

War Legacies Project

WAR LEGACIES PROJECT

2021 Report on the Laos Agent Orange Survey

State of Health and Livelihood





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Agent Orange Survey
State of Health and Livelihood

Published by War Legacies Project
June 2021. This report seeks to
deepen knowledge and raise
awareness of key human health
issues of wartime use of Agent
Orange affecting the people of
Laos today. The report advocates
for solutions that will improve the
lives of all and future generations.

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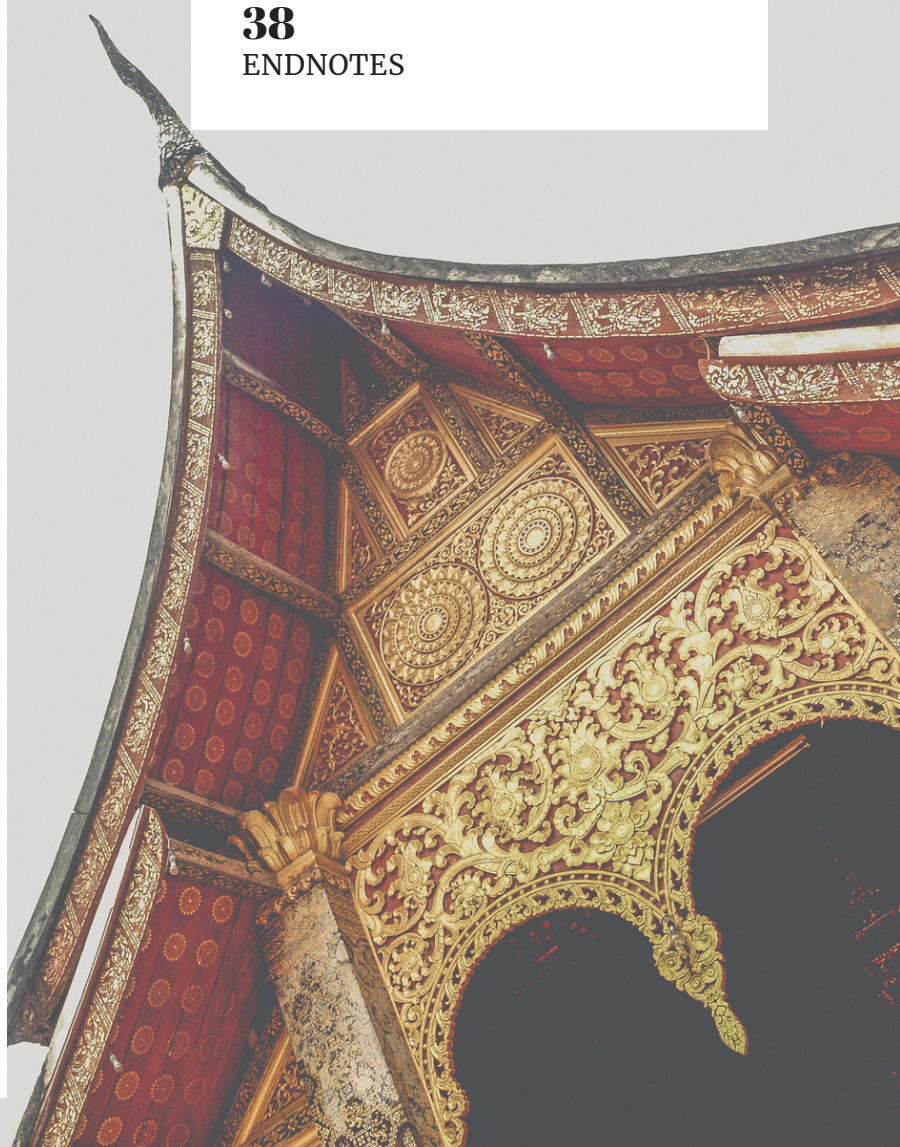
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Foreword

In early 1980, while investigating the post-war impacts of unexploded bombs and cluster munitions in Xephone District, Laos, near the Vietnam border, my late husband Roger Rumpf and I came across a puzzle. Local farmers shared familiar accounts about bombs and cluster munitions; but they also described spray planes that either made them sick or killed crops and defoliated the forests. The medical staff of the makeshift hospital we visited claimed many children were born with missing body parts and deformities. A town veterinarian recounted regularly seeing animals born with missing limbs or two heads.

Roger and I interviewed then Prime Minister Souvanna Phoumma. While aware of the bombings throughout the 1970s, he knew nothing about any spraying. We also asked Lao officials and American research colleagues about herbicides and Agent Orange. No one knew.

In 1982, we spoke with William Buckingham, a U.S. Air Force historian, about Operation Ranch Hand. When we asked if his research included Laos, he carefully stated that he was not authorized to research or write about Laos. The records on Laos, he explained, were still classified. But shortly after we met with several U.S. Congress members and gave press interviews on the issue, Buckingham's *Operation Ranch Hand* (1982) was published. It mentioned that aerial spraying had occurred in Lao territory, marking the first time Lao officials and the American public learned about this history.

Because the secret herbicide sprayings occurred far from urban Lao life and largely impacted small groups of ethnic people who had lived for

centuries secluded in the southeastern mountain range, it remained an unaddressed and hidden tragedy for over 50 years. It was kept secret from Congress and the world. Laos, in effect, served as an ideal testing ground for an emerging form of warfare that avoided "boots on the ground" through new weaponry involving computers, anti-personnel cluster munitions, highly sophisticated bombs, unmanned drones equipped with aerial cameras, electronic sensing devices and herbicide spraying technology.

We must continue to ask why this happened and how we can avoid such misery in the future. We need a serious examination of what we did in Laos, and we need substantive assistance.

If we don't fully expose our war consequences to the world, what are we failing to learn, and how can we claim to value justice and peace?

Jacquelyn Chagnon,
Board President



Introduction

It has been 50 years since the last known "Operation Ranch Hand" spray mission using tactical herbicides flew over Vietnam, Laos and Cambodia. Yet there is still so much to learn about the impacts of the U.S. military's use of Agent Orange on the land and people there over the course of the Vietnam War. Nowhere else is this problem felt more acutely than in the little-known and landlocked country of Laos where the U.S. fought its adjacent "Secret War."

Many more unanswered questions plague the country and its people today. How much was sprayed, and how often and where? Who within the U.S. military and CIA ordered and conducted the spraying? Can more CIA and U.S. military records be unclassified to map the spraying? How many people have been impacted? And are there any residual hotspots in Laos from the Dioxin-contaminated herbicides sprayed in the 60s and early 70s?

Knowing the answers to these questions will play an indispensable part in addressing Laos' post-war recovery efforts and its development. War Legacies Project (WLP) began the Laos Agent Orange Survey in 2014 to find these answers. And one such answer has been found.

Do people in the sprayed regions of Laos bear the same types of birth defects as those in the sprayed regions of Vietnam?

The answer is an unequivocal yes. The Laos Agent Orange Survey found that among 126 villages in 5 districts of the heavily sprayed Salavan and Savannakhet Province in southeast Laos, an average of 4 people per village had birth defects commonly associated with exposure to Agent Orange. Two-thirds of all cases were under the age of 20, more than half of which were under the age of 16. What the survey shows are the potential impacts of the Dioxin-contaminated herbicides on the third and even fourth generations.

This report pushes for a deeper recognition of present-day consequences of the 600,000 gallons of Agent Orange and other toxic herbicides sprayed in Laos to defoliate its tropical-agricultural landscape. Villagers in Laos who were so devastatingly impacted by the herbicides have long been neglected by the international community, unlike their Vietnamese counterparts. More comprehensive surveys need to be conducted throughout the remaining villages near the spray paths of "Operation Ranch Hand"; medical care and vocational training need to be implemented for those living with disabilities.

It is past time that the U.S. government provides support to those from the 800 impacted villages, just as it has to so many in Vietnam.

Many of the children and young adults with disabilities in Laos live just a few miles from Vietnam where they would otherwise have access to U.S.-funded “health and disability programs in areas sprayed with Agent Orange and contaminated with Dioxin, to assist individuals with severe upper or lower body mobility impairment or cognitive or developmental disabilities.”¹ In Vietnam, about \$14.5 million USD have been allocated to these programs in the 2021 fiscal year and over \$94 million since 2011.

We expect the numbers of people impacted to be much smaller in Laos than in Vietnam. Today the population of the formerly sprayed villages in Laos is approximately 500,000 compared to the tens of millions in Vietnam. Based on our findings in Samoi District where every village in the district has been surveyed, we anticipate overall somewhere between 5,000 and 7,500 people in Laos to have disabilities associated with Agent Orange in need of services.

Providing every individual these services is a very attainable goal; but it is urgent. In the past five years since WLP began our work in Salavan and

Savannakhet, nine of the children we have identified in our survey have died from their disabilities.

The U.S. must reckon with the toxic legacies of its war in Laos and undertake the effort of healing and renewal.

That time is now.

Susan Hammond,
Founder and Executive Director



ABOUT US

War Legacies Project is a global NGO that helps persons in Vietnam, Laos and Cambodia, as well as in the U.S., including veterans, overcome ongoing legacies of the Vietnam War-era use of the transgenerationally toxic Agent Orange and unexploded ordnance (UXO) remaining hidden under the soil.

MISSION AND WHY

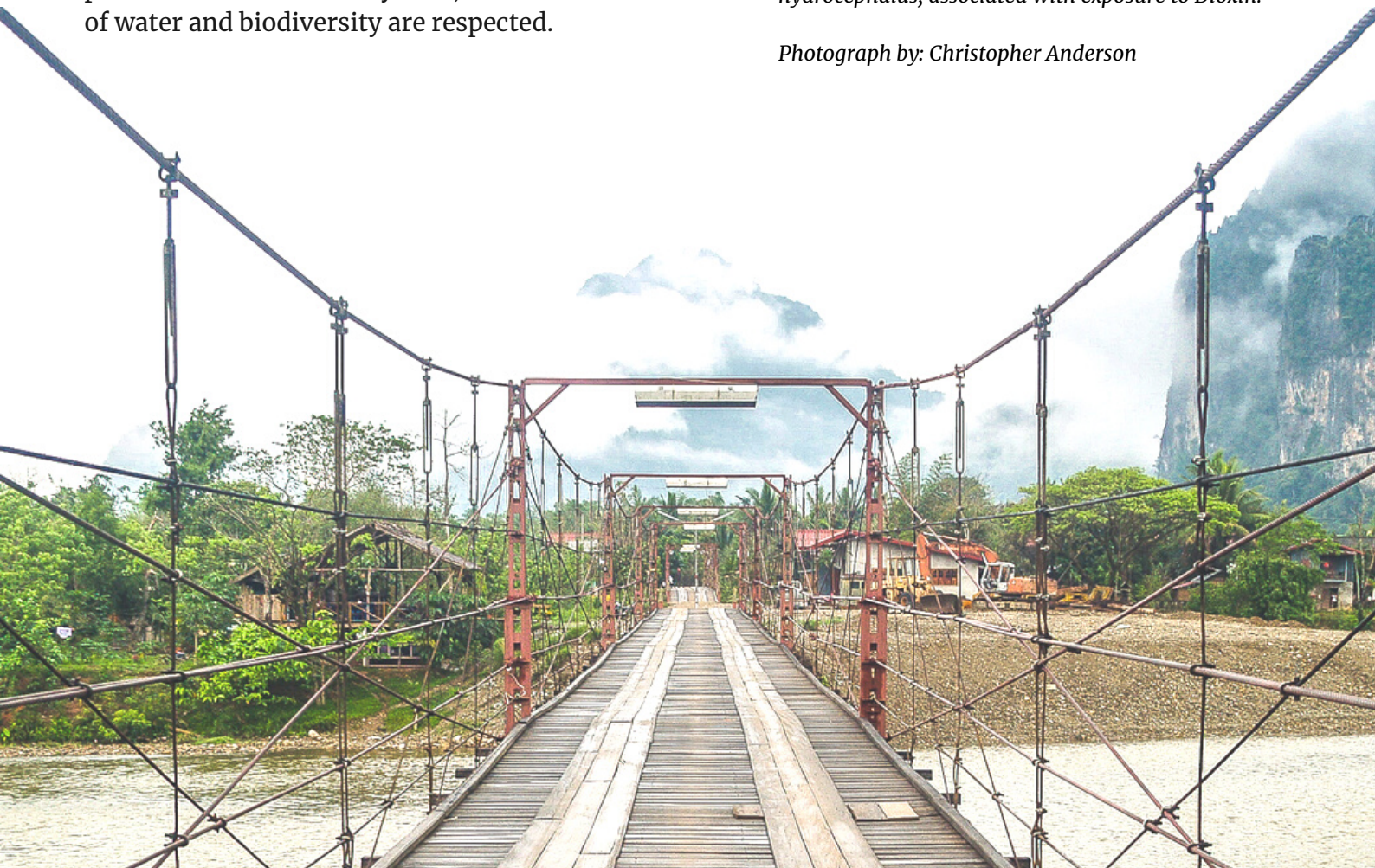
We raise awareness about and address the long-term human health and environmental consequences of war through on-ground researching, programming and advocacy and strategic campaigns. Our work is guided by the belief in healing war's wounds so that the right to economic security, dignity, health, education and clean natural resources is ensured, protected and guaranteed for future generations.

We envision a world free of the ravages of modern war where peace and the rights and dignity of all prevail and where healthy land, forests and bodies of water and biodiversity are respected.



Jacquelyn Chagnon, left, and Susan Hammond measuring the head of a two-year-old boy named Sodsai, who gets severe headaches and has hearing difficulties. They strongly suspect that he has hydrocephalus, associated with exposure to Dioxin.

Photograph by: Christopher Anderson



THE PROBLEM

In the Lao People's Democratic Republic a key challenge to poverty alleviation and development is addressing the legacies of the U.S. Secret War in Laos (1961–1975).

While much of the attention of the international community has focused on unexploded ordnance (UXO), little is known about the impacts of the war's herbicide spraying. As in Vietnam, Laos' southeastern border region was subjected to nine years of heavy carpet-bombing and repeated herbicide spraying. But unlike Vietnam, the generational impacts of wartime herbicides on the Lao population and environment have been neither fully surveyed nor accounted for nor mitigated. Little was known about herbicides being used in Laos at the time and this has had devastating consequences in addressing its ongoing legacies today.

The hidden health and environmental dangers of herbicide spraying have compounded many livelihood problems for those living in this southeastern region. Comprising 15 border districts. Various

socio-economic indices reveal the uneven and slow development of a profoundly impoverished region lagging behind the rest of the country.

Until recently, most of the region's remote villages were inaccessible by road. Some still are only reachable on foot. The lack of a viable transportation infrastructure placed people with physical challenges and disabilities at an even greater disadvantage. As a result, many have been unable to access medical care, rehabilitation services and educational opportunities, all of which lead to increases in poverty.



HISTORY AND GEOGRAPHY OF TOXIC SPRAYING

During the wars in Vietnam, Laos and Cambodia, the Vietnamese and their Lao and Khmer allies built a network of paths that came to be known as the Ho Chi Minh Trail.

It was a military transport route that twisted through the mountainous spine of the Annamite Range, under the cover of dense jungle canopy. The Trail extended into the territories of officially neutral Laos and Cambodia bordering southwest Vietnam. Covert U.S. combat warfare and bombing operations began focusing intensively on bombing and herbicide spraying of the trail in southeastern Laos in 1965.

Laos and Vietnam, as well as parts of Cambodia, became primary targets of the U.S. counterinsurgency program codenamed “Operation Ranch Hand.” Operation Ranch Hand was the U.S. Air Force defoliation, crop destruction and food deprivation program that deployed nascent airwar techniques in its application of 20 million gallons¹ of toxic “rainbow” herbicides on Vietnam, Laos and Cambodia.²

This was in addition to the ongoing heavy carpet-bombing campaigns and widespread use of incendiaries like napalm. The objective was to denude the tropical-agricultural landscape that had provided both subsistence and cover for on-ground insurgents.

According to official records over 600,000 gallons of herbicides were sprayed by planes over 165,000 acres along the Lao side of the Ho Chi Minh Trail between December 1965 and October 1970. These records, however, are incomplete, as declassified CIA Documents reference defoliated areas of the trail as early as November 1964.



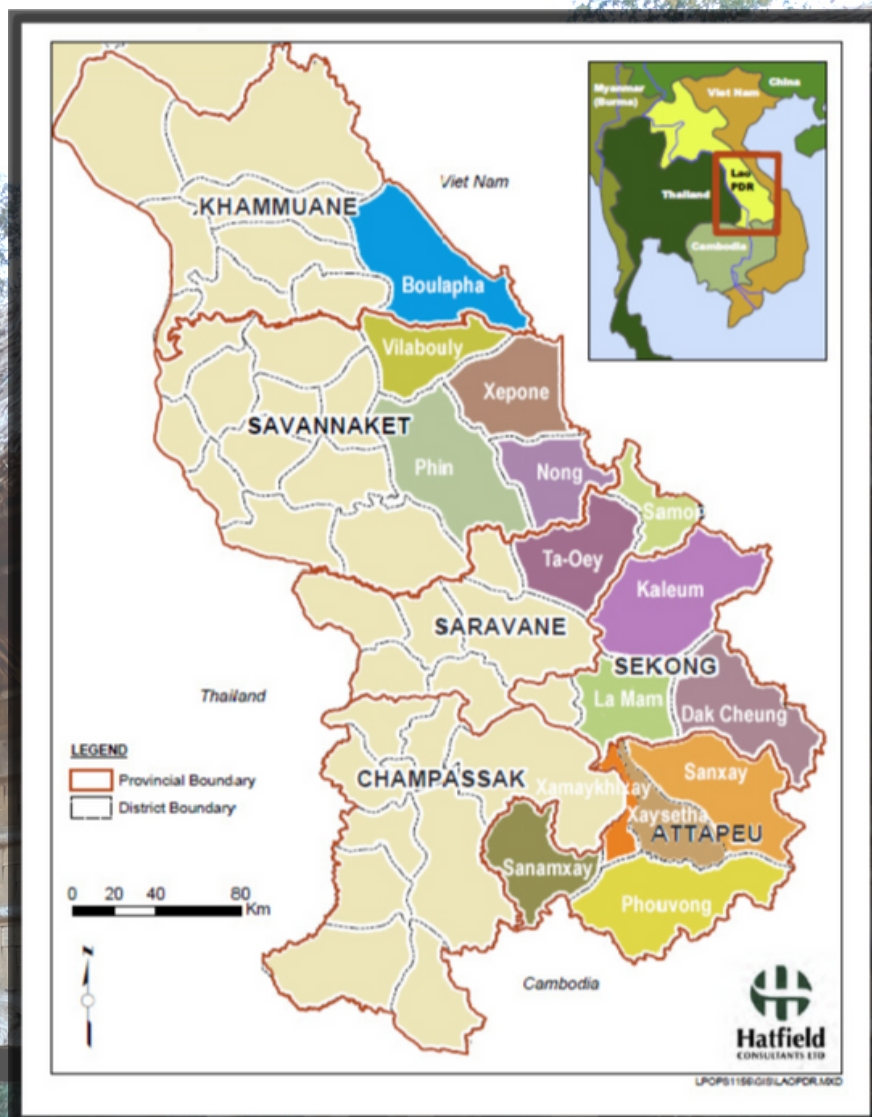
It is suspected that many of the spray runs in Laos were either not recorded or still remain classified. Operation Ranch Hand pilots that were interviewed by the University of Texas Vietnam Archives project in 1981 described numerous spray runs over Laos that were initiated in Udorn, Thailand, as well as in various bases in Vietnam.

They reported spraying runs in central and northern Laos that are absent from the U.S. Air Force records. Indeed much about the war in Laos is still unknown because the CIA and U.S. military have

yet to disclose all classified materials.

The sprayings in central and northern Laos, though sparse and isolated, have been confirmed by public official records. The majority of the spraying, however, occurred along and near the southeastern Lao border with Vietnam. The districts of five Lao provinces that were acutely impacted include:

- Khammouane Province
- Savannakhet Province
- Salavan Province
- Xekong Province
- Attapeu Province



Some of the most intense sprayings in Laos occurred in 1966 when nearly 400,000 gallons of the herbicides rained down over 2,000 miles³ of the tangled paths that comprised the Ho Chi Minh Trail.⁴ During the war, over 500 villages were located within 6 miles of the spray paths.⁵

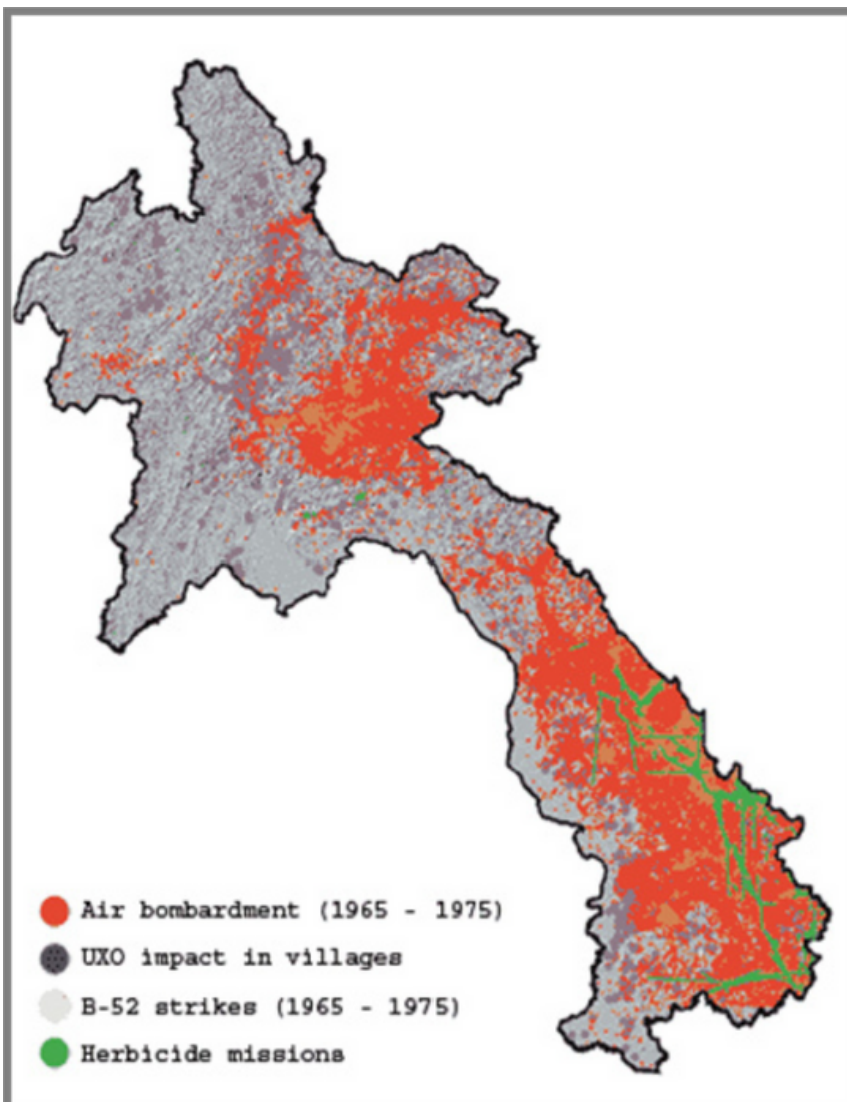


Many villages in the districts of Xepon, Nong, Ta-Oey, Samoi, Dak Cheung, La Mam, Kaleum and Phouvong were sprayed multiple times.

In recent years, efforts have been made to redress the severe economic disparities

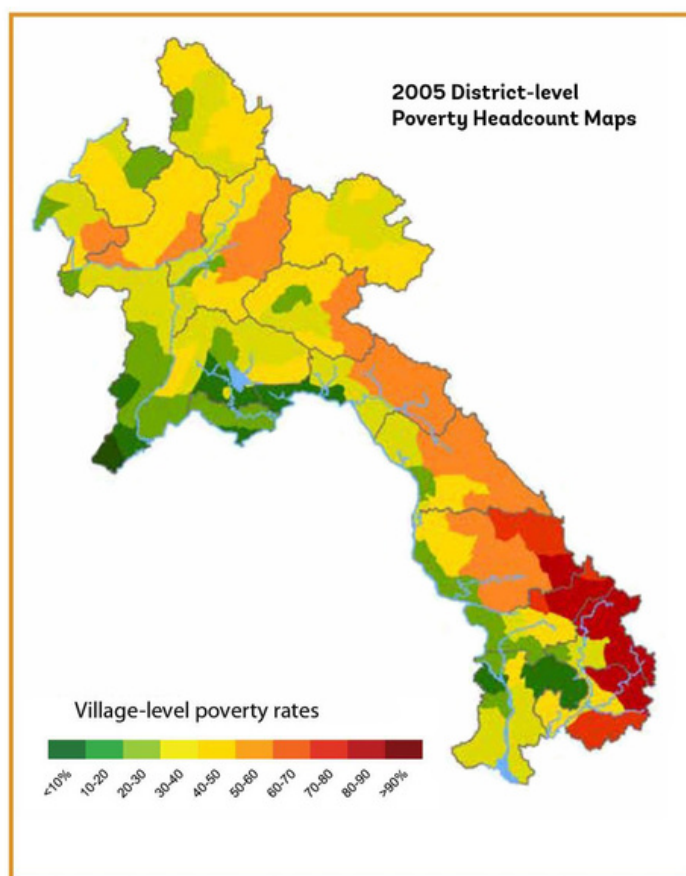
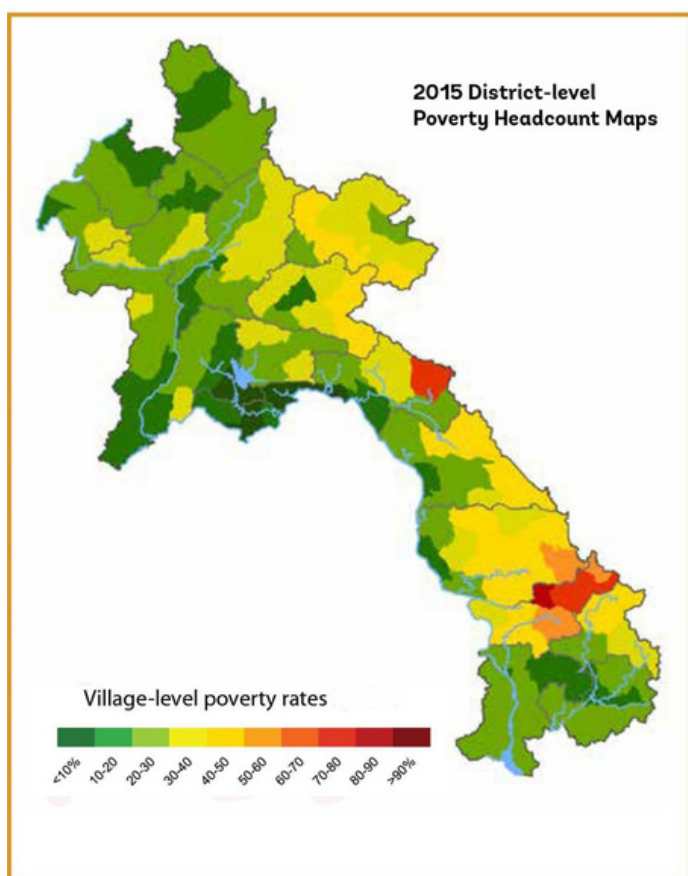
between this heavily sprayed southern region and the rest of Laos. But today, this particular region still remains comparatively underdeveloped. There are an estimated 500,000 people living in 800 villages. In the 2015 census, about 75 percent of these residents lived in rural areas, 15

percent had no road and only rough access tracks during the rainy season, and over 50 percent, excluding those residing in Attapeu province, suffered extreme poverty. They are primarily subsistence upland rice farmers with limited access to the cash economy.⁶



In 2019, World Vision in Laos found that children in these 15 southern districts disproportionately suffered from high-risk vulnerabilities to malnutrition, lack of access to health care, low school rates, child labor, natural disasters, unexploded ordnance risks, social and ethnic discrimination and

C. 2005 versus 2015 District-level Poverty Headcount Maps



Sources: Authors' calculation based on 2012/13 LECS-5 and 2015 Lao PDR Census Where are the Poor: Lao PDR 2015 Census Based Poverty Map (Lao Decide)

many other factors.⁷ Children with disabilities were especially vulnerable.

U.S. accounts of the bombing and defoliation of the Ho Chi Minh Trail fail to mention that the area is home to small indigenous ethnic groups of the southern Annamite mountains. They are the Makhong, Taliang, Ta-Oey, Oy, Alak, Bru, Tri, to name a few. By all accounts, they remain the least educated, the most

susceptible to malaria and tuberculosis, and the poorest peoples in Laos. Their overall low levels of Lao language proficiency present additional challenges of outreach. In all of Laos, they were the most subjected to toxic spraying (Agents Orange, Purple, Blue and White) for at least four years.

War Legacies Project learned from elders in these villages that exposure to the



toxic herbicides appear worse than initially thought. During the war, many of these indigenous ethnic groups along the border region traveled back and forth between villages of their same ethnic groups in Vietnam. It is very likely that they had additional exposures to herbicides sprayed over Quang Tri, Thua Tien Hue, Quang Nam and Kon Tum provinces in Vietnam.



Agent Orange and Human Health Impacts

Agent Orange, specifically the 2,4,5-T component, was contaminated with 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), also known as Dioxin. Dioxin belongs to a family of more than 70 isomers of highly toxic, man-made organic compounds created during industrial processes and waste incineration. The term “Dioxin” is commonly used to refer to the TCDD specifically found in Agent Orange—and also in Agents Pink, Purple, and Green—the most toxic of all Dioxin-like substances. Dioxin is now recognized as

a known human carcinogen and has been shown to be teratogenic (birth defect-inducing) in all species of animals that have been studied.⁸ As in Vietnam, the most commonly used herbicide in Laos was Agent Orange. In addition to the defoliation of the triple canopy forests, there were food denial operations using Agent Blue that destroyed enemy and civilian crops.⁹

The combination of the bombing campaign along the Ho Chi Minh Trail and the crop destruction triggered widespread famine leaving thousands of people malnourished and severely food insecure. For nearly a decade the population was unable to plant upland rice and were forced to flee their villages to damp caves and hand-dug holes for shelter in the mountains to avoid the bombing and herbicides.

Today, the U.S. Veterans Administration (VA) compensates veterans for conditions it has recognized as associated with exposure to Agent Orange and other wartime herbicides. About 20 conditions—17 of which are various cancers and other conditions including spina bifida—have been recognized by the VA.

Moreover, the VA compensates¹⁰ offspring of female veterans who served in Vietnam for 18 specific birth defects and others, so long as it is proven that there is no prior family history of such cases of defects and no known causes.¹¹ This compensation is

tied only to the birth mother's service in Vietnam, not to possible exposure to herbicides. Conversely, the Vietnamese government has recognized over 30 specific birth defects among the children and grandchildren of veterans of the war.^{12 13}

Since 2007, the U.S. government has provided financial assistance to Vietnam. More than \$390 million USD has gone towards Dioxin remediation and health and disability programs. And more recently, in FY 2021 \$14.5 million will be dedicated "to assist individuals with severe upper and lower body mobility impairment or cognitive or developmental disabilities."¹⁴ No U.S. funding has ever been appropriated to assist those with disabilities in the regions of Laos sprayed with Agent Orange and other herbicides.



While there is USAID funding through the Okard Program to support disability programs in Savannakhet province, this funding does not reach the districts in the eastern part of the province.

Until recently these districts were essentially cut off from the rest of the province; and few international aid organizations worked in the region.¹⁵ Thus, the health needs of the herbicide-impacted populations along the former Ho Chi Minh Trail remain tragically overlooked.

Dioxin Hotspots

Unlike in Vietnam, there are no known major Dioxin hotspots—that is, Dioxin-contaminated areas—in Laos.

The bases of operations for most of the aerial spraying missions in Laos were in Vietnam and Thailand. There were over 400 former landing strips, airports or spotter bases of operation in Laos that were part of the U.S. war effort. As in Vietnam, it is possible that herbicide

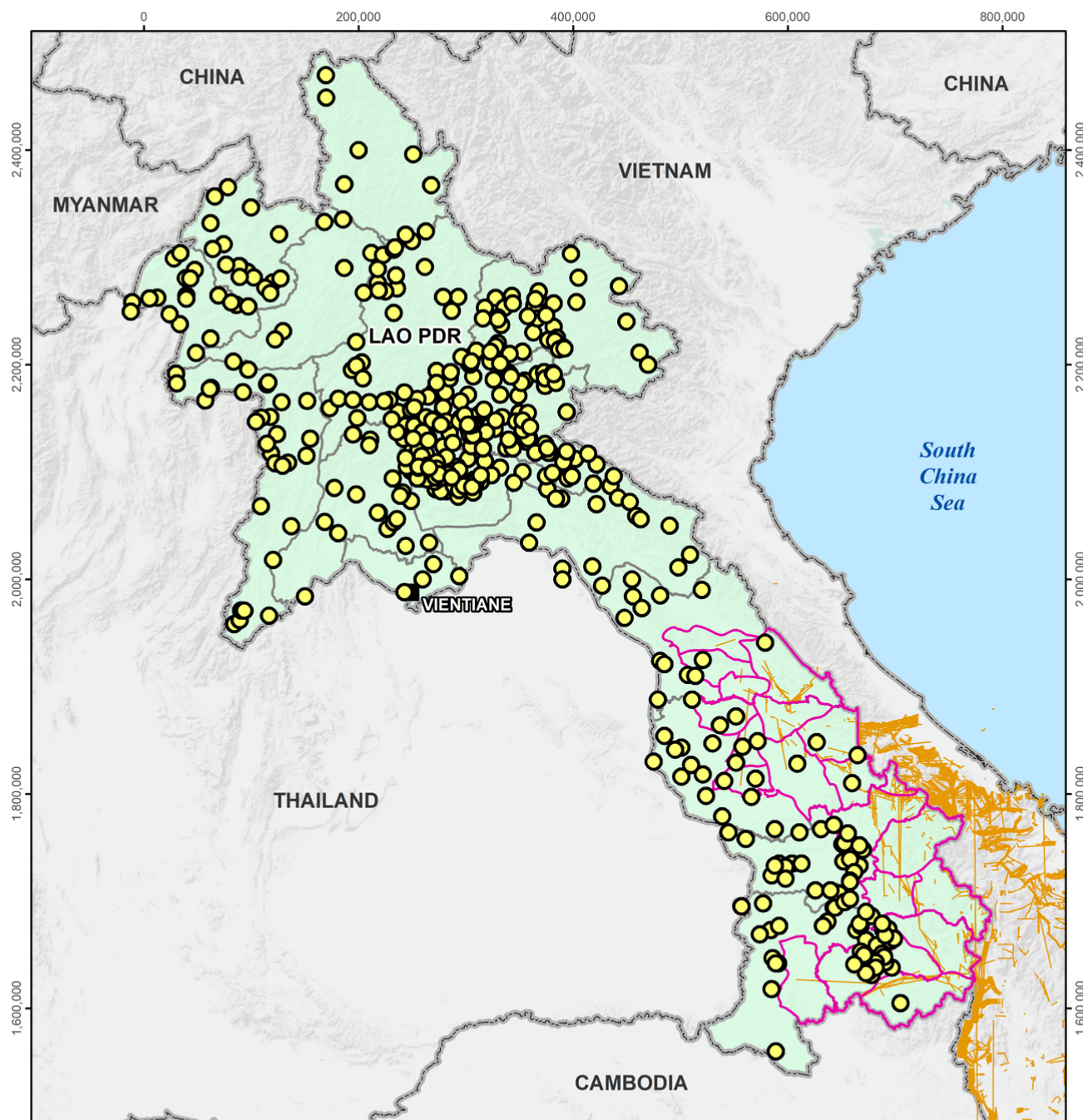
barrels may have been stored at some of these bases for perimeter spraying or to be loaded onto planes. As a result some may be potential Dioxin hotspots.

Research by WLP and Hatfield consultants in 2014 estimated that approximately 30 of these former U.S. paramilitary sites may warrant further investigation for potential Dioxin contamination due to the fact that they were under U.S. or U.S. allies' control for at least 3 years and are located in populated areas. If such hotspots exist, however, their levels of

Dioxin contamination would be comparable to the levels found at the former special A So base in A Luoi District, Thua Thien Hue

Province, Vietnam. The A So base was used for a period of several years by the U.S., and the Dioxin level in the soil

Overview of the Lima sites and Agent Orange spray lines in Lao PDR.



Legend

- Capital City
- Lao PDR Lima Sites
- Herbicide Spray Lines
- Lao PDR District Boundary (Herbicide Sprayed)
- Lao PDR Province Boundary
- Country Boundary
- Lao PDR
- Other Countries

Data Sources:
a) Lima sites locations, obtained by Hatfield, 2013.
b) Herbicide Spray Lines, obtained by Hatfield, 2019.
c) Base data layers, Mekong River Commission, 2007.



0 25 50 100 km
Scale: 1:5,500,000
Projection: WGS 1984 UTM Zone 48N



Agent Orange Investigations in Lao PDR

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found in 1999 by Canadian-based Hatfield Consultants was just under 900 ppt.¹⁶ This level of contamination required the relocation of the nearby village and the installation of a fence to keep people and livestock out.

Unlike in Vietnam, very little testing of soils for Dioxin has been conducted in Laos. But in 2005, in Dak Cheung District, Xekong Province, Canada-based Hatfield Consultants found elevated levels of Dioxin at the landing strip of the former Chavan airbase. Although lower than required for remediation at 37.8 ppt and 31.5 ppt, this was much greater than the background level of between 1 - 11 ppt in rural soils and was nearly 90 percent TCDD indicating Agent Orange was the likely source of the contamination. During the short period the strip was under U.S. military control local residents reported to Hatfield researchers that they recall seeing orange-striped barrels being buried in the area.¹⁷

Because the full extent of the war effort in Laos is still unknown, it is likely that many U.S.-controlled bases established throughout Laos have equally elevated levels of contamination.

We know that for a short period in 1968, Air America pilots used the Porter (XWPCB) plane outfitted with spray nozzles to spray Agent Orange on SkyLine Ridge above the CIA base Long Tieng (LS-20A) and in Na Khang southeast

of LS-36 in northern central Laos. It is unclear where these barrels of herbicide were stored and also where and how herbicides were loaded onto planes.¹⁸ Soil sampling at Long Tieng may be required in the future as it is now being developed into a district capital town.

It is also possible that heavily and repeatedly sprayed villages in southeastern Laos are potential Dioxin hotspots and bear further investigation. Lahang village near the Vietnam Border in Samoi District, Salavan Province, for instance, has high rates of congenital birth defects and sits at the base of a hillside that was heavily sprayed. Years of heavy rainfall may have resulted in pools of Dioxin in the village. There are approximately 12 other possible hot-spot villages in Samoi along the route from the Vietnam Border towards Ta-Oey District in Salavan and Nong District in Savannakhet.

Environmental testing could confirm whether pockets of Dioxin contamination remain in Laos. It should be conducted both 1) in areas where there is a high likelihood of human exposure such as the more heavily used landing strips and bases in Laos and 2) in villages where there are high rates of persons with congenital malformation. We estimate that the question of Dioxin

hotspots in Laos could be put to rest in a matter of several years with a small but robust environmental testing program.

The Laos Agent Orange Survey

Since 2015, War Legacies Project has been conducting a systematic recording and collection of statistical data on the potential impacts of Agent Orange in 126 villages in 5 of the 15 districts impacted in southeastern Laos.

These initial efforts have been part of the Laos Agent Orange Survey, which was launched to determine the extent of herbicide contamination and its human health consequences—to figure out the prevalence of congenital malformations and/or disabilities in previously sprayed regions. During this first phase of the survey WLP focused on selected villages in the five heavily sprayed districts of Samoi and Ta-Oey in Salavan Province and Nong,

Xepone and Vilabouly districts in Savannakhet Province. For Phase II, starting in late 2021, WLP intends to complete surveys in all of the villages of Ta-Oey, Nong, Xepone and Vilabouly districts and then begin surveying the the other 10 heavily sprayed districts in the provinces of Xekong, Attapeu or Khammoune provinces.

The Laos Agent Orange Survey first focused on identifying people with external birth defects and/or congenital disabilities born after 1966 (about nine months after the first sprayings began). Their conditions, in order to be included in the Survey, must be categorized according to what is recognized by the VA and/or the Vietnamese government.

WLP conducted the survey whenever possible with the assistance of local medical staff from district hospitals. Importantly, few local medical staff are not trained to identify congenital birth defects and are usually newly graduated in-training medical students.¹⁹

The most frequently observed conditions have been: paralysis, club foot, cleft lip, hip dysplasia and missing or malformed limbs and body parts. Other conditions, such as



congenital heart defects, among others, are unidentifiable without medical records and without performing complete medical examinations.



Yet on-site identifications are more common, since even simple check-ups in provincial hospitals require up to a week of travel, food costs and complex management of logistics are thus too costly.

Epilepsy

Although not on either the VA's or the Vietnamese list, those with epilepsy have also been counted but only if they have had the condition since birth or if it appeared shortly after birth without a known cause. Only with a genetic component, is epilepsy likely to be associated with Dioxin.

Fifty-eight cases of epilepsy were identified. If not treated, epilepsy can lead to long-term cognitive damage or injuries incurred while having seizures. Therefore, the project has helped

support those identified with epilepsy to have a full medical examination in order to attain access to the appropriate medication regime.

Scoliosis

Seventeen people with severe scoliosis, with either hunched backs or protruding rib cages, have been identified. These cases in particular need more detailed medical examinations to determine if there is potential association with their parents or grandparents' exposure to Dioxin.

Medical intervention is required in many cases to ensure that internal organs are not being constrained by the malformations of the spine.



Other Conditions

Thirty-six people included in the survey had conditions that were not likely associated with direct or transgenerational exposure to Dioxin. This included persons with nomas which are normally caused by bacterial infections, subcutaneous tumors unless they are cancerous, keloids, kidney disease, severe malnutrition, and non-pulmonary tuberculosis.

Where medical intervention was possible, individuals were referred to appropriate medical facilities at the provincial or national level for treatment.

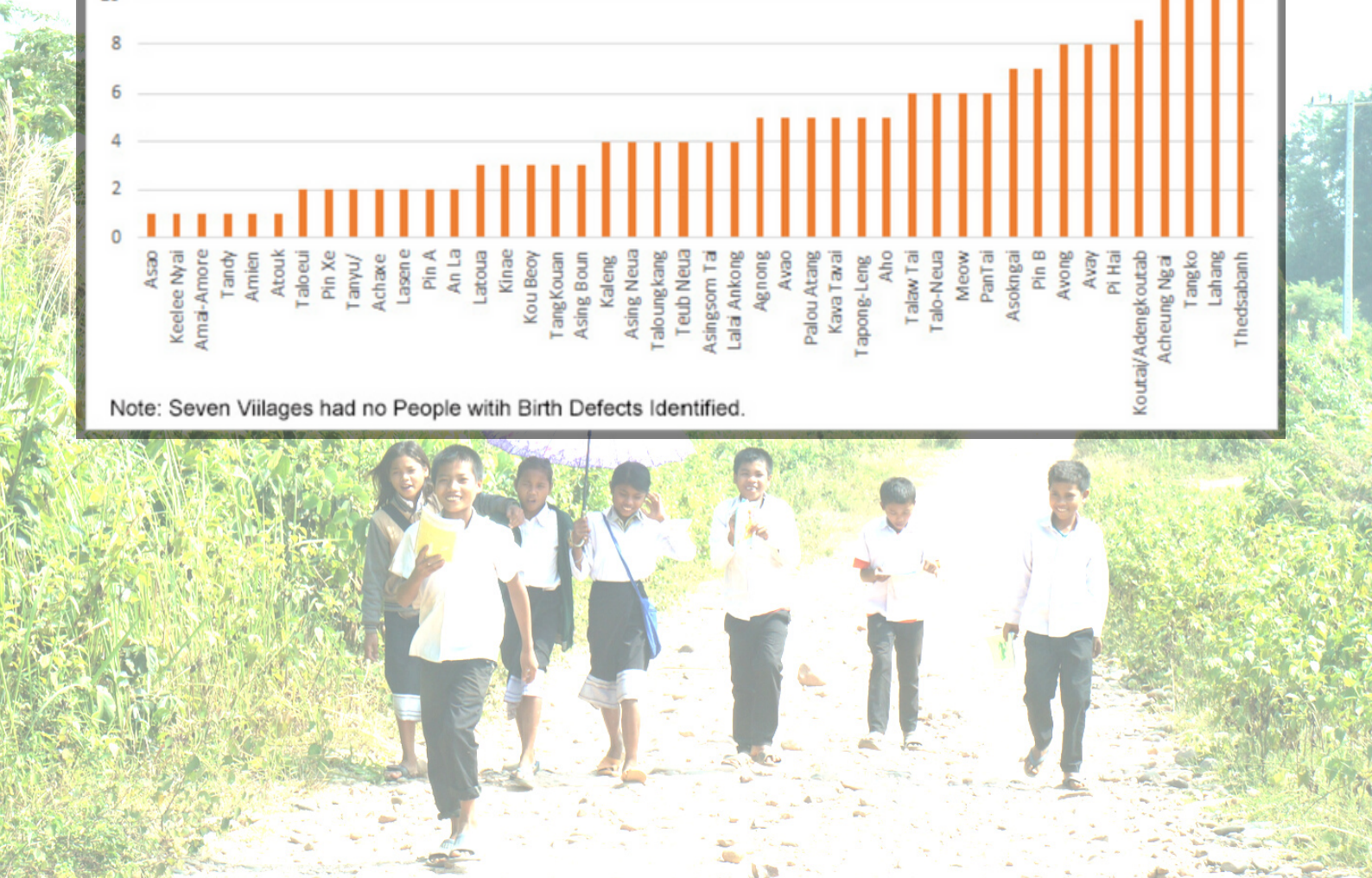
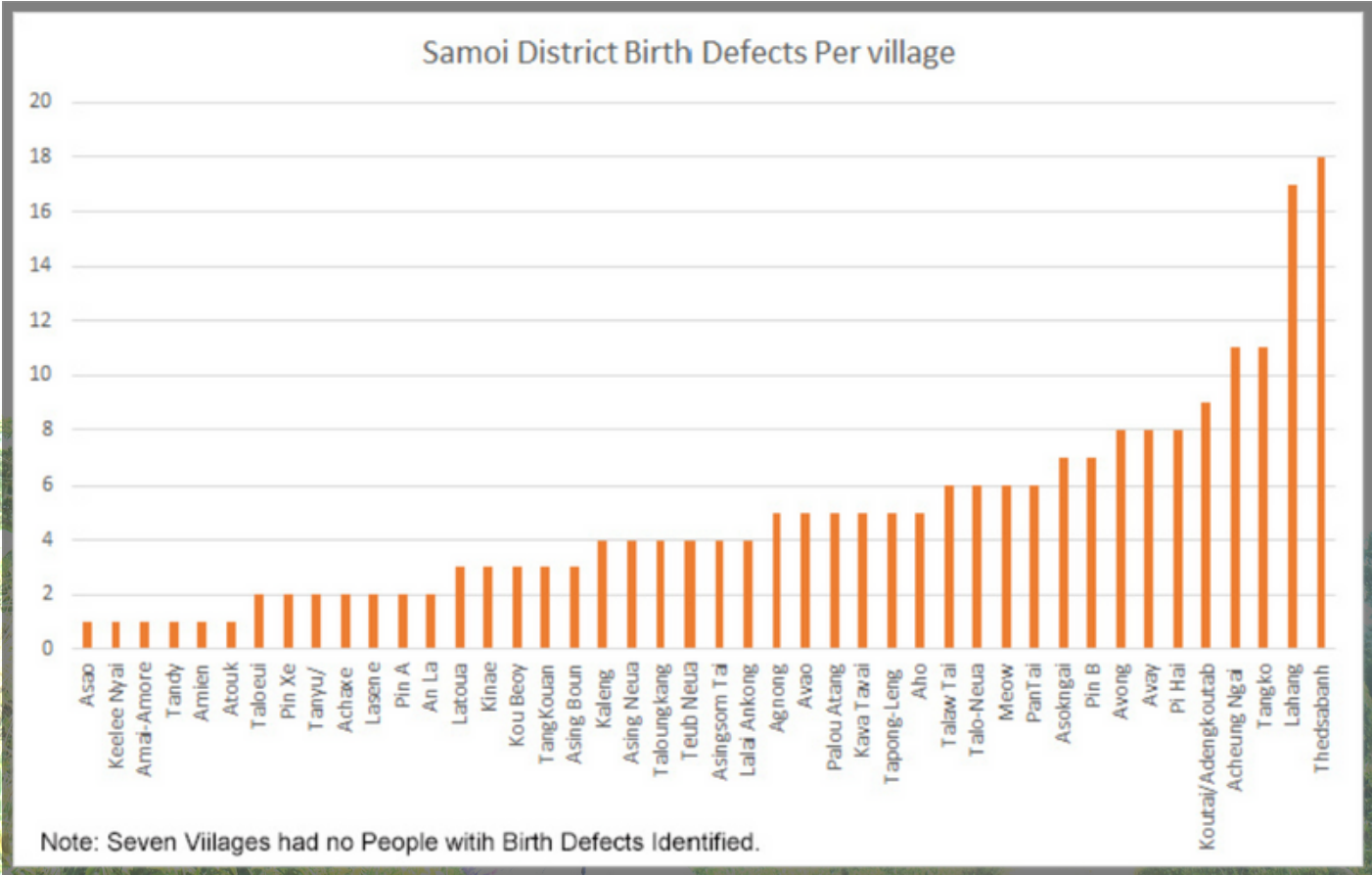


Congenital Malformations

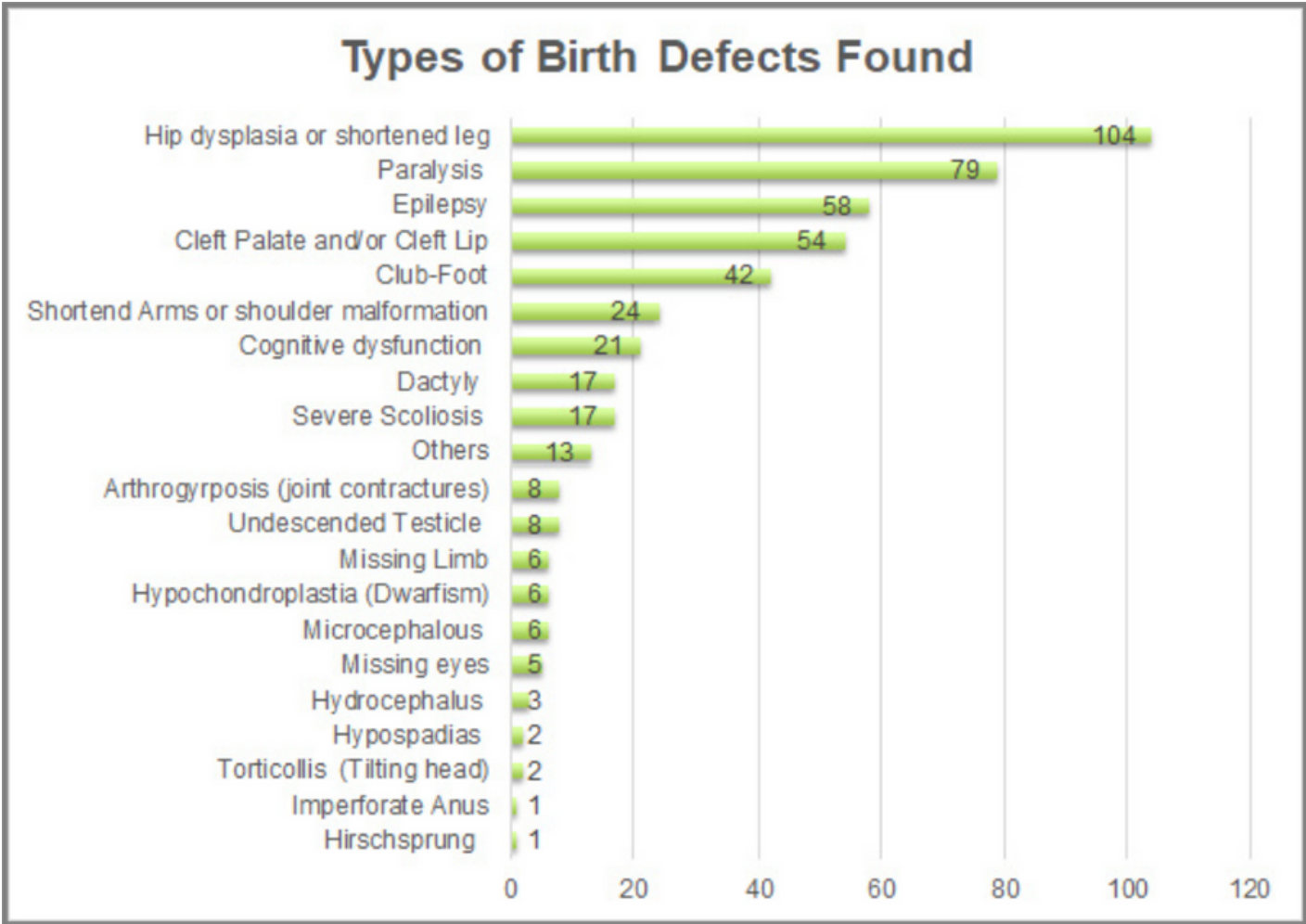
A majority of the villages had at the very least one person with a congenital malformation. The average was four cases per village. The most common birth defect found was hip dysplasia, followed by paralysis and then cleft-lip and/or cleft palate. Hip dysplasia, which causes an uneven gait and muscle atrophy on the

impacted side, negatively impacts an individual’s ability to move and be active. It is most detrimental to those who must climb steep hillsides to engage in upland rice farming and to children who have to walk long distances to school and back.

Table One: Birth Defects per village in Samoi District. All 51 villages were surveyed.



(For details by village see Annex.)



Correlation of Persons with Birth Defects with Spray Runs

There appears to be a correlation between the number of spray runs near a village and the number of people born with birth defects.

Because the survey was able to reach all 51 villages of Samoi District, Salavan, and all are within 6 miles of the spray runs, it is possible to compare the villages that are near the heaviest spraying with those further away. Fourteen of the villages

near where multiple spray runs were conducted tended to have more people than average (more than 4 per village) born with congenital disabilities. This includes the village of Lahang with an estimated population of 528 in 2018. It is near the border of Vietnam and the survey found 17 persons with congenital disabilities.

Kou Tai, with an estimated population of 313, less than 2 km from the Vietnam border, had 8 persons with birth defects and 2 with epilepsy; kava-tava, with a population of 274, and 6 kms from the border, had 12

persons with birth defects; and Acheungngai, with a population of 327, and 9 km from the border, had 9 persons with birth defects and 2 with epilepsy.



This disproportionate prevalence is even more apparent when you add suspected cases of congenital epilepsy into the calculation as it adds six more villages with greater than average persons with congenital disabilities.

Without complete village surveys in other districts in Laos it is difficult to compare the number of people with congenital birth defects with other heavily sprayed districts. As all of Samoi district was surveyed, however, it is possible to compare Samoi District in Laos with A Luoi District in Thua Thien Hue Province in Vietnam which abuts the southern part of Samoi and has similar ethnic groups.

The Vietnamese have found that 1.4 percent of the population in A Luoi have been born with a congenital malformation believed to be associated with Dioxin-contaminated herbicides. By contrast, on the Lao side of the border in Samoi, WLP found that nearly

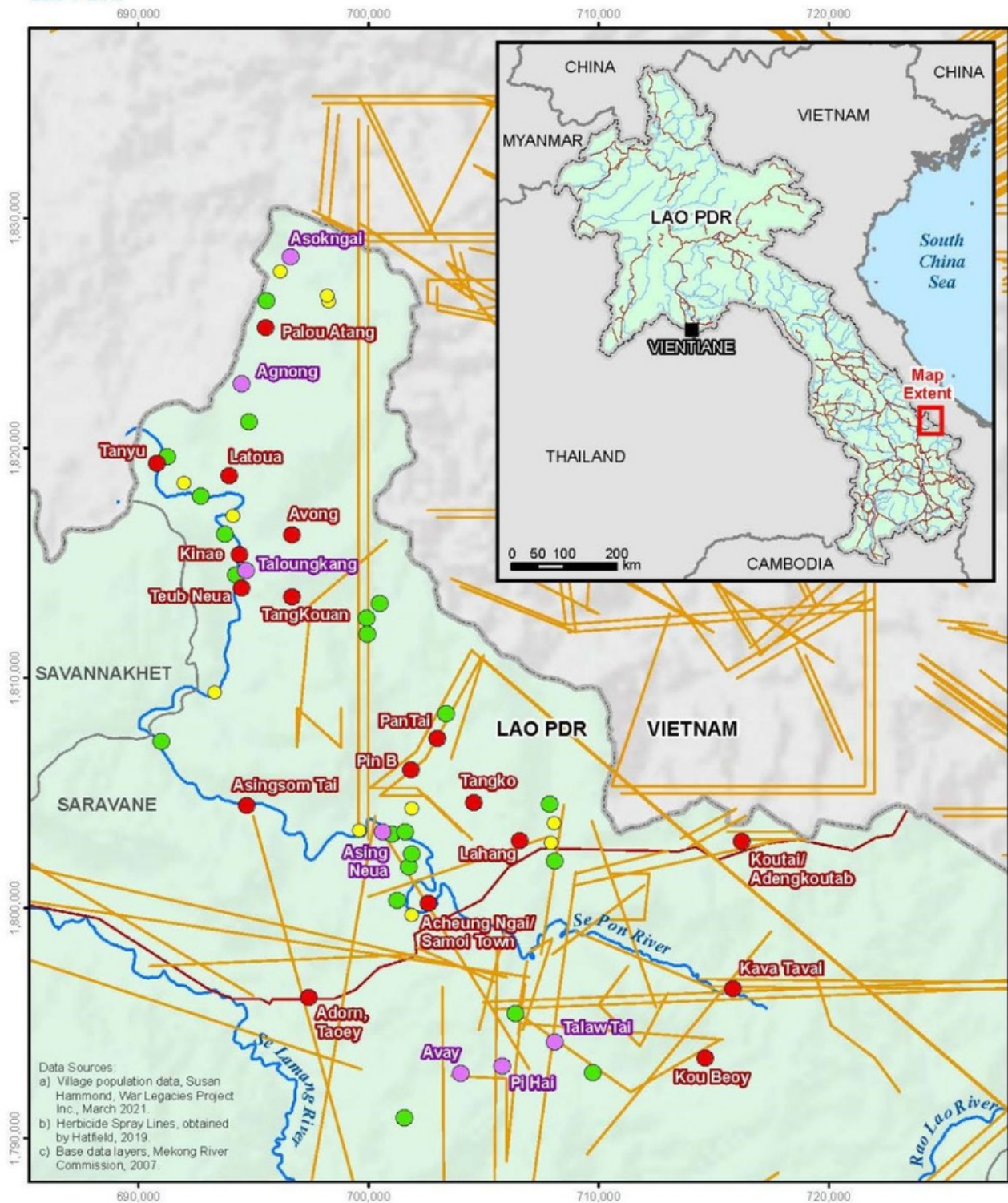
nearly 32 percent or 16 out of the 51 villages, had higher percentages of people born with congenital malformations.

Factoring in cases of epilepsy that have been described to the survey team as starting shortly after birth, the number of villages in Samoi with greater than 1.4 percent of the population with congenital disabilities is closer to 50 percent with 25 villages.

These villages for the most part follow the road from A Luoi to Adone in Ta-Oey District as well as along the road that travels north from Samoi District capital back into Vietnam where one of the original spurs of the Ho Chi Minh Trail entered into Samoi District. All are within six miles of herbicide spray runs.



Percentage of population with external birth defects born after 1966 in Samoi, Saravane Province, Lao PDR.



Agent Orange Investigations in Lao PDR

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Children with Congenital Malformation and Disabilities in the Survey

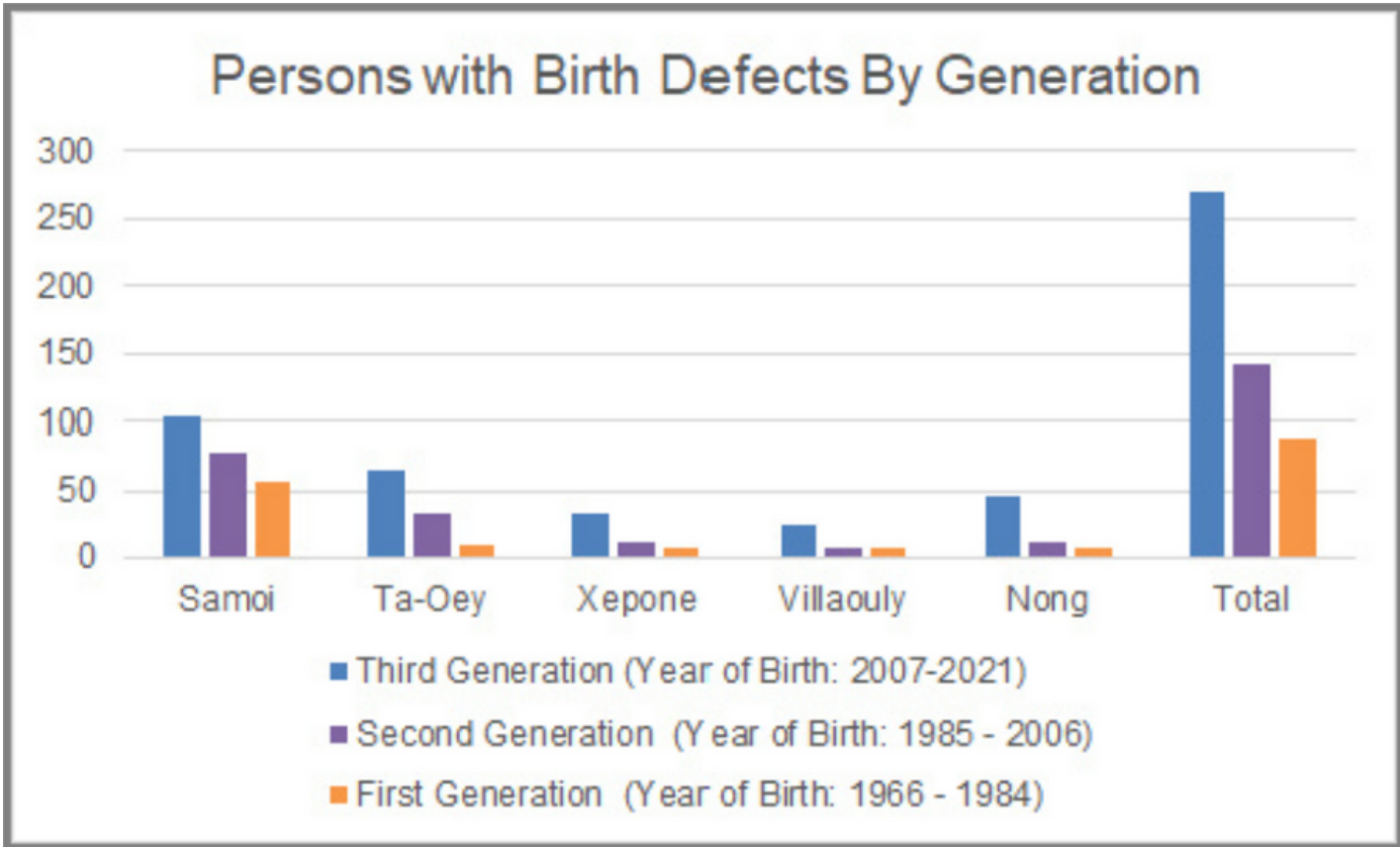
Since the survey began in 2015, more than 517 people with congenital malformations, birth defects or chronic conditions since birth or shortly after birth have been identified. Eighteen, however, were born before the herbicide spraying began.

WLP was able to survey all of the 51 villages in Samoi and 23 of the 56 villages in Ta-Oey. In Xepone, Nong and Vilabouly districts of Savannakhet Province WLP surveyed only 53 of the 229 villages in these 3 districts. During this survey process, priority was given to the villages that were within 5 kilometers (approximately 3 miles) of at least 1 of

the spray runs. With a few exceptions, almost all of the villages in Samoi District fall within 3 miles.

More than half of the children identified in the survey, or 270 children, are below the age of 16, and two-thirds are under the age of 20. This means they would be the third and possibly even some the fourth generation since spraying took place. In addition, 57 percent are male, and 43 percent female.²⁰ Since 2017, 9 of these children have died from complications of their birth defects and 2 young adults from cancer. Children with paralysis for the most part do not attend school.

Table 2: Birth defects by generation



One child had both clubfoot and cleft lip and a second child had both clubfoot and epilepsy. Children identified with cognitive dysfunction exhibited limited cognitive abilities or were reported by the families to have difficulty comprehending and/or expressing themselves.

With such a large proportion of those with congenital birth defects being under 16 years of age, it is possible that there are transgenerational impacts of exposure to Dioxin with these birth abnormalities occurring, as suggested above, in the third and in some cases fourth generation. Vietnam has conducted extensive surveys of persons born with birth defects in the provinces sprayed with Agent Orange and found higher rates of such defects in the second and third generations there as compared to other areas of the country that were not sprayed.

They believe that the Dioxin contaminated herbicides have caused transgenerational impacts. Scientists are only beginning to research the potential epigenetic impacts of Dioxin on the human genome.²¹ The next several years

may provide a more comprehensive answer regarding the role of Dioxin in reproductive abnormalities in humans.

Although Down Syndrome is listed on the Vietnamese list of conditions they associate with Dioxin exposure, WLP's survey did not include children with Down Syndrome. About a dozen children had what appeared to be Down Syndrome in surveyed villages, though excluded from the survey because it is not known whether Dioxin can cause Down Syndrome.

Deaf-mute children, as well, were omitted from the Survey, with the exception of unusual cases in which families with more than two deaf-mute children were born to parents who were hearing or if a child's deafness was attributed to their malformed ears. Likewise, those who were blind were not included in the Survey but there were exceptions. Five children in Nong District, for example, who were born without eyes, were included. In total, there were approximately a dozen children under the age of 18 who were deaf-mute in the villages surveyed and about the same number who were blind.



There were 14 people born before herbicide spraying began who had birth defects and malformations, they were not included in the survey, however, where necessary WLP referred them for medical care.

WLP has begun the process to request permission to finish surveying the remaining 33 villages in Taoey district and 46 villages in Nong district, especially those that were within 6 miles of the spray paths.

Additionally, WLP plans to survey 16 villages in Ta-Oey and 4 villages in Nong that are 6 miles out from the spray paths. There is a need to understand comparatively the levels of congenital malformations and birth defects between areas that were sprayed and areas that weren't.

The Untold Stories Project

Much of the surveying work included extensive interviews with village elders. WLP staff spoke with them at length, recording and documenting their pre-war, wartime and post-war accounts of life in Laos. This urgent endeavor to capture as much of civilian eyewitness memories of the war is a vital part of WLP's ongoing "Untold Stories" project. The end goal is to consolidate all of the stories, as well as other photographic and digital content, and archive the

collection in the Library of Congress and in Lao Archives.



Elders interviewed by WLP staff noted that before the war their villages were relatively self-sufficient with adequate food and livestock. Over 70 percent of their diet came from foraging and hunting animals in nearby rich and biodiverse forests.

During the war, however, food was scarce and the most vulnerable, mainly children and the old, died of hunger. Diminishing of food sources was also further exacerbated by constant carpet-bombing which forced thousands of civilians to flee their villages into mountain caves or dugout shelters. Movement from place to place was frequent and upland farming was no longer tenable because so much of the area was subjected to destruction by bombs and herbicides. Livestock were either killed or disappeared in the midst of the attacks.

Villagers from these previously targeted regions still suffer from long-term malnutrition. On average most families have only enough rice for six months a year. The present-day food insecurity endemic in these regions results both from lack of development and from the latent health and environmental dangers of Agent Orange contamination and explosives.

The most prevalent and dangerous of wartime explosives are the anti-personnel bomblets, now known as “bombies,” that remain hidden and undetonated below the soil surface of many of these villages. Attempts to farm these areas can result in unexpected detonations causing severe injuries or death.

Many village elders recalled aerial herbicide spraying occurred near their villages during the war. Their reports were consistent with timings found in spray records, including the number and types of planes in each run. Other reports, however, were not found in the Ranch Hand/Service HERBS records. This suggests the spray records for Laos are likely incomplete and that many incidents of spraying were never recorded.

There may have been some level of obfuscation or intentional omissions in the spray records.

Several hundreds of thousands of missing gallons of herbicides—in particular, Agents Orange, Purple, Pink and Green—have never been accounted for.²² A complete disclosure of all herbicide spraying-related content by the U.S. military, the CIA and other clandestine actors is needed in order to grasp just what transpired in Laos.



In addition, some villages, such as Lahang in Samoi district, are only a few miles from the border crossing between Laos and Vietnam. People frequently travel between both countries in this area to trade or to visit relatives.

Those who can afford the travel also cross the border for medical care as it is closer than traveling to provincial capitals or to the national capital in Vientiane.

Many of these Lao recognized the disparity in the support the U.S. gave to the Vietnamese versus Lao citizens. They asked why children with birth defects in their villages in Laos did not receive any assistance and why Americans know so little about the war in Laos.

Support Provided by War Legacies Project

Of the 517 people identified in the survey, about 25 percent have been sent or accompanied by WLP to provincial and national level hospitals for further examinations and/or treatment.



Priority was given to those for whom life-saving or life-changing surgeries or medical intervention could be performed within Laos. Hence children with cleft lip and/or cleft palate, club foot, severe scoliosis and arthrogryposis were prioritized. Others with more complicated cases were referred to specialists from outside of Laos who were visiting on medical missions.

The epilepsy cases identified in Samoi district were referred to medical specialists and, where possible, their seizures are now controlled with medication to prevent further injury and cognitive impairment.

In order to facilitate direct support for persons with disabilities, WLP identified

and worked with local partners—the District Department of Labor and Social Welfare, the District Women's Union, district hospitals and Nai Bans (village heads). These partnerships, however, have been limited to cases of medical interventions that could be performed in Laos, by visiting medical teams, or in a few exceptions across the border at the Hue School of Medicine Hospital.

There are other challenges. For example, several young adults and children with cases of hip dysplasia traveled to the provincial rehabilitation center to receive orthotic lifts to level out the length of the legs, control abnormal motion and provide heel correction.²³ Later it

was discovered that many of the orthotics had not been used adequately, if at all.²⁴

Nonetheless, providing services in conjunction with the surveying work has helped WLP staff to build trust among many of our beneficiaries and their families, especially children.



Priority was also given to children in order to ensure early intervention



through various WLP programs. Children receive the most assistance in the form of rehabilitation services and medical interventions in order to mitigate complications and ensure integration into their peer group as the child matures.

Some of the children who were previously unable to walk due to severe clubfoot are now able to run and play with their peers and attend school. Children who had cleft lips or palates no longer faced the stigma attached to their conditions after WLP-provided services.²⁵

Persons with disabilities unable to walk on their own now have wheelchairs and/or home renovations to build accessible home amenities. The costs to bring a child from remote areas to Vientiane and to other larger cities to access health facilities for care or surgeries can total up to \$400 or more. The biggest expense is the travel costs for the child and one or two caregivers and living expenses while away from home. WLP usually provides financial assistance to help offset logistical costs such as transportation that are out of reach for most families.

WLP has also supported persons with disabilities by sending them to Vientiane to receive training. Most have been teens and young women. Seventeen youths enrolled in vocational training programs while women received training in sewing, weaving and other handicrafts at the Women’s Disabled Development Center or at the SiKeurt Vocational center.

Table 3: Persons with Disabilities supported by WLP Project

Type of Support	14/02/18-13/02/21		
	Female	Male	Total
Health support	50	77	123
Vocational support	16	7	22

Ms. Yen Ly Visits Her Village

Survey Case Study I

Born with arthrogryposis, a rare birth defect that causes multiple joint contractures, Yen Ly began life in a bamboo and thatch house with her elderly parents and younger brother in the village of Pasia, Salavan Province. Along the Ho Chi Minh trail, just west of the Vietnam border, her village is a mere 2 miles from where over 14,000 gallons of Agent Orange were sprayed in 1966.



Yen is a quick learner, very gregarious, with a somewhat wacky sense of humor. When her teacher first introduced her to WLP, walking was very difficult, but she managed to make the trip

across her village and up the hill to school. After the regional rehabilitation center in Pakse determined there was little they could do for her level of disability, WLP helped her travel to Vientiane in 2015 for a fuller examination. A Lao doctor diagnosed her with arthrogryposis, a very severe case that impacted her hands, feet and knees. Her most urgent problem, however, was severe malnutrition. At home she survived on rice and hot peppers, rarely getting protein or fresh vegetables.

A foreign orthopedic surgeon determined that only multiple operations could make her legs function better and facilitate walking. Yen had a wheelchair and a walker, but only intermittently used them. After surgery, she lived on an organic

farm near Vientiane gaining strength to enroll in a vocational training program learning handicrafts at the Lao Disabled Women's Center.

In February 2017, Yen was strong enough to make her first trip back home. WLP staff accompanied her on her first plane flight. Terrified, but excited, she held her breath for take-off, then the vistas of fields and rivers became magical. At landing, fear gripped her and she shouted in Lao: "I don't want to die.

Please don't let me die." On the ground, the man next to her exclaimed, "I'm so glad you did not die. You're too pretty to die early." He asked: What is your name? Where are you going? Jacquelyn Chagnon, WLP's Lao Program advisor, introduced Yen's circumstance and WLP's work. When he had moved on, she revealed to Yen that he was the Prime Minister of Laos, now the President of the Lao PDR. Yen had had no idea who she was talking to.



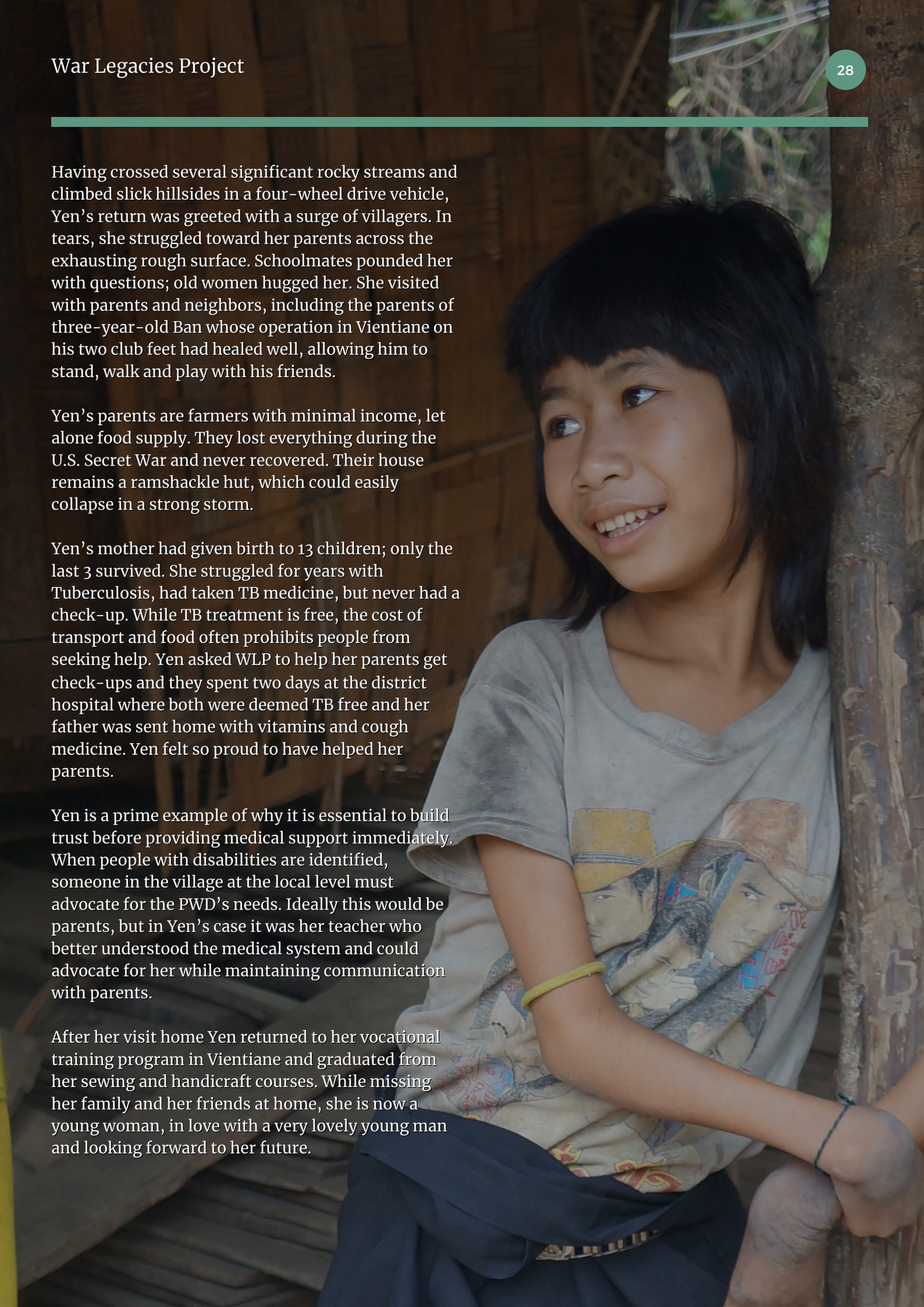
Having crossed several significant rocky streams and climbed slick hillsides in a four-wheel drive vehicle, Yen's return was greeted with a surge of villagers. In tears, she struggled toward her parents across the exhausting rough surface. Schoolmates pounded her with questions; old women hugged her. She visited with parents and neighbors, including the parents of three-year-old Ban whose operation in Vientiane on his two club feet had healed well, allowing him to stand, walk and play with his friends.

Yen's parents are farmers with minimal income, let alone food supply. They lost everything during the U.S. Secret War and never recovered. Their house remains a ramshackle hut, which could easily collapse in a strong storm.

Yen's mother had given birth to 13 children; only the last 3 survived. She struggled for years with Tuberculosis, had taken TB medicine, but never had a check-up. While TB treatment is free, the cost of transport and food often prohibits people from seeking help. Yen asked WLP to help her parents get check-ups and they spent two days at the district hospital where both were deemed TB free and her father was sent home with vitamins and cough medicine. Yen felt so proud to have helped her parents.

Yen is a prime example of why it is essential to build trust before providing medical support immediately. When people with disabilities are identified, someone in the village at the local level must advocate for the PWD's needs. Ideally this would be parents, but in Yen's case it was her teacher who better understood the medical system and could advocate for her while maintaining communication with parents.

After her visit home Yen returned to her vocational training program in Vientiane and graduated from her sewing and handicraft courses. While missing her family and her friends at home, she is now a young woman, in love with a very lovely young man and looking forward to her future.



Bouam of Adorne Village—A Very Rare Congenital Condition

Survey Case Study II

In 2016 WLP met 9-year-old Bouam. He was brought by his grandfather, his primary caretaker, to meet the WLP survey team outside the home of the village head.

Adorne, in eastern Salavan Province, lies on the main road approaching the Vietnam border. From 1966 to 1967 the hills around Adorne were sprayed with approximately 13,000 gallons of Agent Orange. Crops were also targeted with 4,800 gallons of Agent White. Since 2016, new road development has opened up this previously remote section of the former Ho Chi Minh Trail.

Bouam has very long eyelashes and big expressive dark eyes. He also has a severe case of scoliosis and a body deformation making his joints appear swollen. His stunted stature made the WLP team assume he was much younger. Bouam can stand and walk short distances. With no schooling, he understands Lao, knows very basic letters and numbers, and is talented at drawing.

Bouam had never been examined at district level or the provincial hospital to determine what might have been causing his unusual condition and what could be done to improve it. At the time, WLP found no medical person in the district, province, nor Lao or foreign doctors in Vientiane, who could identify his condition. His special case required consultation with one of the visiting teams of medical experts to Laos.

Not until November 2019 was WLP able to bring Bouam, then 13, to Vientiane. He and four other patients went for check-ups on their scoliosis and bone conditions with a team of U.S. doctors



specializing in spine abnormalities. By then, Bouam looked much thinner, and had developed purplish tumors on his hands, back and face.

Bouam's case immediately sparked attention. Lead surgeon Dr. Michael Hartman of Indiana worked into the night consulting overseas surgeons to diagnose Bouam.

Surgeon Hartman and Lao surgeon Kongkham of Friendship Hospital diagnosed Bouam with Maffucci Syndrome¹ (purplish tumors) or the similar Ollier Disease². Both are rare congenital birth defects. Ollier Disease can eventually lead to chondrosarcoma, a soft tissue cancer

recognized by the VA associated with exposure to Agent Orange–Dioxin.

Subsequently, Bouam had blood tests, X-rays of all of his bones, and an Echocardiogram at Children's Hospital as well as an MRI at the Friendship Hospital in Vientiane. In addition, Bouam was provided special nutritional food packets to boost his strength. He looked decidedly healthier and stronger by the time he left for home several weeks later. In the future, Bouam may need to have a bone biopsy to test for cancer.

Bouam's case is an example of how important it is to ensure there is early identification and early intervention for children with disabilities in Laos, and especially how challenging it is to provide this type of care in remote regions of the country. The closest hospitals do not have training in identifying more complicated cases of birth defects, nor are they knowledgeable about how to get a child like Bouam referred to specialists at the Provincial or National level hospitals. Navigating the complexities of the Lao medical system is overwhelming especially for those who have little or no education in the Lao language. WLP staff assistance was necessary to work with Bouam's grandfather to get him to Vientiane and to the right medical professionals.

In the absence of medical social workers WLP had to advocate for Bouam's care at all steps and bring him from one hospital to another to finally reach a diagnosis and develop a treatment plan. Even the first step of care, to get on the bus to Vientiane from Adorne was out of the reach of Bouam's family who are poor subsistence farmers. They simply did not have access to the cash for travel and daily living expenses away from home. Moreover, once they left their province for Vientiane the medical insurance system in Laos was no longer valid. Physical therapy, if it was determined to be required, was only available at the provincial capital. Financially, appropriate care was out of reach for most in the rural villages, especially if a long stay away from home was required.

Additionally, complex coordination is needed. To date this process is still being led by WLP staff and requires much logistical support to be provided for the family when a child travels to Vientiane for medical care. Traveling so far from home is stressful for the families. One of the biggest obstacles is building trust with their doctors so that the tests needed to make a proper diagnosis can be conducted. In future, medical social work should be developed to guide the family through the medical system to find district and provincial staff trained in birth defects and disabilities closer to home.

Bouam was not attending school, so he did not qualify for the nutritional support program in his village causing malnutrition that contributed to his small stature. Bouam would benefit from non-formal education classes to enable him to catch up to his peers and eventually receive training in a vocation that he could engage in his village of Adorne. Gaining independence for a teen such as Bouam is a process that will need multi-level intervention to achieve. Even a solution as simple as a wheelchair remains complicated by the fact that the paths in his village are bogged down in mud half of the year.

Nonetheless, his case also shows that with the right resources and working closely with the Lao infrastructure a great deal can be done. Those providing services also benefit from the hands-on learning of how to help persons with disabilities navigate through the existing medical system. The caregiver, head of the village, district and provincial level health staff, and doctors at the Children's hospital in Vientiane all gained skills to better address Bouam's particular situation and will be better equipped when the next child in need arrives.

I <https://rarediseases.org/rare-diseases/maffucci-syndrome/>

II <https://rarediseases.info.nih.gov/diseases/7251/ollier-disease>

III Background photograph of Bouam by: Christopher Anderson

Existing support for PWD in this region and in Lao PDR

Lao Government

With limited resources, the Lao authorities have made great strides in improving and providing access to medical care, vocational training, inclusive education and social integration for people with disabilities. In 2014 they passed the Decree on the Rights of Persons with Disabilities. Medical care is free or deeply subsidized by the Lao government for people with disabilities and the poor up to the provincial level of care. But in the southeastern region of Laos the quality of health care at the district hospitals is rudimentary. For more specialized care one needs to travel to the provincial capital or national capital in Vientiane.

Children's Food Programs

Most of the schools in Laos including those in the southeastern border region have a school-based program to provide meals to students to combat child malnutrition and stunting. But unless the child with a disability attends school, they do not benefit from this program.

Provincial and National Hospitals

Some procedures to address congenital malformations such as cleft-lip and club foot can be addressed at the provincial hospitals in Savannakhet and Salavan. But more advanced procedures such as to address cleft-palate, spinal malformations, complex facial surgery, stents for hydrocephalus, and most orthopedic conditions must be conducted at one of the national hospitals in Vientiane. Visiting teams of specialists also travel to Laos to train Lao doctors in early detection of birth defects and intervention treatments. These medical missions, for the most, do not ever reach the southeastern districts.

UXO Victims Program

The UXO Victims Program is focused on providing orthotic and prosthetic devices and rehabilitation for people who have been injured when unexploded ordnance (UXO) is set off. Their care is provided free of charge by the UXO victim's support program, funded in part by the U.S. government. But children with congenital malformations who could use the same types of assistance often must pay for these services. Fortunately, the training that is provided to support people impacted by UXOs is also benefiting those who have missing limbs due to birth abnormalities.

Okard

The U.S. is currently funding the five-year Okard project in Vientiane, Xieng Khoang, and Savannakhet that provides training in health and rehabilitation services for persons with disabilities, supports vocational training programs and livelihood opportunities and helps coordinate government and non-government organizations that support persons with disabilities to advance their rights. But it does not reach the rural populations in the border regions that were heavily sprayed with herbicides. Nonetheless, the training that is provided for rehabilitation specialists and medical professionals in Savannakhet and Vientiane will benefit those PWDs from the rural regions who need to travel for more specialized care.

Center for National Rehabilitation

The CNR does have satellite branches in Pakse and Savannakhet provincial capitals. They are best trained to address missing limbs from unexploded ordnance. They are ill-prepared to handle conditions of physical disabilities where paralysis and/or muscle wasting is present. Moreover, they are ill-prepared to address cognitive impairments. For most rehabilitation programs it is necessary to travel to Vientiane to the CNR which often requires a long stay.

Inclusive Education

Programs

Catholic Relief has worked to ensure that children with disabilities are integrated into the education system and the community including in Nong, Xepone and Villabouly districts. ChildFund Laos, Plan International, World Vision and Save the Children have in the past conducted inclusive education and medical screening in Xaybouathong, Khammouane Province through the BEQUAL Program funded by AusAID, the European Union and the Lao Government.

But these programs have not reached most of the border districts in southeastern Laos which were heavily sprayed by herbicides. Still, the lessons learned from these programs can be useful in developing programs in the more remote districts of southeastern Laos.

Programs could provide PWDs and their caregivers regular medical check ups, non-formal education classes, vocational training and teams of social assistants trained in basic care of PWDs who speak the local languages and can assist families when traveling to large medical facilities.

Challenges in Providing Medical Care

- Most persons with disabilities have never visited a doctor so very little trust in the medical profession has been established. Villagers more often rely on traditional medicine and healers.
- There is little awareness that medical intervention at the early stages may be possible for addressing some of the birth defects or illnesses such as arthrogryposis, club foot and hip dysplasia.
- Health professionals in district hospitals have limited training in how to identify unusual disabilities and medical conditions. In addition, they have not been trained on how to work with people with disabilities and their families to address their unique concerns.
- Most medical professionals at the district and provincial levels are unable to communicate in the local ethnic languages hindering communication with PWDs and their care-givers. Many living in border areas are ethnic minorities who have very rudimentary Lao language skills and very low literacy levels and therefore need constant guidance.
- There is no formal system of trained medical social workers in these areas to assist children and adults who have physical and/or cognitive challenges in navigating the complex medical and rehabilitation system in Laos.
- The local village medical clinic staff are often unaware of which health facilities to suggest to patients and most are just beginning to learn how the Lao medical referral system works. They are often unaware of specialized assistance available at higher levels of health care. As a result they will send the family home if medical care is not available at the local level instead of referring them to the provincial or national level facility.
- Most affected persons are poor upland rice farmers who do not have access to the cash economy to support even bus travel to provincial or national level medical facilities. Travel to a major hospital even at the province level is often financially prohibitive.
- Traveling to the district capital for medical care or to reach transportation to the provincial capital is daunting. Many villages are accessible only by foot, motorbike or four-wheel drive vehicles and only during the dry season. Even then it can take several hours as modes of transportation are very limited. Many of the villages are still inaccessible in the rainy season.
- Travel for medical care must be scheduled around the family's agricultural work schedule and the dry season.

- Children who require surgery often need to stay weeks or months in hospitals far from home. Most hospitals have no facilities yet for specialized playrooms, books and other learning tools for children and young adults. Thus, patients become bored very quickly and are anxious to go home before treatment is even started or finished. Accompanying caregivers need financial support to cover living expenses while away from home.
- A young child with a disability often needs to have two caregivers travel with them. Consequently scheduling child care at the home village can be difficult for families with young children.
- Medical expenses are covered by national insurance only if the person follows the referral procedure and only for medical care up to the provincial level. If the child needs to travel for care at a Vientiane facility the cost is not covered by government insurance.
- Many young children with disabilities have other underlying medical issues and malnutrition. Children with severe disabilities that are unable to go to school are then deprived of the school feeding programs established to combat malnutrition in this region.
- Communications with families to coordinate travel for medical care is difficult as most can not afford a cell phone. Communications with the families often must be coordinated through the district level government staff and the Nai Ban (village head).
- When patients and caregivers are able to travel for medical services they find themselves confused navigating the medical system and adjusting to the urban environment. A system of young volunteers as guides would be helpful to give patients and caregivers assurance and proper information.
- If complex surgery is required, caregivers will often want to travel back to their village to confer with elders as well as perform rituals to be certain their village spirits support proceeding with surgery.
- Lao doctors and surgeons even at the national level do not yet have sufficient training to address complex birth defects. Many conditions require the care of a visiting team of specialists and their surgery schedule books up very quickly. Some children, such as those with arthrogryposis, often require multiple years of surgeries in the most complex cases.
- Children with paralysis, cerebral palsy and other movement disorders have no access to rehabilitation services at the district level. Even if they are able to travel to the provincial capital for extended rehabilitation there are very few trained rehabilitation staff and even fewer that have specialized training to address their needs.

Recommendations

The above and other programs for persons with disabilities in Laos provide a good foundation to build upon for future programs targeted at those with congenital malformations and disabilities in the heavily sprayed regions of Laos. Listed here is some of the work that remains to be done:

- Focus more of existing U.S. government and other international assistance on the Lao PDR in the districts where Dioxin-contaminated herbicides were used by the U.S. government during the war. This should start with the 15 most severely impacted districts along the former Ho Chi Minh Trail of southeastern Laos.
- Release the locations of all covert sites where the CIA and covert military operations may have conducted herbicide spraying by hand and by helicopter or covert aerial spraying. This is necessary to prioritize where environmental testing needs to be conducted.
- Conduct limited testing of soils and sediments, fish and animals, and human breast milk in select villages with high rates of people with disabilities. Conduct similar testing in areas where there is a possibility of the storage of herbicides or frequent perimeter spraying during the war.
- Train medical professionals at the district, provincial and national levels in early detection and early intervention for birth defects.
- Continue to train medical specialists in orthopedic surgery, neurology, plastic surgery, cardiology, spinal surgery and pediatric surgery.
- Grant persons with disabilities travel and food stipends to enable them to travel with a caregiver to hospitals at the national or provincial levels for specialized services.



- Assist the Lao government in establishing a medical social work system. This would greatly help families of children and adults with disabilities to navigate through the complex medical referral system in Laos and communicate with medical professionals.
- Support the provincial and district hospitals to develop village-based medical screening programs with specialists from the national and provincial hospitals that can travel with a four-wheel drive to remote villages to conduct medical examinations and refer people for services.
- Establish non-formal education programs for children and young adults with disabilities and special learning needs who were or are unable to attend school in their villages.
- Establish rehabilitation centers and vocational training programs at the district level to assist persons with disabilities from the heavily sprayed districts. Improvement of the road network would allow a single center to service several districts.
- Foster more communication between the programs for people with disabilities to make it clear which costs are covered by medical insurance and which costs are covered by international programs supporting people with disabilities.
- Develop livelihood support programs to enable youths and young adults with disabilities to have an alternative to upland rice farming in rural villages of southeastern Laos.
- To combat child nutritional deficits, expand the school feeding program to include homebound children with disabilities.



Conclusion

The amount of funding needed to address the potential ongoing impacts of Agent Orange in Laos would be a small fraction of the \$230 million that has been allocated by the U.S. since 1993 to address explosives in Laos.²⁶

It would be a fraction of the \$390 million already allocated to Vietnam for the health and environmental impacts of Agent Orange there.²⁷ While environmental testing may possibly reveal minimal Dioxin hotspots in Laos, none will compare to the hotspots at the Da Nang and Bien Hoa Airbases. Mitigation measures would most likely require at most the relocation of populations who are living or farming on contaminated soils until the soil can be remediated as was done at the former A So special forces base in A Luoi, Vietnam.

While there are hundreds of thousands and potentially millions of people with disabilities and health issues associated with exposure to Dioxin-contaminated herbicides across at least 10 provinces in Vietnam, those most impacted in Laos are restricted to the 15 districts in the 5 Lao provinces along the border with Vietnam.

Medical screening and educational assessments would need to be completed in the 800 villages that were heavily sprayed. A mobile screening program should be developed to help identify other health and educational needs facing these small ethnic communities.

Lessons learned from OKARD, BEQUAL and programs in other regions of Laos will help in the development of necessary programs with district-level government agencies and ensure capacity building of local Lao agencies and organizations. The aim will be to address the particular educational and medical needs of those in the underserved southeastern region of the country.

With an average of four people with congenital birth defects and/or disabilities per village in the heavily sprayed regions in Laos, WLP estimates that between 3,200 and 5,000 will require specialized programming. This is a very manageable number. In a matter of a few years the U.S. government could fund programs that will alleviate this forgotten and long neglected legacy of the war in Laos.



END NOTES

History and Geography of Toxic Spraying

- 1** The Army Chemical Corps responsible for overseeing the distribution of the herbicides cannot account for approximately 14 percent of the herbicides procured for the war effort. Some of these herbicides may have been used in unrecorded spray missions, including missions in Laos in the early 1960's.
- 2** The tactical "rainbow" herbicides used included: Agents Orange and Purple made up of Dioxin contaminated 2,4,5-T combined with 2,4-D; Agents Pink and Green consisting of Dioxin contaminated 2,4,5-T; Agent Blue - the arsenical compound cacodylic acid and Agent White - picloram.
- 3** Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Lao PDR. Hatfield Consultants. March 2005. Annex 2A Summary of Herbicide Applications in Lao PDR, 1965-1971 from US Embassy data.

As part of the Operation Ranch Hand effort in Laos, mainly Agent Orange as well as Agent Purple were used; anticrop Agents Blue and White were also used but to a lesser extent.
- 4**
- 5** Most villages surveyed were within three miles of the spray paths. However, WLP also selected villages within six miles from the spraying for several reasons: 1) Villages often moved within a one-to-two mile radius over the course of the war 2) Upland farming occurred in the surrounding hills therefore a villagers range of activity exceeded the village boundaries 3) villagers often had to flee several miles to the surrounding hills during the bombing and spraying 4) Planes sprayed a path approximately 1/2 mile wide and spray drift could have reached several more miles from the recorded path due to high winds in the mountain regions and 5) to account for discrepancies between the recorded and actual spray paths.
- 6** https://lao.unfpa.org/sites/default/files/public-pdf/PHC-ENG-FNAL-WEB_o.pdf
- 7** Mapping Child Vulnerability Dimensions in the Lao PDR: A Spatial-statistical analysis 2019.
https://resourcecentre.savethechildren.net/node/17470/pdf/child_vulnerability_laos_wvl_cde_20191019_for_web.pdf?embed=1

Agent Orange and Human Health Impacts

- 8** Interview with Linda Birnbaum, former Director of U.S. Environmental Protection Agency Toxicology Division. 2004.
<https://agentorangerecord.com/interview-with-dr-linda-birnbaum-about-dioxin/>
- 9** Agent Blue, a combination of two arsenic compounds, sodium cacodylate and cacodylic acid, was used primarily against rice crops, bamboos and grasses.

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- 10** <https://www.va.gov/disability/eligibility/hazardous-materials-exposure/agent-orange/#full-eligibility-requirements>
- 11** <https://www.publichealth.va.gov/exposures/agentorange/birth-defects/children-women-vietnam-vets.asp>
- 12** <https://luatvietnam.vn/y-te/thong-tu-lien-tich-20-2016-ttlt-byt-bltdbxh-bo-lao-dong-thuong-binh-va-xa-hoi-107374-d1.html>
- 13** One clear explanation of how Dioxin can potentially impact humans and animals can be found in an interview with Linda Birnbaum, former director of the National Institute of Environmental Health sciences.
<https://agentorangerecord.com/interview-with-dr-linda-birnbaum-about-dioxin/>
- 14** <https://www.appropriations.senate.gov/imo/media/doc/SFOPSRept.pdf>
- 15** While the southeastern border region of Laos has begun to receive governmental and foreign aid attention for UXO clearance, road construction, electricity supplies, nutrition and clean water projects, there remains no structure for addressing services for PWDs.
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Dioxin Hotspots

- 16** <https://www.hatfieldgroup.com/wp-content/uploads/2020/05/hatfieldao.pdf>
- 17** Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Lao PDR. Technical Report: Assessment of the Agent Orange Dioxin Situation in Lao PDR. March 2005. Hatfield Consultants. Prepared for United National Industrial Development Organization
- 18** <https://library.utdallas.edu/specialcollections/hac/cataam/notebooks/aam68.pdf>
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The Laos Agent Orange Survey

- 19** These trained medical staff are the equivalent of a medic. Also, many of them do not speak local ethnic languages.

Children with Congenital Malformation and Disabilities in the Survey

- 20** It is a bit unclear why there are more males than females with birth defects found in the survey. In general slightly more males than females are born with birth defects. Some conditions, such as cleft lip, are more prevalent in males and this was found to be the case with twice as many males with cleft-lip than females. There were more males with conditions that are more common in females such as hip dysplasia and scoliosis. It is possible that female children with birth defects did not survive as long as male children. It may also be the case that families were more reluctant to bring forward their female children to the survey team. This disparity between the percentage of males versus females found in the survey needs to be further explored.
- 21** Animal studies have found that environmental exposures and even stress can cause ill-health effects in the third and fourth generation.

The Untold Stories Project

- 22** There are various estimates of the amount of herbicides procured and used. However, the most complete today is by Jeanne Stellman and her colleagues at Columbia University. When Agent Orange was banned for use in Vietnam there were approximately 11.37 million gallons shipped to Johnston Island to be destroyed. An inventory of the remaining herbicides conducted in July 1970 states that there were 1.44 million gallons remaining in Vietnam stockpiles.

Support provided by War Legacies Project

- 23** Early detection of hip dysplasia is essential so that treatment can begin before it becomes debilitating.
- 24** Once home, people reverted to walking barefoot or with sandals.
- 25** Children with cleft lips are usually youths who never had their cleft lips surgically corrected are now able to smile and are no longer called by the nickname "Heuy," meaning cleft lip, and use their name giving to them by their parents at birth.

Conclusion

- 26** <https://www.google.com/url?q=https://www.state.gov/reports/to-walk-the-earth-in-safety-2020/&sa=D&source=editors&ust=1615680599373000&usg=AOvVawoh34hVsQiBnZvIooMgADK4>
- 27** U.S. Agent Orange/Dioxin Assistance to Vietnam. Congressional Research Service. Updated January 15, 2021. <https://fas.org/sgp/crs/row/R44268.pdf>

ANNEX

Table One: Survey Results in Samoi, Ta-Oey, Villabouly, Xepone, and Nong Districts

Condition	District					Total	Over 55	Not likely AO	Potentially AO	Unclear if AO
	Samoi	Ta-Oey	Villabouly	Xepone	Nong					
Hip dysplasia and leg problem	71	14	4	7	12	108	5	0	103	0
Idiopathic paralysis	20	26	6	8	19	79	0	0	79	0
Epilepsy	48	2	3	7	1	61	3	0	0	58
Cleft lip - cleft palate	13	20	6	8	8	55	1	0	54	0
Club-foot	14	8	7	9	4	42	0	0	42	0
Short arm / arm problem / soft shoulder	15	3	2	1	3	24	0	0	24	0
Cognitive dysfunction	9	6	0	5	3	23	0	0	23	0
Others	14	7	0	2	0	23	3	15	5	0
Cysts / keloid	14	4	0	1	0	19	1	18	0	0
Severe scoliosis / chest and spine	4	8	1	0	5	18	1	0	0	17
Malformed dactyly (finger and toes)	10	2	3	0	0	15	0	0	15	0
Undescended testical	6	1	0	0	2	9	0	0	9	0
Arthrogryposis (joint contractures)	1	2	4	1	0	8	0	0	8	0
Microcephalous (cerebrospinal fluid)	0	2	0	0	4	6	0	0	6	0
Hypochondroplasia (dwarfism)	2	2	0	0	2	6	0	0	6	0
Missing limb (ear, hand, arm or leg)	3	2	0	1	0	6	0	0	6	0
Missing eyes	0	0	0	0	5	5	0	0	5	0
Hydrocephalus (water in the brain)	2	0	0	1	0	3	0	0	3	0
Cancer: colon. bone, skin tissue	2	1	0	0	0	3	0	3	0	0
Torticollis (tilting head)	0	0	0	2	0	2	0	0	2	0
Hypospadias (penis deformity)	0	0	1	1	0	2	0	0	2	0
Hirschsprung (missing nerves to colon)	0	0	1	0	0	1	0	0	1	0
Anus unperforated	1	0	0	0	0	1	0	0	1	0
Spina bifida	0	0	0	0	0	0	0	0	0	0
Total	249	110	38	54	68	519*	14	36	394	75

*WLP found two children with two disabilities which is why the number here is 519 when the survey found 517 cases of congenital birth defects.

Table Two: Age of Persons with Disabilities by District

District	Children/Youth			Young Adults			Adults	Non AO	Total
	0-5	6-10	11-16	17-20	21-35	26-35	36-55	Over 55	
Samoi, Salavan	37	33	40	25	17	30	54	13	249
Ta-Oey, Salavan	25	27	21	10	6	11	8	2	110
Xepone, Savannakhet	11	11	11	4	3	4	8	0	52
Villaouly, Savannakhet	14	6	5	1	3	5	4	0	38
Nong, Savannakhet	26	9	12	3	6	2	8	2	68
Total	113	86	89	43	35	52	82	17	517
Under 16	288								
Under 20	331								
17-55				212					
21-55					169				