Timor-Leste should seek to become a "fully-fledged radiology country".

But one, perhaps ironic, affirmative fact. Timor-Leste has aggressively isolated itself and also follows internal lockdown regulations so that by the end of July 2020 there has not been one death due to COVID-19 infection in the country.

Conflict of Interest

None. ■

REFERENCES

East and Southeast Asia, Timor-Leste. The World Factbook, Washington DC, Central Intelligence Agency.

Timor-Leste's Economy Remains Strong. Prospects for Private Sector Development Strengthen, Asian Development Bank.

Timor-Leste Demographics and Health Survey 2016 (PDF) General Directorate of Statistics, Ministry of Planning and Finances and Ministry of Health.