



Published in final edited form as:

*Int J Occup Environ Health*. 2012 ; 18(1): 22–28.

## A BASELINE PROFILE OF ASBESTOS IN THE US-AFFILIATED PACIFIC ISLANDS

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### Abstract

Asbestos is a recognized occupational and environmental hazard in the Asia-Pacific Region, yet information regarding asbestos consumption, exposure and asbestos-related diseases in the US affiliated Pacific Islands (USAPIs) is scarce and the situation regarding asbestos in these islands, particularly with regards to disease burden, surveillance and health care capacity, is not well understood. Searching through scientific and “grey” literature and interviews with local cancer registry personnel and health professionals yielded no published data but sufficient indirect evidence of past and ongoing asbestos exposure, documented cases of mesothelioma and asbestosis, and minimal capacity for preventing and recognizing asbestos-related illnesses. The relatively low levels of capacity and resources within the USAPIs can impede regional progress in asbestos prevention and highlight the need for an integrated regional approach to address these data and capacity gaps. A regional mechanism to share expertise and resources and facilitate technical assistance to the USAPIs is urgently needed.

### Keywords

asbestos; mesothelioma; Pacific Islands; Micronesia; Guam; Palau

### INTRODUCTION

Asbestos is a recognized occupational and environmental hazard in the Asia-Pacific Region. The Asian Asbestos Initiative (AAI) was organized to systematically delineate the magnitude and burden of asbestos-related health impacts, and to provide a forum for the exchange of information on ongoing and promising interventions to mitigate the impact of

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Competing financial interest declaration:

A M David was contracted by WHO to undertake the data collection and oversee the technical report writing for the submitted work. The other authors have no competing interests in the submitted work.

Disclaimer:

This work represents the opinions of the authors and not necessarily that of the World Health Organization.

asbestos exposure on population health<sup>1</sup>. Three AAI meetings have been convened, the latest one held in November 2010 in Fukuoka, Japan. Asian countries have actively participated in these meetings, but the Pacific Islands have not been as well represented. Furthermore, information regarding asbestos consumption, asbestos exposure and asbestos-related diseases in the Pacific is scarce and the situation regarding asbestos in these islands, particularly with regards to disease burden, surveillance and health care capacity, is not well understood.

To address this data gap, the World Health Organization (WHO) commissioned Guam-based Health Partners, L.L.C. to conduct a preliminary review of available data and create a baseline profile of the six United States affiliated Pacific Islands (USAPIs), namely American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), Federated States of Micronesia (FSM), Guam, the Republic of the Marshall Islands (RMI) and the Republic of Palau (Palau). We report the findings from the initial effort to determine the extent of the asbestos problem in the USAPIs.

## BACKGROUND

The United States affiliated Pacific Basin Islands consist of six island jurisdictions that are geographically, politically, economically and socio-culturally diverse: Guam (population: ~181,000), Commonwealth of the Northern Mariana Islands (population: ~46,000), and American Samoa (population: ~66,000), which are considered U.S. flag territories, and three other jurisdictions—Federated States of Micronesia (population: ~107,000), Republic of the Marshall Islands (population: ~67,000) and Republic of Palau (population: ~21,000)—which are independent countries but are freely associated with the United States, meaning they are politically independent but each has signed a Compact of Free Association with the United States establishing specific rights and responsibilities. These latter three territories are collectively known as the Freely Associated States or FAS<sup>2</sup>.

The US flag territories fall under the legal mandate of the US federal government, with occupational exposures overseen by the Occupational Safety and Health Administration (OSHA) and environmental exposures regulated by the US Environmental Protection Agency (EPA). The Freely Associated States (FAS) have their own national legislation to regulate occupational and environmental hazards, but these national statutes strive to be closely aligned to the US standards. The FAS are recognized as voting members in the United Nations system, and have the ability to sign on and ratify international treaties and conventions that address occupational and environmental hazards and exposures.

## METHODOLOGY

The data search strategy followed the pathway of exposure model and focused on 3 key areas:

1. **Environmental presence** of asbestos – specifically looking at evidence of past/current importation and use, regulatory frameworks related to asbestos, and capacity to handle asbestos remediation
2. **Exposure potential** – specifically examining high risk occupations and activities
3. **Disease** – asbestos-related disease prevalence and health system capacity to recognize and treat asbestos-related diseases

Initially, the search focused on systematically identifying published reports in the scientific literature. However, because of the paucity of published data on asbestos in these Pacific Islands, the search strategy was expanded to include “grey literature,” such as websites of

relevant organizations, news reports, generic search engines (e.g. Google and Yahoo), and service provider sites (including sites of asbestos litigation lawyers and asbestos remediation companies). Websites on international conventions and treaties with direct relevance to asbestos were perused to check if any of the FAS were signatories. In addition, the following were contacted by phone and email to ascertain if relevant information was available: cancer registry personnel, health professionals and local OSHA and EPA representatives.

## FINDINGS and DISCUSSION

In general, information on asbestos consumption and health effects in the USAPIs was extremely scarce. A systematic search using multiple search terms within the medical, public health and environmental health databases of published peer-reviewed literature did not result in any retrievable documents.

The expanded search of generic search engines, grey literature and other potentially relevant online information resulted in the identification of 49 relevant sites (Figure 1). Close to half (45%) of the sites identified were from private sector businesses offering asbestos-related services; websites of commercial entities offering asbestos remediation/removal were the most common (27%), followed by sites of lawyers offering asbestos litigation services (18%). Information on regulatory issues and news reports involving asbestos issues comprised 8% and 6% respectively of the sites generated. The rest of the sites provided general information (not specific to USAPIs), or were irrelevant for the purpose of the data collection.

### Asbestos Production

No evidence indicates that asbestos production/mining has been conducted in any of the USAPIs. The US Geological Survey (USGS) website did not provide any information for the USAPIs<sup>3</sup>. The most recent draft of the OHSE Country Profiles for Asbestos contained pages for FSM, RMI and Palau but the data fields on asbestos production were empty<sup>4</sup>.

### Asbestos Consumption

No data on asbestos consumption in the USAPIs were found. The USGS site, which tracks global asbestos consumption, did not contain information on the USAPIs<sup>4</sup>. This may not necessarily indicate that the USAPIs do not consume asbestos; it is entirely possible that consumption levels are too low to be captured in this database. Alternatively, the USGS database may be less complete for countries and territories with small populations<sup>5</sup>. While no data on importation of raw asbestos existed for any of these islands, it should be noted that the Republic of the Marshall Islands is party to the Rotterdam Convention, under which the importation of asbestos (except for chrysotile) is subject to the prior consent of the government.<sup>6</sup> Customs data exists for importation of construction materials in general, but it is not disaggregated to specifically track asbestos-containing products.

### Regulatory Frameworks

**International Treaties and Conventions**—A search of signatories to relevant international treaties and conventions revealed that RMI is a Party to the Rotterdam Convention<sup>6</sup>, and FSM and RMI are parties to the Basel Convention<sup>7</sup>. The Trust Territories (Guam, CNMI and American Samoa) are not Parties to any of these conventions by virtue of the non-ratification of the US government of any environmental treaty. Within the greater Pacific, Fiji is a Party to International Labour Organization (ILO) Convention 155 (Occupational Safety and Health). None of the USAPIs and other Pacific Islands are Parties to ILO Convention 162, concerning Safety in the Use of Asbestos<sup>8</sup>.

**Regional Treaties and Conventions**—The Waigani Convention, also known as the Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region opened for signature in Waigani, Papua New Guinea in 1995 and entered into force in 2001. The Secretariat of the Pacific Regional Environment Programme (SPREP) serves as the Convention's Secretariat while the Secretary General of the Pacific Islands Forum Secretariat serves as Depositary. The Convention covers toxic, poisonous, explosive, corrosive, flammable, ecotoxic, infectious and radioactive wastes, including asbestos. Parties are obligated to ban the import of hazardous and radioactive wastes, minimize the production of hazardous wastes and cooperate to ensure that wastes are treated and disposed of in an environmentally sound manner.

The Convention is open to all Pacific Island Forum countries. Currently, there are 13 Parties: Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu. France, Marshall Islands, United Kingdom and the United States are eligible to join the convention but have not yet done so. Palau signed the convention in 1995 but has yet to ratify<sup>9</sup>. Thus out of the 3 USAPIs that have the capacity to ratify international treaties, 1 has ratified, 1 has signed and 1 has not yet acted on the Waigani Convention. Table 1 summarizes the status of the USAPIs in relation to relevant international and regional treaties.

**National/Territorial Legislation**—A review of the USAPIs' national/territorial occupational health and safety legislation revealed the absence of legislation specifically addressing asbestos in the workplace, although laws and ordinances addressing general occupational safety exist. The USAPIs also have environmental protection and solid waste laws in place, but these do not specifically address asbestos. Only Guam has 1 law that addresses requirements for removal, abatement and disposal of asbestos containing materials<sup>10</sup>. This law does not address restrictions on importation of asbestos nor workplace issues related to asbestos. There are no national or territorial laws that specifically address the regulation of asbestos-containing material in the USAPIs.

## Potential for Asbestos Exposure

**Past Exposures**—On Guam and CNMI, which served as active military ports during the Second World War (WWII), past exposure from military service is a possibility. Guam maintained active shipbuilding facilities even after WWII, and it is conceivable that both military and civilian workers who were involved in ship maintenance were exposed to asbestos<sup>11</sup>. However, because military personnel often serve in various military installations across the world, it may be challenging to ascertain if the actual occupational exposure occurred in Guam.

In addition to occupational exposure in military bases, the use of asbestos-containing construction materials can account for past exposures. Various news reports and legislative documents over the past 10 years describe concerns raised about asbestos in schools, military structures (in compounds previously run by the US military such as the former military base in the island of Tinian) and old government buildings. These old buildings date back to the post World War II era, when re-construction of edifices destroyed by the war commenced. On Guam and CNMI, legislative documents and technical reports indicate that budgetary appropriations have been made to cover the cost of asbestos removal in various buildings and other infrastructure<sup>12, 13</sup>. These confirm that the local political leadership were

aware of the presence of asbestos and legislated its removal in the past. Removal efforts may have resulted in unintended exposure.

**Ongoing Exposures**—Potential current exposures fall under the following categories:

1. Demolition workers – including construction workers involved in tearing down structures that may contain asbestos
2. Post-disaster exposures – whereby typhoons/cyclones and earthquakes cause the destruction of asbestos-containing buildings, releasing respirable asbestos fibers into the atmosphere
3. Inadvertent environmental exposure – from decaying military equipment and infrastructure
4. Unrecognized occupational exposure – arising from the use of undeclared and/or legally imported asbestos-containing materials

**Demolition Work:** Table 2 lists completed projects in asbestos inspection, asbestos abatement/removal and disposal and regulatory compliance monitoring reported in the websites of four local environmental services providers<sup>14-17</sup>. These websites indicate completed and ongoing asbestos work in 3 of the 6 USAPIs, and provide evidence of the presence of significant amounts of asbestos in existing buildings and other structures.

A number of these projects were implemented within military bases and installations, where asbestos containing materials were frequently used for construction. Currently, the US military maintains bases in Guam and on one of the islands within Kwajalein atoll in the Marshall Islands; additionally, in the past, it had bases in Tinian, CNMI and American Samoa<sup>18</sup>.

**Post-disaster Exposures:** The Northern Micronesian islands, especially Guam and CNMI, are often in the pathway of tropical typhoons and cyclones. They are also within the Pacific Rim earthquake belt. When these natural disasters hit, structures made with asbestos containing materials can suffer considerable damage, releasing respirable asbestos fibers into the environment.

In CNMI, a case study from the National Oceanic and Atmospheric Administration (NOAA) Abandoned Vessel Program documented post-typhoon damage to an abandoned fishing vessel. The crews mitigating the oil spill from the damaged ship also had to remove asbestos-containing material, which they discovered as they were conducting their clean-up operation<sup>19</sup>.

**Inadvertent Environmental Exposures:** In some of the USAPIs, decaying military equipment and buildings with asbestos-containing materials can be found lying about in open fields<sup>20, 21</sup>. Potentially, these could be a source of environmental asbestos exposure, especially if the asbestos containing materials were friable.

**Unrecognized Occupational Exposures:** The USAPIs are increasingly importing construction materials from China, India, the Philippines and other Asian countries where asbestos-containing substances may not be stringently regulated. Building contractors who were interviewed consider it possible that unlabeled asbestos-containing construction materials from these countries enter into the USAPIs, subsequently causing inadvertent occupational exposure among construction workers. The extent of this potential problem is unknown. Occupational exposure can also occur from improper handling of legally imported asbestos containing construction materials coming from the US mainland.

### Asbestos-related Diseases

At present, there are no established registries that capture asbestos-related diagnoses. Repeated calls to the Guam Occupational Safety and Health Administration (OSHA) office and email correspondence to two regional environmental epidemiologists at the Hawai'i Department of Health were unanswered.

Data gatekeepers of cancer registries in the region were contacted; data were provided by the Pacific Regional Cancer Registry<sup>22</sup> and Guam Cancer Registry<sup>23</sup>. The Principal Investigator of the Comprehensive Cancer Control in the US Affiliated Pacific Islands grant, provided additional information for American Samoa<sup>24</sup>. In addition, interviews were conducted with the largest radiology group providing services to Guam and CNMI<sup>25</sup>, as well as the only civilian pulmonologist in the USAPIs<sup>26</sup>. The results are summarized in the table 3. These findings document the presence of asbestos-related lung diseases, including mesothelioma in Guam and possibly in American Samoa. However, the health professionals interviewed believe that existing data likely underestimate the actual prevalence of disease.

### Capacity to address prevention and control of asbestos exposure and asbestos-related diseases

Medical professionals can undergo specific training and certification in the ILO Classification of chest radiographs to detect and diagnose occupational lung diseases, including asbestos-related lung diseases, and are designated as "A" (trained) readers or "B" (trained and certified) readers. Outside of the military health care system (where turnover of health professionals is rapid), there is only 1 known "A" reader on Guam, and no known "B" readers<sup>24</sup>. Currently, there is only 1 board-certified, residency-trained occupational and environmental physician in Guam, but this health professional is not in active clinical practice. There is likewise only 1 civilian pulmonary medicine specialist in Guam<sup>26</sup>. There are no known "A" or "B" readers nor residency-trained occupational medicine physicians or pulmonologists in the other USAPIs.

## CONCLUSIONS AND RECOMMENDATIONS

The results of this data gathering exercise corroborate that significant data gaps exist in the US affiliated Pacific islands in relation to asbestos consumption, exposure and disease. However, sufficient evidence is available to confirm that asbestos is present in these islands, and furthermore, there are ongoing activities in asbestos detection, abatement and disposal. These indicate that past and current asbestos exposures are likely, and that, therefore, the risk for future development of asbestos-related diseases needs to be acknowledged and anticipated.

Preliminary data from cancer registries also indicate that asbestos-related diseases, specifically mesothelioma and asbestosis, have been diagnosed in some USAPIs. Data in these registries likely are severely under-estimated, given the lack of capacity within the health care system to recognize and diagnose asbestos-related health effects and the paucity of data on asbestos exposure.

At present, there are no surveillance mechanisms that can reliably capture asbestos-related indicators. Until such systems are established, it will be difficult to estimate the magnitude of asbestos-related exposures and health problems in these islands. Data collection systems will need to cross-link with information collected by non-health sectors involved in asbestos-related activities.

Capacity building within the health care sector is also urgently needed to enhance the skills of primary care providers and occupational medicine health professionals in recognizing



asbestos-related diseases, acquiring good occupational histories, and supervising the diagnostic work-up and management of suspected cases and exposed personnel. Capacity building is likewise required in the non-health sectors, including labor, environment and private industries in identification of potential asbestos contaminants, environmental monitoring for asbestos exposure, safe handling and disposal of asbestos-containing products and safe work practices when using asbestos-containing materials. Before monitoring and disposal can be carried out, it is crucial to identify potential sources of asbestos contamination. This might be achieved most effectively by community participation in capacity building and outreach efforts. Local knowledge will likely be important in identifying potential asbestos containing materials and areas. In contrast, enhancing local capacity for monitoring and disposal can be selectively conducted among relevant professional and worker groups.

The relatively low levels of capacity and resources within the USAPIs highlight the need for an integrated regional approach to address these data and capacity gaps. A regional mechanism to share expertise and resources and facilitate technical assistance to island countries and territories is urgently needed. A number of Asian countries, including Japan, South Korea and Singapore, already have extensive experience and knowledge in primary and secondary prevention of asbestos-related diseases<sup>1</sup>. These Asian countries are a potential source of technical assistance and support for capacity building within the Pacific. The Asian Asbestos Initiative, and WHO and ILO regional meetings are potential avenues for the exchange and transfer of information and technologies from these Asian countries to the Pacific Islands. Within the Pacific, SPREP and WHO can facilitate the capacity building and resource sharing between the non-US affiliated Pacific islands and the USAPIs.

The Pacific islands represent the “weakest link” in the Asia-Pacific region. While Asian countries are expanding their capabilities in tracking asbestos consumption and exposure, monitoring for health effects, and implementing the critical policy and programme interventions to prevent/reduce exposure and asbestos-related harm, the data and capacity gaps in the Pacific will impede overall progress in the Region as it seeks to mitigate and reduce the overall health impact of this hazardous substance. Thus, action to close these gaps is crucial.

The WHO Regional Framework for Action for Occupational Health 2011-2015 calls for a coordinated intersectoral and multi-country approach to effectively eliminate the harm from asbestos within the Asia-Pacific region<sup>27</sup>. Ensuring the implementation of this approach to assist the USAPIs to redress their data and capacity gaps will be critical for progress to occur equitably across the region.

## Acknowledgments

This work was supported by the Environmental Health Program, World Health Organization Western Pacific Regional Office. The authors thank Dr. Neal Palafox (John A. Burns School of Medicine, University of Hawai'i at Manoa), Dr. Mohammed Madantschi (Guam), Dr. Nathaniel Berg (Guam Radiology Consultants), Dr. Robert Haddock and Ms. Melani Montano (Pacific Regional Cancer Registry, University of Guam Cancer Research Center), and Ms. Roxy Mad (research assistant) for their valuable assistance.

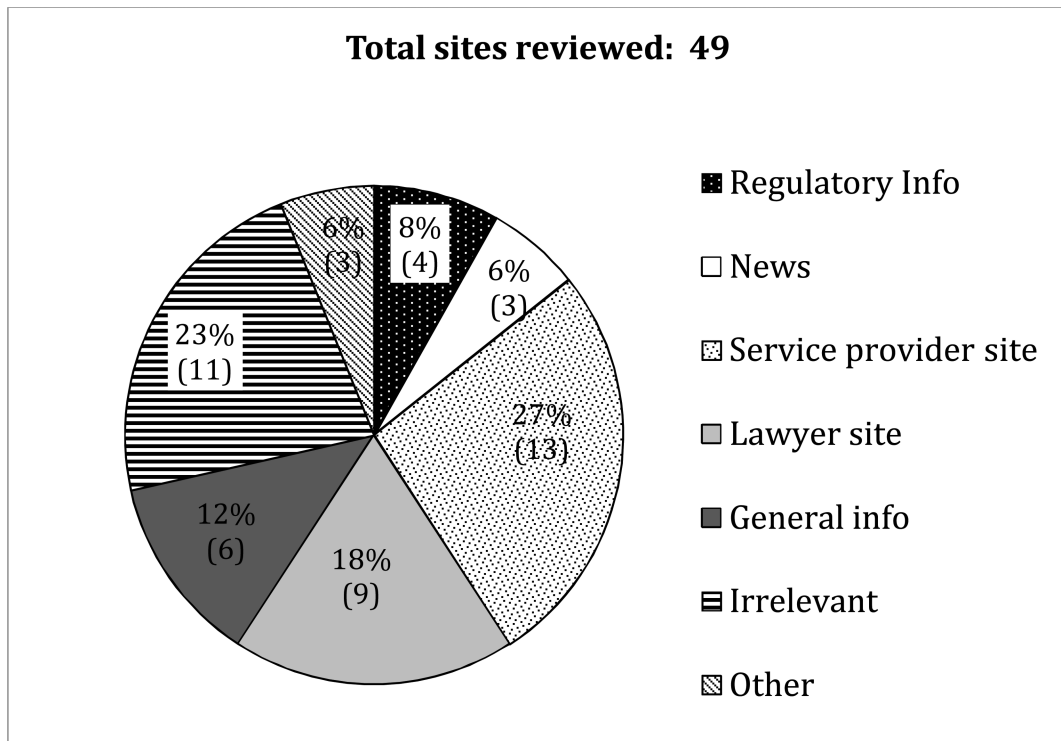
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**Figure 1.** Distribution by type of online sites with potential asbestos information for USAPIs in the expanded literature search

**Table 1**

Pacific Islands' participation in relevant international and regional regulatory frameworks

Pacific Island	Rotterdam Convention <sup>6</sup>	Basel Convention <sup>7</sup>	ILO 139 <sup>8</sup> (Occupational Cancer)	ILO 155 <sup>8</sup> (Occupational Safety & Health)	ILO 162 <sup>8</sup> (Asbestos)	Waigani Convention <sup>9</sup>
<b>USAPIs</b>						
Guam	-	-	-	-	-	
CNMI	-	-	-	-	-	
FSM	-	✓ 6 Sept 1995	-	-	-	✓
RMI	✓ 27 Jan 2003	✓ 27 Jan 2003	-	-	-	-
Palau	-	-	-	-	-	Signed but not ratified
AMS	-	-	-	-	-	
<b>Other Pacific Islands</b>						
Others: Fiji	-	-	-	✓ 28 May 2008	-	✓
Cook Islands	-	-	-	-	-	✓
Kiribati	-	✓ 7 Sept 2000	-	-	-	✓
Nauru	-	✓ 12 Nov 2001	-	-	-	✓
Niue	-	-	-	-	-	✓
Papua New Guinea	-	✓ 1 Sept 1995	-	-	-	✓
Samoa	-	✓ 22 Mar 2002	-	-	-	✓
Solomon Islands	-	-	-	-	-	✓
Tonga	-	✓ 26 Mar 2010	-	-	-	✓
Tuvalu	-	-	-	-	-	✓
Vanuatu	-	-	-	-	-	✓

Note: "-" indicates the Pacific Island is not a Party to the specific Convention

"✓" – Indicates that the Pacific Island is a Party to the specific Convention, followed by the data of ratification (if available)

**Table 2**

Summary of completed asbestos-related projects in the USAPIs

Company Name	Description	Work done in:					
		AMS	CNMI	FSM	Guam	Palau	RMI
<i>Allied Pacific Environmental Consulting, Inc. (APEC)</i> <sup>14</sup>	27 completed medium to large-scale projects in asbestos abatement and removal; a full-service environmental consulting firm with offices on Guam (established 1998) and CNMI (established 2001).		X		X		
<i>IHP Industrial Hygiene Professionals</i> <sup>15</sup>	5 large-scale, long term asbestos-related projects; an environmental testing and safety training company based in Guam, USA, founded in 1994 as a sole proprietorship and later incorporated in 1997.				X		
<i>Guam Pacific International LLC</i> <sup>16</sup>	On Guam since early 2003, performing over \$40 million in work at the island's Navy and Air Force installations; services include asbestos & lead abatement.				X		
<i>Nexus Environmental Group, Guam</i> <sup>17</sup>	7 completed large-scale asbestos abatement projects; offices in Guam and CNMI.		X		X		X

**Table 3**

## Known asbestos-related diseases in the USAPIs

USAPI	Mesothelioma	Other asbestos-related lung disease	Other asbestos-related disease
<b>Guam</b>	3 cases in Guam Cancer Registry since 1998 <sup>23</sup> 1 case diagnosed by Guam's clinical pathologist since he started practice <sup>23</sup> No cases diagnosed by the only civilian pulmonologist (Guam-based] in the USAPIs <sup>26</sup>	10-12 cases diagnosed in the past 15 years by Guam's senior radiologist <sup>25</sup> 5-7 cases of asbestosis and 12-15 cases of pleural plaques diagnosed in the past 7 years by the only civilian pulmonologist (Guam-based) in the USAPIs <sup>26</sup>	No data
<b>CNMI</b>	No data	No data	No data
<b>FSM</b>	No data	No data	No data
<b>RMI</b>	No data	No data	No data
<b>AMS</b>	2 cases from anecdotal reports <sup>iii</sup>	No data	No data

Sources: <sup>i</sup>Interviews with Drs. Bob Haddock and Ms. Melani Montano; <sup>ii</sup>Interview with Dr. Mohammed Madantschi

<sup>iv</sup>Interview with Dr. Nathaniel Berg

<sup>iii</sup>Interview with Dr. Neal Palafox