

Folk Epidemiology Recorded in Palm Leaf Manuscripts of Laos

Bethany G. Elkington, Kongmany Sydara, John F. Hartmann, Bounhong Southavong, D. Doel Soejarto¹

Key terms: epidemiology, traditional medicine knowledge, medical ethnobotany

Abstract

In an effort to preserve traditional medicine knowledge and to uncover information about disease patterns and treatment in the Lao People's Democratic Republic (PDR), linguistic experts have scanned centuries-old medical palm leaf manuscripts for disease entries. A list of more than 7000 diseases has resulted, shedding valuable light onto the medical history and traditional medicine heritage of the people of Laos, as well as providing an index for faster research into specific diseases and their traditional treatments.

Background

The use of palm leaves for record keeping is believed to have originated in India, dating back to the sixth century BC, and was brought to Laos by Buddhist missionaries in the form of Pali-Sanskrit scriptures.² Traditionally, palm leaf manuscripts (*bailan* in the Lao language) found in Laos have been created by Buddhist monks as a means of keeping religious records. However, the manuscripts have also been used to keep other kinds of records, such as those relating to history, law, customs, astrology and magic, as well as traditional medicine and healing.

The palm leaf manuscripts of Laos are typically created with leaves from the palmyra palm (*Borassus flabellifer* L., *Arecaceae*), a palm tree with large, fan-like leaves. A similar material that has been used to make the manuscripts comes from leaves of *Corypha* sp. (*Arecaceae*). Both of these trees are featured in figure 1. The leaves are cleaned, dried, and sanded to form a flat writing surface. Then a sharp object, like a metal-tipped stylus, is used to scratch characters onto the leaves. The rounded characters found in the manuscripts are probably indicative of the material constraints that inform their creation; straight lines and angles tend to tear the palm leaves while curved lines do not. Conversely, rectangular characters may be associated with records carved in stone.³ Usually, there are four or five lines of engraved writing on each side.

¹ Bethany G. Elkington and D. Doel Soejarto are from the Department of Medicinal Chemistry and Pharmacognosy, University of Illinois at Chicago, Chicago, IL, USA. John F. Hartmann is from the Department of Foreign Languages and Literatures, Northern Illinois University, DeKalb, IL, USA. Kongmany Sydara and Bounhong Southavong are from the Institute of Traditional Medicine, Ministry of Health, Vientiane, Lao People's Democratic Republic.

² John F. Hartmann, "The Spread of South Indic Scripts in Southeast Asia," *Crossroads: An Interdisciplinary Journal of Southeast Asian Studies* 3, no. 1(1986): 7.

³ Hartmann, "The Spread of South Indic Scripts," 15.

Once the writing is complete, a mixture of soot and oil is rubbed onto the leaves, and the soot gets caught in the scratches to make the characters stand out. The tools are shown in figure 3. It has been reported that the soot or ashes often come from the cremated remains of a monk's teachers, attesting to the sacredness of the documents.⁴



Figure 1: Trees used to make palm leaf manuscripts. a) *Borassus flabellifer* L. (Photo courtesy of Morakot Wattanasak and Rungsima Lertjanyarak.) b) Lan tree. *Corypha lecomtei* Becc. ex Lecomte. (Photo courtesy of Monchai Phongsiri.)

⁴ Justin T. McDaniel, "Some Thoughts on Hoi Kaeo and Wohan in Lao Buddhist Literature," Presented at the Second International Conference on Lao Studies at Arizona State University, May 5, 2007.

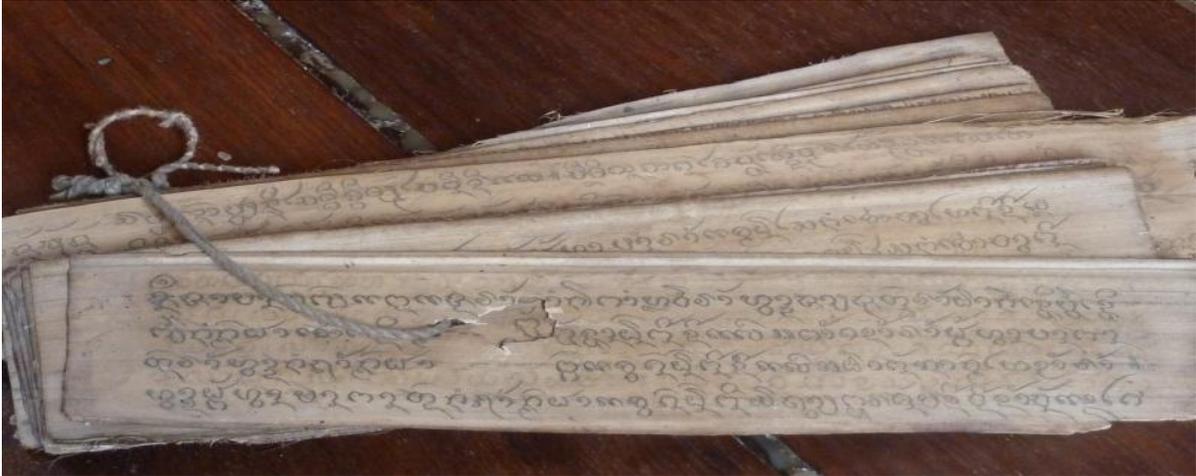


Figure 2: Palm leaf manuscripts.

Typically, one palm leaf measures around 45-55 cm in length and 4-5 cm in width. There is a commonly held belief in the temples that one can tell the subject material of a manuscript by the length of its bundles. For example, religious manuscripts will be the length of an arm, and medical manuscripts the length of a forearm. The leaves are threaded together with cord and held between wooden covers, and they are usually wrapped in cloth for storage. Although they are susceptible to decay from mold and insects, if the manuscripts are properly stored, they will last for hundreds of years.



Figure 3: Instruments used to inscribe palm leaf manuscripts.

Another type of material that has been used to keep records is paper made from the bark of the paper mulberry tree (*Broussonetia papyrifera* (L.) L'Hérit. ex Vent., Moraceae), known as *sa* in the Lao language (figure 4). Using this material allows for the creation of a larger and softer surface area to write on (figure 5), but it is much less durable than the palm leaves.



Figure 4: Paper mulberry tree, *Broussonetia papyrifera* (L.) L'Hérit. ex Vent.



Figure 5: Reading from a paper mulberry book.

The Preservation of Lao Manuscripts Programme (PLMP) of the Lao Ministry of Information & Culture, which received support from the German Ministry of Foreign Affairs, was established in 1992 and ran for more than ten years. It followed an inventory project funded by the Toyota Foundation in Japan, which laid the groundwork to reignite interest in the manuscripts held in rural Lao communities.⁵ The PLMP surveyed more than 800 *wat* (monasteries) and, in the process, managed to preserve more than 86,000 texts.⁶ Through active interaction with local communities,

⁵ Dara Kanlaya, "The Preservation of Palm-leaf Manuscripts in the Lao PDR," in *The Literary Heritage of Laos: Preservation, Dissemination, and Research Perspectives*, ed. Kongdeuane Nettavong et al. (Vientiane: National Library of Laos, 2005), 362.

⁶ Harald Hundius, "Lao Manuscripts and Traditional Literature: The Struggle for their Survival," in *The Literary Heritage of Laos: Preservation, Dissemination, and Research Perspectives*, ed. Kongdeuane Nettavong et al. (Vientiane: National Library of Laos, 2005), 5.

the project has emphasized the importance and proper handling and storage techniques of the manuscripts. During the surveys, microfilm duplicates of nearly 12,000 texts were reproduced *in situ*, the majority of which were recorded on palm leaves. Each text in the microfilm was catalogued with a unique code, allowing for easy recognition of the origin and subject matter of the manuscript. These microfilms are now incorporated in the Digital Library of Lao Manuscripts Collection. The National Library of Laos launched a website allowing public access of more than 8,000 of the images on microfilm in 2009. The website can be found at <http://www.laomanuscripts.net>.

The oldest manuscripts held in Laos today are from the beginning of the sixteenth century.⁷ At least seven different spoken languages have been found in the manuscripts held at the National Library, transcribed in at least nine distinct written scripts.⁸ However, in the majority of the manuscripts in Laos, the Tham script is used to transcribe the spoken Lao language,⁹ as demonstrated in figure 6. The word “Tham” signifies the Lao term for the Pali term *Dhamma*. Tham is a written script derived from a Mon alphabet, which, in turn, has roots in South India. Pali, another term that is frequently associated with the manuscripts, is an Indic language that has traditionally been used to record poetry, as well as ethical, astrological, medical, narrative, historical, and grammatical texts in parts of South Asia and among the majority of the Buddhist lineages of mainland Southeast Asia.

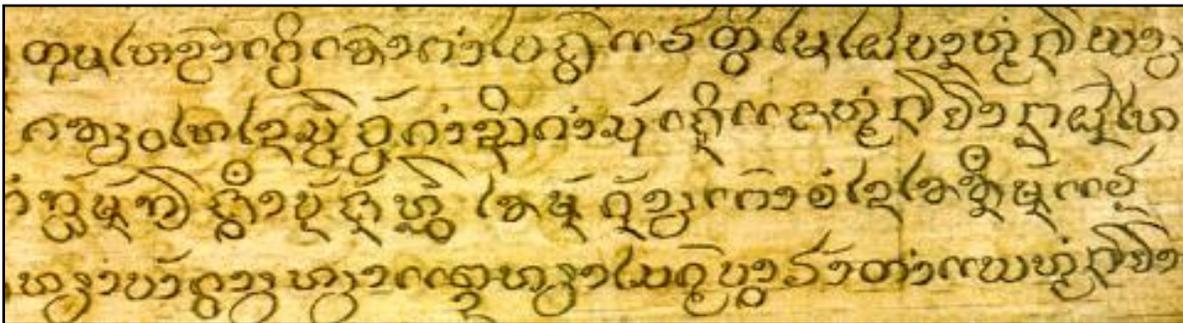


Figure 6: Example of Tham-Lao in a medical palm leaf manuscript.

Many Buddhist monks have also been healers, and have kept a record of their treatments in the palm leaf and mulberry paper manuscripts.¹⁰ Some of the manuscripts containing information about healing and medicine date back at least two hundred years. The National Library has digitized at least 1500 microfilm images containing information about healing or traditional medicine. Adding to the data, the Institute of Traditional Medicine (ITM) in Vientiane holds a collection of medical manuscripts, which they began translating into modern Lao script more than ten years ago.

⁷ National Library of Laos 2009, “DLLM Collection,” “Texts,” second paragraph.

⁸ National Library of Laos 2009, “DLLM Collection,” “Languages and Scripts,” “Statistics,” “Number of texts and digital images by language and script.” Languages include Monolingual Pali, Pali and Vernacular, Lao, Lan Na, Tai Lue, Tai Nuea, Tai Dam, Thai, and Other. Scripts include Tham Lao, Tham Lan Na, Tham Lue, Khom, Lao Buan, Lik Tai Nuea, Thai, Tai Dam, and Other.

⁹ McDaniel, *Gathering Leaves and Lifting Words*, 35, 143.

¹⁰ Kamala Tiyavanich, *The Buddha in the Jungle* (Seattle: University of Washington Press, 2003), 326, 335.

As many anthropologists have noted, medicine and magic often go hand-in-hand,¹¹ and many of the “medical” manuscripts contain entries that include what is often referred to as “magic” or “sorcery.”¹² For example, there are entries in the manuscripts about love potions and instructions for regaining lost items. As a result, the National Library has sorted medical and magical manuscripts into the same category. However, the vast majority of manuscripts about traditional healing cite the use of different plants to treat different ailments.

Objectives

In its broader context, this research is part of an international, multidisciplinary project, which aims to improve human health through the discovery of new medicines, biodiversity conservation, and the promotion of scientific research and sustainable economic activity in Vietnam and Laos.¹³ One objective of the present research was to develop an index of diseases, thereby minimizing the amount of time required to find information about specific ailments. Thus, if a researcher is interested in the traditional treatments for a specific disease or symptom, he/she can simply do a search of the database to find all listed instances of that disease and then go to the original manuscripts to learn more about the treatments.

At the same time, this study also aimed to quantify and analyze the ailments that were treated in Laos in the past and shed some light on the medical history of the people. Certain trends in what was treated in the past may be indicative of diseases that are presently plaguing the people of the region.

Methods

Through the National Library’s categorization methods, thirty-one rolls of microfilm containing 1,039 digital manuscript images were identified as containing information about healing or traditional medicine. Two professional translators at the National Library, Ajan Bounleuth and Ajan Thongxeuy, read through the 1,039 pages of digital manuscripts and made a list of what they found. Two healers who had previously been monks and had learned the Tham script – a traditional healer named Bountham Panyachit and a medical doctor named Uthai Souanasee – examined six bundles of medical manuscripts held at the Institute of Traditional Medicine, the National Library, and a few temples, also making a list of the diseases that they found. The lists referenced where each entry could be found in the manuscripts, effectively generating an index for the manuscripts.

¹¹ William Halse R. Rivers, *Medicine, Magic, and Religion* (New York: Harcourt, Brace, 1924; New York: Routledge, 2001 reprint), 36.

¹² Richard Pottier, *Yu Di Mi Heng: être bien, avoir de la force; essai sur les pratiques thérapeutiques Lao* (Paris: Ecole Française Extrême Orient, 2007), 124.

¹³ Djaja Djendoel Soejarto et al., “Studies on Biodiversity of Vietnam and Laos: The UIC-Based ICBG Program,” *Pharmaceutical Biology* 37, Supplement (1999): 100-113; D. D. Soejarto et al., 100; “Ethnobotany/ethnopharmacology and Mass Bioprospecting: Issues on Intellectual Property and Benefit-sharing,” *Journal of Ethnopharmacology* 100, no. 1-2 (2005): 17-18.

Dr. Kongmany Sydara at the Institute of Traditional Medicine then translated the disease entries from Lao into English. Both the English and Lao entries were analyzed. The number of occurrences of entire names of ailments was counted to gain an overview the list. Following this step, a search was done for shorter, simpler search terms of one or two words relating to different body parts and symptoms.

Results and Discussion

A database containing 9,706 entries from the manuscripts was created. Of these entries, 325 disease entries came from original palm leaf and/or mulberry paper manuscripts, and 9,381 entries came from the microfilm. There were 1,210 citations of *sainyasat*, very roughly translated as “magic,”¹⁴ 711 entries that did not contain medical information, and 532 notes about entries that were unclear or illegible. In total, from the 9,706 total entries in the database, there are 7,080 citations about treating specific ailments. An excerpt from the database is shown in table 1.

Table 1: Sample of medical palm leaf manuscript index

Province	Microfilm Code	Disease (Lao Script)	Possible English translation
Luang Prabang	0395_322	ໄຂ້ບວດຕົວ	Fever with body ache
Luang Prabang	0395_322	ໄຂ້ໜ້າແດງ	Fever with red face
Champasak	0910_145	ບໍ່ແຈ້ງ	Not clear
Salavan	0897_390	ບໍ່ມີ	No disease listed
Khammuan	0739_361	ຢາກິນຜິດ	Food allergy
Savannakhet	0820_063	ຢາຂີຮາກ	Cholera
Salavan	0897_390	ຢາແຂ້ວໜັ້ນ	Maintain teeth
Khammuan	0739_360	ຢາໄຂ້ຕີນເຢັນມືເຢັນ	Fever causing cold feet and hands
Xayabouly	0613_402	ຢາຄະຍີ	Asthma
Salavan	0897_390	ຢາແລັບແຂ້ວ	Tooth ache
Salavan	0897_391	ຢາແລັບຕາ	Eyes ache
Xayabouly	0613_402	ຢາແລັບທ້ອງແລ້ງ	Abdominal pain
Xayabouly	0613_402	ຢາແລັບຫົວໃຈ	Chest pain
Vientiane	0025_075	ຢາແລັບຫົວຝາຍດຽວ	Migraine
Xayabouly	0613_402	ຢາຍ່ຽວ	Urination
Vientiane	0025_076	ຢານໍານົມຫລາຍ	Galactagogue

¹⁴ Justin McDaniel, *The Lovelorn Ghost and the Magical Monk: Practicing Buddhism in Modern Thailand* (New York: Columbia University, 2011), 109-111.

Savannakhet	0820_062	ຢາບວດຫິ້ວ	Kidney pain
Salavan	0897_390	ຢາຜີປາກອາກ	Abscess with open apex
Savannakhet	0820_062	ຢາສະເອີະ	Hiccup
Salavan	0897_390	ຢາໝາກສຸກ	Eruptive fever
Savannakhet	0820_062	ຢາໝາກໂຫກລົມ	Heartburn (only wind)
Luang Prabang	0395_320	ຢາຫ້າມໄຂ້ສັນນິບາດ	Fever with convulsions
Salavan	0897_391	ຢາຫູໜວກ	Deafness
Khammuan	0739_360	ຢາອາບນ້ຳມົນ	Bath of water empowered by mantras
Xayabouly	0613_402	ຢາເອ້ນ	Tendon diseases
Xayabouly	0613_403	ຢາຮານຂີ້ໝູ	Jaundice
Champasak	0910_143	ໄສຍະສາດ	Magical art

The palm leaf manuscripts that were studied originated from the provinces of Champasak, Khammuan, Luang Prabang, Xayabouly, Salavan, Savannakhet, and Vientiane. These are indicated in figure 7. Four written scripts (Lao Buhan, Tham Lao, Tham Leu, and Thai) were found to transcribe four spoken languages (Lao, Pali, Tai Leu, and Thai). Only three of the manuscripts were dated, with dates of 1275 CS (1913 CE), 2491 BE (1948 CE), and 2520 BE (1977 CE).¹⁵ All other manuscripts were undated.

¹⁵ CS stands for “Cullasakarāja,” which is an era beginning at 638 CE. CE stands for “Christian Era,” which is the same as “Anno Domini” or AD. BE stands for “Buddhist Era,” beginning in 545 BC (Before Christ) in Thailand and Laos.

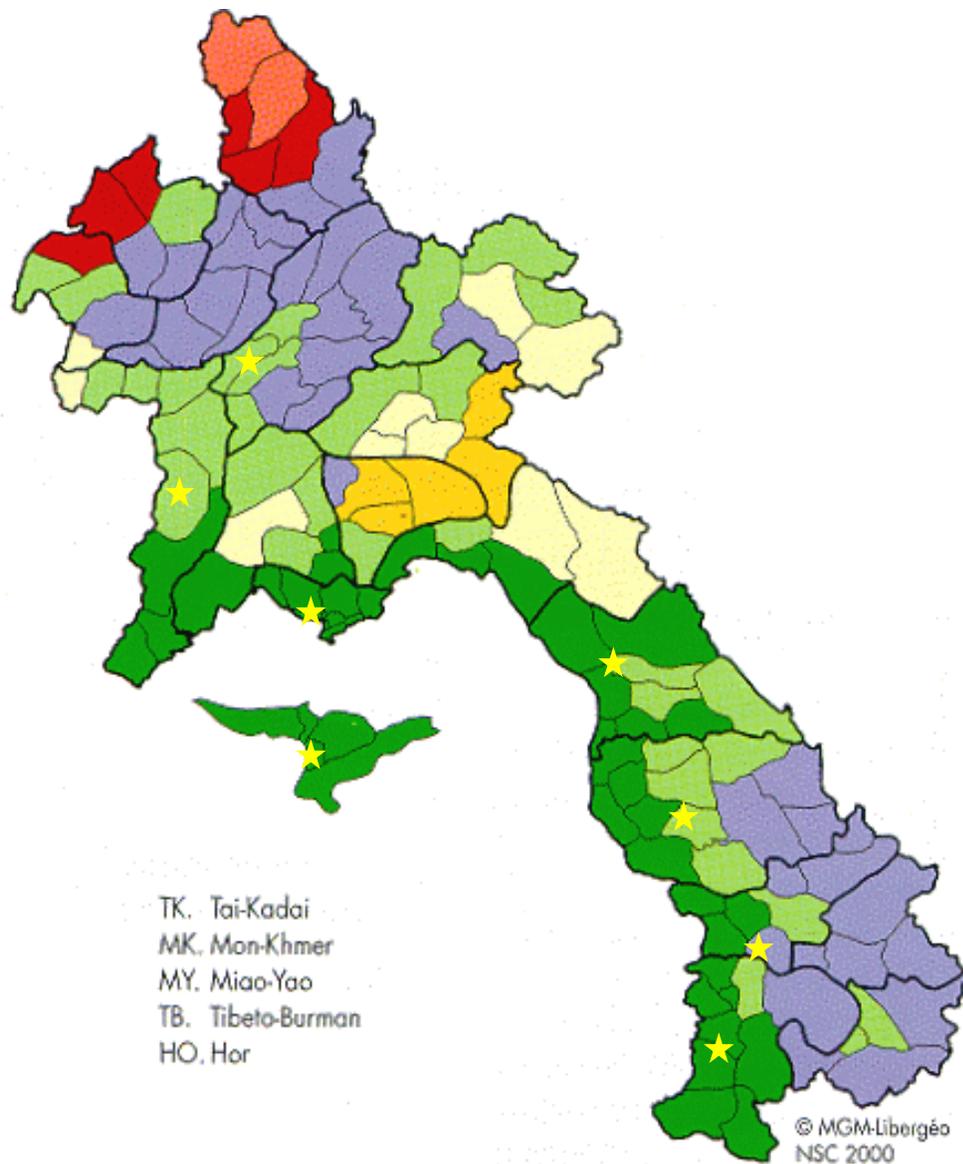
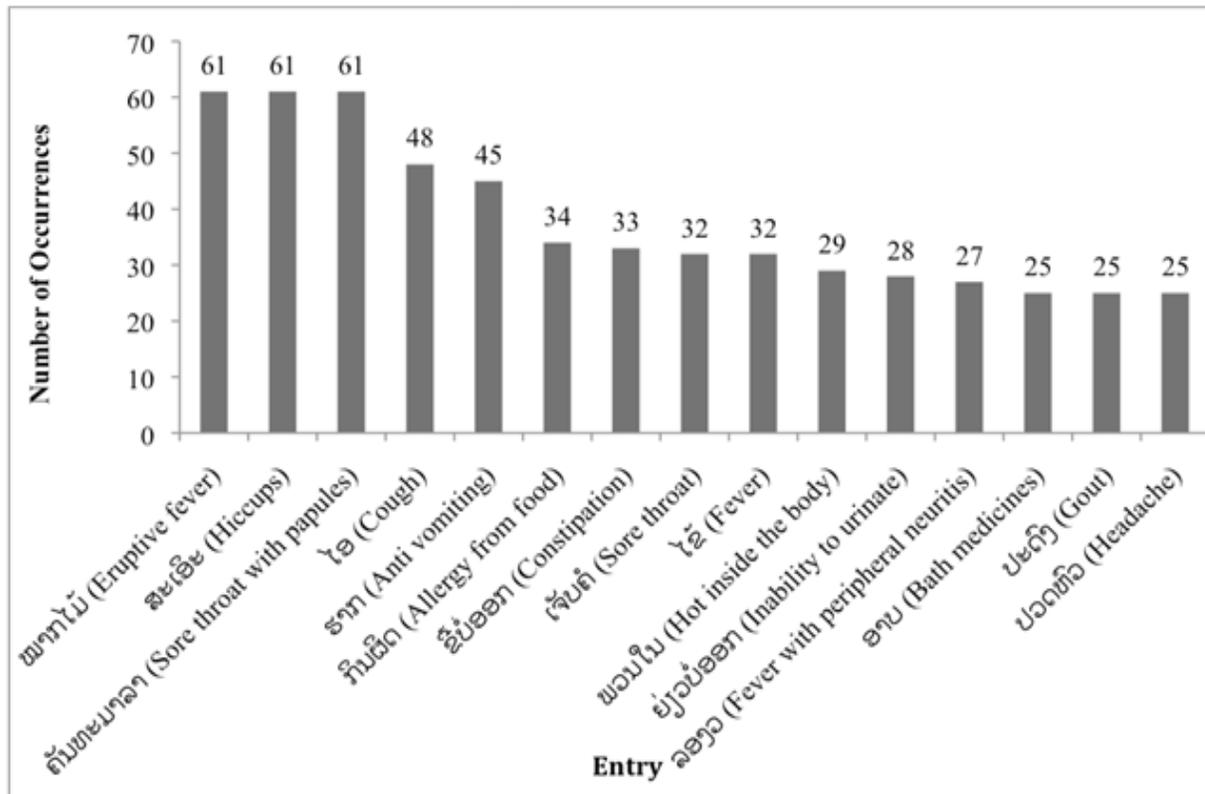


Figure 7: Map of the study area, denoting ethnolinguistic areas. Yellow stars indicate the approximate origins of the manuscripts used in this study. (Image adapted from Bounthavy Sisouphanthong and Christian Taillard, *Atlas of Laos: Spatial Structures of the Economic and Social Development of the Lao People's Democratic Republic* [Copenhagen: Nordic Institute of Asian Studies, 2000]: 45.)

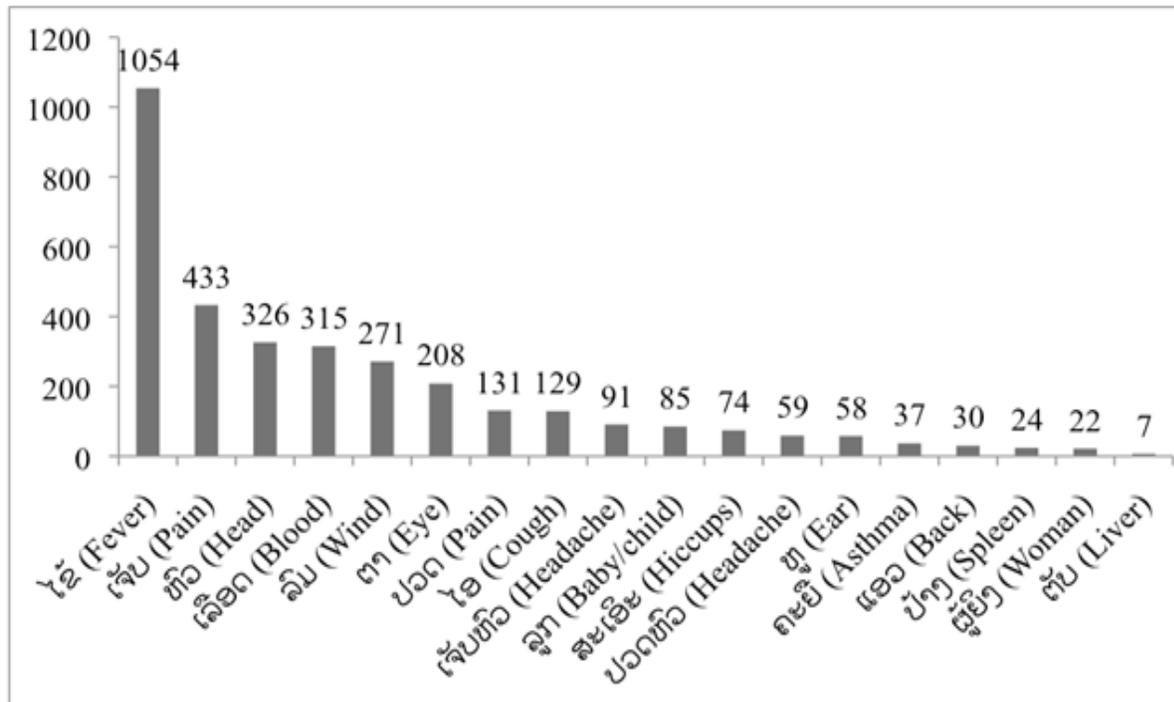
The database was sorted to see which entries were most common (table 2), and some simpler, arbitrary terms were counted (table 3). It is worth noting that there were 61 entries for “hiccups” (*sa eu*) when the list was sorted by entry, but 74 entries were found when doing a specific search for the same term. This is because some entries contained more than one ailment and, therefore, were sorted differently. Treatments containing the term “fever” (*khai*) were listed quite frequently, with 1,054 citations. “Pain” was indicated by at least two different terms (*jep*, with 433 citations, and *pouat*,

with 131 citations) and the term for “head” (*hua*) came up 326 times. Remarkably, there were only 7 occurrences of the term for “liver” (*tap*), a major cause for discomfort in Laos today. In fact, liver cancer is the leading form of cancer in Laos, with lower survival rates than seen in many other ethnic groups.¹⁶

Table 2: Occurrence of the most frequent subject entries in the manuscripts.



¹⁶ Liver cancer is largely attributable to, among other causes, Hepatitis B. See: World Health Organization, International Agency for Research on Cancer, *GLOBOCAN 2008: Cancer Incidence, Mortality and Prevalence Worldwide in 2008*, “Lao People’s Democratic Republic” Fact Sheet, <http://globocan.iarc.fr>; Sandy L. Kwong and others, “Disparities in Hepatocellular Carcinoma Survival among Californians of Asian Ancestry, 1988 to 2007,” *Cancer Epidemiology, Biomarkers and Prevention* 19 (2010): 2747-57, <http://cebp.aacrjournals.org/content/19/11/2747.full.pdf+html?sid=cdd12423-589a-429a-8e4c-9effc9a269c3>; Hepatitis B Foundation, “Hepatitis B and Primary Liver Cancer,” Hepatitis B Foundation, November 2, 2010, http://www.hepb.org/professionals/hepb_and_liver_cancer.htm.

Table 3: Occurrence of different arbitrary search terms in the manuscripts.

Difficulties encountered in this project were mainly in spelling and translation. For example, the previously-mentioned term *sainyasat* (spelled ໄຊຍະລາດ and ໄສຍະລາດ) and other culture-bound syndromes involving spiritual and animist terms, such as the phenomena of *khwan*, *pii*, and *lom*, are rather ambiguous and difficult to translate into biomedical terms.¹⁷ Additionally, many entries were non-specific. The entry *fii nai thong*, roughly translated as “sores in the abdomen,” was translated into biomedical vernacular as “tuberculosis” by one translator and as “stomach ulcers” by another. The list was revised multiple times for consistency.

Future Work

The National Library holds many more medical manuscripts that could be incorporated into this data, thereby providing more reliable statistics. There are also other analyses that could be carried out. It would be interesting to determine if there is a correlation between the frequency of specific disease entries and the region where the palm leaf manuscripts were found, possibly indicating if one region and/or ethnic group has had more experience with different diseases. A comparison of these results with similar studies from countries in the same geographic region, as well as with studies from other countries throughout the world, may reveal some interesting trends. GIS

¹⁷ Pottier, *Yu Di Mi Heng*, 117, 266-280, 498, 499, 506-509.

programs might assist in the analysis as well, especially since the data are arranged according to geographic occurrences, i.e., provinces.

The major limitation of this project was the need to translate the entries before investigation, for information is easily lost in the process of translation. A possible solution to this problem could be to conduct a digital character recognition search directly from the digitized microfilm images.

Summary

A great deal of the traditional healing art in Laos is well preserved in historical medical manuscripts still found in the country today. Analysis of these medical manuscripts could lead to invaluable new discoveries about the medical history of the people of Laos and alternative medical treatments. In-depth studies of the manuscripts by the scholarly community are helping to demonstrate the importance of the manuscripts while, at the same time, affirming the Lao people's intellectual ownership of particular methods of disease treatment. All of this helps to encourage their preservation.

Acknowledgements

We are thankful to the Director and staff of the National Library of Laos for granting us access to the Palm Leaf Manuscripts room, along with the use of the digital images of the medical manuscripts. Professor Harald Hundius and David Wharton have provided invaluable insights regarding the project. Mr. Monchai Phongsiri, Ms. Morakot Wattanasak, and Dr. Rungsima Lertjanyarak supplied the photos of palm leaf trees. We are eternally indebted to the Buddhist community and traditional healers who shared their knowledge with us. Funding for this project was provided by Kraft Foods, the International Cooperative Biodiversity Group Grant 2-U01-TW001015-09-10 (via funds from the US National Institutes of Health, the US National Science Foundation, and the Foreign Agricultural Service of the United States Department of Agriculture), and the Institute of International Education (via a 2008-2009 Fulbright Grant).

Bibliography

- Hartmann, John F. "The Spread of South Indic Scripts in Southeast Asia." *Crossroads: An interdisciplinary Journal of Southeast Asian Studies* 3, no. 1 (1986): 6-20.
- Hepatitis B Foundation. "Hepatitis B and Primary Liver Cancer." Hepatitis B Foundation, November 2, 2010, http://www.hepb.org/professionals/hepb_and_liver_cancer.htm (accessed December 31, 2010).
- Hundius, Harald. "Lao Manuscripts and Traditional Literature: The Struggle for Their Survival." In *The Literary Heritage of Laos: Preservation, Dissemination, and Research Perspectives*, edited by Kongdeuane Nettavong et al., 1-9. Vientiane: National Library of Laos, 2005.
- Kanlaya, D. 2005. "The Preservation of Palm-Leaf Manuscripts in the Lao PDR." In *The Literary Heritage of Laos: Preservation, Dissemination, and Research Perspectives*,

- edited by Kongdeuane Nettavong et al., 358-65. Vientiane: National Library of Laos, 2005.
- Kwong, Sandy L., Susan L. Stewart, Christopher A. Aoki, and M.S. Chen. "Disparities in Hepatocellular Carcinoma Survival among Californians of Asian Ancestry, 1988 to 2007." *Cancer Epidemiology, Biomarkers and Prevention* 19 (September 7, 2010): 2747-57. <http://cebp.aacrjournals.org/content/19/11/2747.full.pdf+html?sid=cdd12423-589a-429a-8e4c-9effc9a269c3> (accessed December 29, 2010).
- McDaniel, Justin T. "Some Thoughts on Hoi Kaeo and Wohan in Lao Buddhist Literature," Presented at the Second International Conference on Lao Studies at Arizona State University, May 5, 2007.
- . *Gathering Leaves and Lifting Words: Histories of Buddhist Monastic Education in Laos and Thailand*. Seattle: University of Washington Press, 2008.
- . *The Lovelorn Ghost and the Magical Monk: Practicing Buddhism in Modern Thailand*. New York: Columbia University Press, 2011.
- National Library of Laos. 2009. "About DLLM." The Digital Library of Lao Manuscripts. <http://laomanuscripts.net/en/pages/about.html> (accessed on August 23, 2010).
- Pottier, Richard. *Yu Di Mi Heng; être bien, avoir de la force; essai sur les pratiques thérapeutiques Lao*. Paris: Ecole Française Extrême Orient, 2007.
- Rivers, William Halse R. *Medicine, Magic, and Religion*. 1924. Reprint, New York: Routledge, 2001.
- Sisouphanthong, Bounthavy and Christian Taillard. *Atlas of Laos: Spatial Structures of the Economic and Social Development of the Lao People's Democratic Republic*. Copenhagen: Nordinc Institute of Asian Studies, 2000. Published in association with Silkworm Books.
- Soejarto, Djaja Doel, Charlotte Gyllenhaal, Jacinto C. Regalado, John M. Pezzuto, Harry H. S. Fong, Ghee Teng Tan, Nguyen Tien Hiep et al. "Studies on Biodiversity of Vietnam and Laos: A UIC-based ICBG Program." *Pharmaceutical Biology* 37 (1999 supplement): 1-14.
- Soejarto, D.D., G.T. Tan, H.J. Zhang, C.Y. Ma, S.G. Franzblau, C. Gyllenhaal, M.C. Riley et al. "Ethnobotany/Ethnopharmacology and Mass Bioprospecting: Issues on Intellectual Property and Benefit-Sharing." *Journal of Ethnopharmacology* 100, no. 1-2, (August 2005): 15-22.
- Tiyavanich, Kamala. *The Buddha in the Jungle*. Chiang Mai: Silkworm Books, 2003.
- World Health Organization. International Agency for Research on Cancer. *GLOBOCAN 2008: Cancer Incidence, Mortality and Prevalence Worldwide in 2008*. "Lao People's Democratic Republic" Fact Sheet, <http://globocan.iarc.fr> (accessed May 8, 2012).