

# Reducing malaria in Solomon Islands: lessons for effective aid

Camilla Burkot and Katherine Gilbert

## Abstract

The burden of malaria in Solomon Islands, a small island state of approximately 653,500 people and lower-middle-income status, remains among the highest of all countries outside of sub-Saharan Africa. Nevertheless, significant improvements in malaria control have been made in the last 25 years. From a peak of nearly 450 new cases per 1,000 population in 1993, by 2016 annual national malaria incidence dropped to 81 cases per 1,000.

Solomon Islands also remains one of the world's most aid dependent nations, and assistance from international donors has been particularly visible in the health sector. This paper explores the role that foreign aid has played in the reduction of malaria in Solomon Islands in recent years. Within this, the paper considers the role of the Solomon Islands Ministry of Health and Medical Services with respect to its efforts to coordinate donors and improve aid effectiveness as well as its broader efforts to reform the health system.

This study uses a qualitative within-case methodology, including a review of the published and grey literature as well as a series of in-depth, semi-structured qualitative interviews conducted between March and May 2017. 18 interviews were conducted with key stakeholders who have been involved in the design, funding, and implementation of malaria control and elimination activities in Solomon Islands: individuals currently or previously employed by the Ministry of Health and Medical Services, bilateral and multilateral donor agencies, advisers, researchers, and members of civil society.

## **Reducing malaria in Solomon Islands: lessons for effective aid**

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## 1. Introduction

Solomon Islands is a small island state of approximately 653,500 people (Solomon Islands National Statistics Office, 2017).<sup>1</sup> Though it is classified as a lower-middle income country, Solomon Islands remains among the world's most aid dependent nations, and development assistance has been particularly visible in the health sector. Key donors include the Australian government and the Global Fund to Fight AIDS, TB and Malaria (Global Fund); multilateral agencies including the World Bank, World Health Organisation (WHO), and the Pacific Community (SPC) have also been prominent development partners. Beginning in 2008, the Solomon Islands Ministry of Health and Medical Services (MHMS) and donors agreed to pursue a sector-wide approach (SWAp), with the objective of enhancing donor coordination and aid effectiveness for health systems strengthening, and which has been appraised as generally successful in doing this (Negin & Martiniuk, 2012). In addition donors have made significant investment in key vertical programs, including malaria, over the last 15 years. However, until now there has been limited documentation in the public domain on the effectiveness of donor efforts on malaria in Solomon Islands.

The burden of malaria in Solomon Islands, particularly for infants and children, remains among the highest of all countries outside of sub-Saharan Africa. Nevertheless, significant improvements in malaria control have been made in the last 25 years. From a peak incidence of nearly 450 (confirmed) cases per 1,000 in 1993, the national annual parasite incidence rate declined by 67% by 1999 (Over, Bakote'e, Velayudhan, Wilikai, & Graves, 2004). Following a decade of relative stagnation between 1997 and 2007 – with the exception of an increase in cases in the wake of the Tensions from 1998 to the arrival of the Regional Assistance Mission to the Solomon Islands (RAMSI) in 2003 – incidence continued to drop, as shown in Figure 1, and was associated with a decline in malaria morbidity (Hodge, Slatyer, & Skiller, 2015, p. 104). Deaths due to malaria have

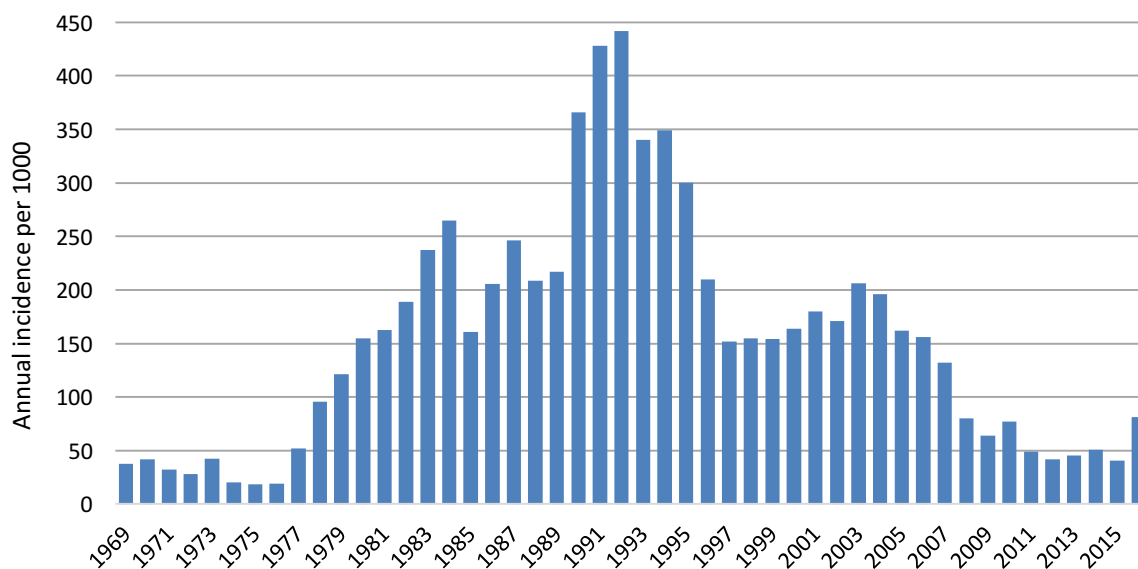
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<sup>1</sup> Readers unfamiliar with Solomon Islands are encouraged to read the introductory chapter to the country's Health in Transition review, available at:

[www.wpro.who.int/asia\\_pacific\\_observatory/hits/series/sol/en/](http://www.wpro.who.int/asia_pacific_observatory/hits/series/sol/en/)

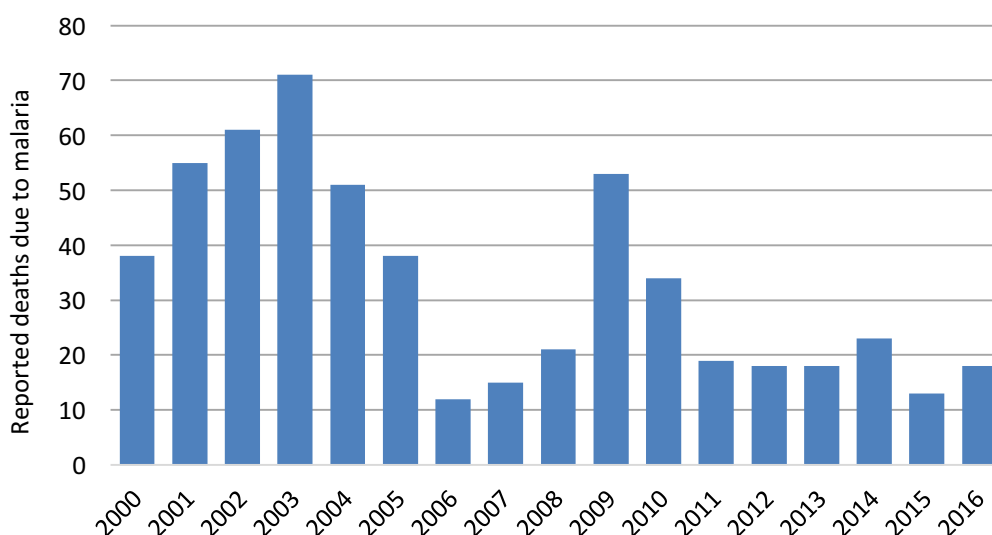
also dropped to low levels (though there is variability from year to year given the small numbers), and by 2016 constituted just 2% of all causes of death reported by health facilities, as shown in Figure 2 (MHMS, 2017).

**Figure 1: National annual parasite incidence (API), 1969-2016**



Data sources: 1969-1991: Over et al, 2004; 1992-2016: Ministry of Health and Medical Services, 2017

**Figure 2: Reported malaria deaths, 2000-2016**



Data sources: WHO Global Health Observatory; Ministry of Health and Medical Services, 2017

However, history shows that successes in malaria control can be fragile. A 2012 systematic review of malaria resurgence events in 61 countries indicates that over 90% of resurgence events can be attributed to a weakening of malaria control programs, including as a result of resource constraints (Cohen et al., 2012). The resurgence of malaria in Solomon Islands in the late 1970s (following the near-eradication achieved under the Malaria Elimination Program), for example, has been linked to reduced funding, decentralisation and other health system changes that took place following independence in 1978, as well as changes in vector behaviour and resistance (Cohen, et al., 2012; UCSF Global Health Group, 2012). The question of the sustainability of gains in malaria control continues to be pertinent for Solomon Islands today, as the national malaria program is currently grappling with reduced donor funding as well as reforms initiated by the MHMS to integrate and decentralise<sup>2</sup> its various programs (MHMS, 2016a, 2016b). It also has wider relevance, as recent research shows that global development assistance for malaria has been in decline since 2010, and while government health expenditures have steadily increased, they have not been able to make up the shortfall in donor assistance (Shretta et al., 2017). This financing trend reinforces the importance of ensuring the most effective use of available funding, and highlights the risk that gains in malaria control and progress toward elimination may be lost if donor assistance is phased out prematurely.

This paper explores the role that foreign aid has played in the reduction of malaria in Solomon Islands in recent years, based on an analysis of interviews and review of documents conducted in March-May 2017. Within this, the role of the MHMS is considered with respect to its efforts to coordinate donors and improve aid effectiveness as well as its broader health system reform. After a brief discussion of the research methodology, the first half of the paper reviews the history of donor involvement in malaria in Solomon Islands starting from the post-World War II period. The second half presents key observations and lessons learned related to the role and effectiveness of donor support for malaria in Solomon Islands, with a primary focus on

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<sup>2</sup> For simplicity, we use the general term 'decentralisation' in this paper. Deconcentration, a subset of decentralisation, more specifically describes the MHMS reform efforts to give more authority to the Provincial Health Offices which are under the authority of the MHMS (World Bank, 2017).

aid in the period 2003 to the present. It concludes with perceptions of the sustainability of the recent gains.

Briefly, our analysis suggests that foreign aid since 2003 has contributed to the observed reduction in malaria by ensuring population-wide access to key scientific innovations, but with limitations. Aid flows to malaria were largely donor-driven and the program design, combined with the rapid scale-up in available donor resources, did not consistently enable the most effective use of resources. Vertical donor investment in malaria control and elimination over the past 15 years has relied heavily on parallel systems, i.e.: systems for governance, finance and service delivery separate to those used for mainstream health service delivery.<sup>3</sup> The legacy of this approach was the allocation of significant resources and autonomy to the National Vector-Borne Disease Control Program (NVBDCP), earning it the nickname ‘the Ministry of Malaria’, with limited positive spill-over effects for health systems performance at either the national or provincial level. While this has changed over time, with donors increasingly using MHMS systems to manage their aid to the malaria program and supporting MHMS-led efforts to better integrate malaria interventions into provincial level service delivery, deconstructing the ‘Ministry of Malaria’ is not without its challenges. Looking forward, we argue that donors wishing to support efforts to reduce the burden of malaria in Solomon Islands should continue to support this process of integration, and engage in a nuanced dialogue with MHMS and other development partners about the long-held (and long-postponed) goal of malaria elimination from Solomon Islands.

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<sup>3</sup> There is some overlap between the concepts horizontal/integrated or vertical health programs (used in global health literature) and use of country or parallel systems to manage aid (used in aid effectiveness literature). A vertical health program is defined as one with objectives related to a specific disease or group of health problems, which may use systems for governance, finance and/or service delivery that differ from those used by general health services (Atun, Bennett, & Duran, 2008; Cairncross, Periès, & Cutts; Mills, 2005). When donors support vertical programs, especially when they fund the introduction of new interventions, they often establish or reinforce the use of specific systems. We follow the approach taken by WHO Maximizing Positive Synergies Collaborative Group (2009) and refer to the systems established by donors within a vertical program as parallel systems. Table 3 in this paper details the parallel systems supported by donors in relation to the malaria program.



## 2. Methodology

Based on quantitative data which indicate that malaria has significantly reduced in Solomon Islands over the last decade, this case study seeks to understand aid's contribution to recent malaria control and elimination efforts, in line with the following research questions:

- What was the impetus for recent efforts (beginning in 2003) to reduce the prevalence and incidence of malaria in Solomon Islands?
- What role did aid donors (bilateral and multilateral) play in the recent decline in malaria?
- How did donor actors and domestic actors interact in the design and implementation of malaria control and elimination interventions? Was this consistent with / supportive of development partner coordination structures established under the SWAp?
- What are the key learnings from the most recent reduction in malaria, and past reductions, that can be applied to prevent malaria resurgence?
- What are the broader lessons of this case relating to the allocation and management of aid funding that may be applied:
  - a) to malaria reduction and elimination efforts in other countries?
  - b) to efforts to control other diseases in Solomon Islands?
  - c) to inform the broader strengthening of health systems and reinforce the most efficient use of increasingly scarce financial resources?

To explore these questions, a qualitative within-case methodology was used, involving a review of the published and grey literature as well as a series of in-depth, semi-structured qualitative interviews.

A total of 18 interviews were conducted with key stakeholders, including individuals currently or previously employed by the MHMS at the national and provincial level, representatives of bilateral and multilateral donor agencies, technical advisers, researchers, and members of civil society organisations who are or were previously engaged in the design, funding, and implementation of malaria control and elimination activities in Solomon Islands. Fourteen of the interviews were conducted in person in

Honiara between 30 March and 7 April 2017. The remaining four were conducted by telephone between 10 April and 12 May 2017.

The analysis presented here is a synthesis of our findings from the literature review and interviews. We note that for key periods of time during which investment in malaria increased significantly (particularly 2005 to 2010), there are limited publicly available records from the MHMS and the Australian aid program, which meant that we have largely relied on interview data. This is both a limitation and strength of this study – it is subject to the bias of the interviewees, but also adds to the information available on the public record.

Ethics approval to conduct this study was obtained from the ANU Human Research Ethics Committee (2017/028) and the Solomon Islands Health Research and Ethics Review Board (HRE No. 005/17).

### **3. The history of donor involvement in malaria in Solomon Islands**

#### **3.1 Pre-independence and the global eradication effort**

Foreign actors and donors have long had an interest in malaria in Solomon Islands, stretching back to at least World War II (Spencer, 1992) and intensifying during the post-war colonial period. As of 1954, the British Solomon Islands Protectorate (BSIP) had not yet established a general malaria control program, though some limited residual spraying and efforts to clear presumed or identified vector breeding sites such as drains and swampy ground were carried out in Honiara and around government stations, and prophylaxis (paludrine) was issued to foreigners and individuals traveling from non-endemic to endemic areas (World Health Organization, 1954).

A new phase emerged when WHO launched the Global Malaria Eradication Campaign in 1955, largely funded by the United States (US\$17.5m out of US\$20.33m) (Trigg & Kondrachine, 1998). As the first global health program that aimed at worldwide coverage, it was not without controversy (Trigg & Kondrachine, 1998). Advocates of the campaign wanted to pursue eradication before mosquito resistance to the insecticide DDT appeared and argued that eradication was financially more viable than continued control efforts. Others thought that eradication was not possible given the logistics and cost of spraying, as well as the human resources needed to be recruited and trained to carry out a campaign (Najera, Gonzalez-Silva, & Alonso, 2011; Trigg & Kondrachine, 1998). Some also argued that a full-scale eradication program should only be commenced once a satisfactory rural health service was established (Spencer, 1992).

As the global eradication campaign got underway, so too did preliminary eradication efforts in colonial territories in Papua New Guinea (PNG) and BSIP. A small project in Ontong Java (a remote outer island in Malaita Province, Solomon Islands), which commenced in 1959, sought to test whether intensive chemotherapy and limited insecticide spraying might prove a feasible strategy to pursue elimination. In 1961, a Malaria Eradication Pilot Project was launched by BSIP and WHO in the Shortland Islands and New Georgia (Western Province), Guadalcanal and Savo (Central) (NNG Department of Health, 1961, p. 6; Saint-Yves, 1978; Spencer, 1992).

Regional dialogue was also initiated. A series of Inter-Territorial Malaria Conferences for the South-West Pacific were convened, the first in Port Moresby in 1959, which brought together representatives of the BSIP and territories of PNG, as well as WHO officials, researchers and scientists. The reflections delivered during these early conferences foreshadowed several issues that would recur as part of malaria control and eradication efforts in Solomon Islands: financial and administrative problems as the primary barrier to progress; a strategy of progressive elimination starting in remote areas; and waves of disease resurgence. In his opening address to the first conference, the then Administrator of PNG, Brigadier D.M. Cleland, noted that while the American forces stationed in the South Pacific during WWII expended an estimated US\$6m per year (equivalent to approximately US\$85m in 2017) on malaria control measures – “an enormous financial undertaking and one, of course, that is only possible under the abnormal circumstances of war” – by 1959 the malaria burden had returned to what it was believed to have been before the wartime effort (TPNG Department of Public Health, 1959, p. 29).

Similar challenges were faced elsewhere. The global eradication campaign achieved success in Asia and Latin America, but not in other regions, leading WHO to shift its focus from eradication to control in 1969 (Trigg & Kondrachine, 1998). Although WHO’s worldwide mission to achieve eradication ended, eradication-focused interventions continued in BSIP. A dramatic drop in the incidence of malaria in the pilot areas was confirmed in 1963, and thus the BSIP pilot program was perceived as more successful than similar efforts in PNG (Spencer, 1992). The pilot transitioned to a Pre-Eradication Program in 1965, and then a full Malaria Eradication Program in 1970, covering all districts in BSIP based on DDT residual spraying, improved case detection and treatment with chloroquine-primaquine and mass blood surveys (Saint-Yves, 1978; Spencer, 1992; World Health Organization Western Pacific Region, 1990). The Malaria Eradication Program was associated with declining incidence in all districts as shown in Table 1, although caution should be taken in using incidence as a measure of impact as it only refers to ‘confirmed’ cases which at the time would have been only those cases detected by – and therefore with access to – microscopy. Because incidence in Eastern

and Western districts<sup>4</sup> had reduced significantly, spraying with DDT ceased in those districts in 1976, but continued in Central and Malaita districts<sup>5</sup> during 1976 and 1977.

**Table 1: Changes in API associated with the Malaria Eradication Program in SI in early 1970s**

District	API per 1000 population	
	Central (Central, Guadalcanal, Isabel and Rennell/Bellona <sup>6</sup> )	96.8 (1970)
Malaita	29.0 (1971)	19.1 (1975)
Eastern (Makira and Temotu)	107.1 (1972)	7.6 (1975)
Western (Choiseul and Western)	12.4 (1972)	2.8 (1975)

*Source: Saint-Yves 1978, p. 170*

BSIP achieved self-governing status as the Solomon Islands in 1976 and full independence two years later. There were high hopes for the successful transition of the Malaria Eradication Program to the new independent government, with the program being integrated and decentralised into the rural health service. With respect to ongoing spraying operations in Central and Malaita districts, the approach dispensed with “very expensive shipping and vehicle hire” in favour of “setting up of independent spray squads to operate independently in smaller areas, travelling on foot or by powered canoe” (Turner, 1977, p. 189) (see also Saint-Yves, 1978; World Health Organization Western Pacific Region, 1990). In 1977 the outgoing BSIP Senior Malaria Eradication Officer, Dr D.A. Turner, reported that funding was secured for the Malaria Eradication Program from the United Kingdom until 1981 (Turner, 1977). He anticipated that:

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<sup>4</sup> The Western district included provinces now referred to as Choiseul and Western. The Eastern district included Makira and Temotu.

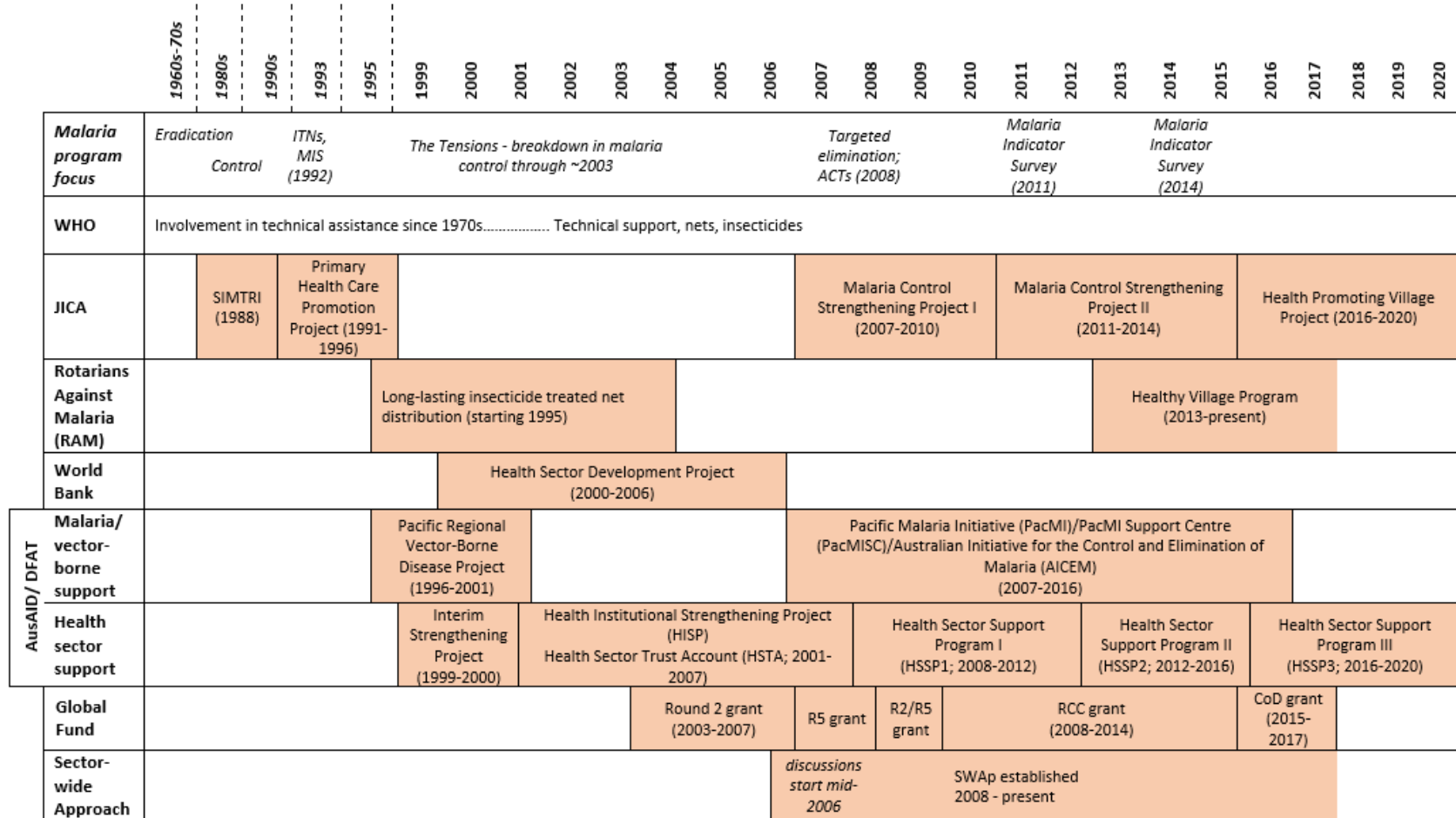
<sup>5</sup> The Central district included provinces now referred to as Central, Guadalcanal, Isabel and Rennell/Bellona.

<sup>6</sup> Bellona was surveyed and believed to be non-endemic for malaria as early as 1952 (Black, 1952).

*[F]unds... which may still be required thereafter can probably be easily met from the recurrent budget of the SI government, as the requirement for staff and materials will be greatly reduced by then... The Malaria Eradication Program in fact peaked in its organisational requirement and financial expenditure in 1975, and these will diminish progressively from now on. By 1977, the Malaria Eradication Program will be run entirely by Solomon Islanders with continued technical assistance from two WHO advisers. Active steps are being taken to integrate the Malaria Eradication Program with the Rural Health Services so that the Senior Medical staff will undertake the responsibility for the execution of the programme at the District or Council level, and Nurses will be able to assume progressively more of the work of malaria staff in the field. (Turner, 1977, p. 197).*

There is limited literature on the malaria program in the immediate post-independence period, but it is suggested that upon independence in 1978 the objective of eradication was abandoned and the new national government took carriage of a focused national malaria control program (Bakote'e, 2001). Though DDT spraying recommenced in all provinces by 1980, malaria incidence continued to grow and peaked in 1983 with a reported annual incidence of 337/1000 population (84,000 cases) (World Health Organization Western Pacific Region, 1990, p. 6). At that point, mass drug administration as well as vector control measures, including larviciding, use of larvivorous fish, and bed net trials, were implemented in an effort to reduce incidence, with only limited impact on national malaria incidence.

**Figure 3: Timeline of selected donor contributions to Solomon Islands national malaria program**



### **3.2 Turning the tide: bed nets and birth of the NVBDCP**

Though national incidence had climbed to a new record high of 440.5 cases/1000 population in 1992 (MHMS, 1997, p. 5), the late 1980s and early 1990s saw a number of pivotal changes which led to a period of sustained progress in malaria control in Solomon Islands. The national malaria program, previously an “army style” operation, was integrated into the MHMS in the late 1980s and became the National Vector-Borne Disease Control Program (NVBDCP) in 1992 with the program’s director reporting to the Undersecretary for Health Improvement (public health) (Bakote'e, 2001). A National Malaria Control Policy, in line with the WHO Global Malaria Control Strategy based on early diagnosis and treatment, vector control measures, epidemic response and building research capacity, was adopted in 1993 (MHMS, 1997).

The mass distribution of pyrethroid insecticide-treated bed nets from 1992 appears to be the key technical intervention contributing to the significant and sustained reduction in malaria incidence over the subsequent six years (Over, Bakote'e, Velayudhan, Wilikai, & Graves, 2004). Bed net coverage reached up to 60% of the national population by 1998 (World Health Organization Western Pacific Region, 2003) and by 1999 malaria incidence had dropped by some 67% nationally since 1995 and 82% since 1992 (Global Fund, 2002, p. 146).

As the program laid new foundations in the 1990s, it was supported by a growing group of donors, as illustrated in Figure 3. The program’s 1996 Annual Report credits the decline in malaria from 1992 in part to “positive responses by donor agencies and foreign governments” (MHMS, 1997, p. 3). The report (p. 15) details contributions from a total of nine donors – ranging from bilateral partners including Australia, Japan and Korea, multilaterals including WHO and UNICEF, and nongovernmental organisations such as Rotarians Against Malaria and Soroptomists International – which collectively disbursed SBD\$8.7m over 1995-1996.

Increased donor involvement also led to the establishment of increased parallel systems and infrastructure. For example, with support from the Japanese aid agency JICA, the construction of the Solomon Islands Malaria Training and Research Institute (SIMTRI) was completed in 1988, and in 1991 a five year project aimed at building capacity in malaria personnel was launched (JICA, 2007). In 1992, the Solomon Islands Malaria



Information System was introduced (MHMS, 2005, p. 24), based on software developed in the Philippines and with Filipino technical support (MHMS, 2005, p. 24 and 27).

In 1996, the then South Pacific Commission (SPC) launched a new Pacific Regional Vector-Borne Disease Project (PRVBDP), with funding from AusAID, in Solomon Islands, Vanuatu, and Fiji. Its aims included “strengthening national and regional planning, surveillance and management capabilities; strengthening laboratory support and clinical services; and supporting intersectoral activities through nongovernmental organizations and community groups ... through a combination of technical collaboration, training, and provision of equipment and supplies” (World Health Organization Western Pacific Region, 1997). Though the PRVBDP focused on malaria, dengue, and filariasis, malaria was its primary focus in Solomon Islands. It also supported the development of parallel systems, supporting community microscopy in Malaita Province. By training community members in microscopy, coverage of microscopy services in the province increased from 30% to 61% by 2001 (Bakote'e & Jionisi, 2001). PRVBDP further developed the Malaria Information System and built NVBDCP staff capacity to use it, and conducted operational research to determine the best diagnostic methods and to increase community participation in malaria control (Bakote'e & Jionisi, 2001).

### **3.3 The Tensions**

Donor interest in malaria control continued to build into the early 2000s. The World Bank Health Sector Development Project – the Bank’s first foray into health sector support in Solomon Islands – aimed in part to support and accelerate the trend of reduced malaria (as one of three core objectives) and launched in March 2000 with a loan of US\$4m (World Bank, 2007a). Notably, because it reflects a trend that would recur later on, Australia agreed to pre-finance (i.e., advance payment for) the loan’s priority activities, an act that was interpreted as reflecting the “strong working relationships” between the development partners (World Bank, 2007a, p. 5). The malaria component of the project sought to fund “incremental costs for program improvement, analysis of historical information on malaria control; design and implementation of operational studies...; and the evaluation and dissemination of the findings to policy makers and health managers.” (World Bank, 1999, p. 3).

Unfortunately, the project made limited headway as it coincided with the start of the Tensions. The resulting macroeconomic crisis precipitated by violence resulted in the halting of Solomon Islands government funding for the NVBDCP in late 2000. Additionally, the government's default on its debt service obligations to the Bank led to the suspension of disbursements for more than two years from September 2001 (World Bank, 2007a, p. 5). The suspension was lifted in 2003 when Australia paid the Solomon Islands government's debts to the World Bank (and to the Asian Development Bank), and the project was scaled back to cover only two provinces and extended by 18 months. While recognising the impact that the collapse of government and major fiscal problems had on the project's ability to have impact on malaria and other health problems, with respect to donor relations the project Completion and Results Report cites the need for close coordination with development partners as a key lesson learned, alongside stakeholder involvement throughout the life of the project and better networking in the provision of health care services among all stakeholders (World Bank, 2007a, p. 15). A review of that report also warns that "[i]t is easier to design multi-sectoral committees, such as in this case for reproductive health and malaria, than to make them function effectively." (World Bank, 2007b, p. 7).

Beyond its contributions to the World Bank health sector project, Australian aid played a critical role in preventing a complete collapse of the health services during the Tensions (Office of Development Effectiveness, 2009, p. 10). Direct grants provided to Provincial Health Offices through the Health Sector Trust Account, set up in May 2001, allowed for essential health services to continue to be delivered through nurse aid posts and rural health clinics in rural areas (Thompson & Drexler, 2015, p. 15). In addition, in August 2001 the Health Institutional Strengthening Project, managed by JTA International, commenced work to strengthen health sector management at the national and provincial level and to develop the role of the National Referral Hospital. This project and its predecessor, the Interim Strengthening Project (A\$1.6m, 1999-2001) were predominantly focused on providing technical assistance; close to 80% of expenditure on these projects was accounted for by international technical advisors (Office of Development Effectiveness, 2009, p. 16). Between 1999 and 2007, approximately A\$90m was provided as support to the Solomon Islands health sector, of which 63% was spent through the Health Sector Trust Account (Office of Development Effectiveness, 2009, p. 9). These funds were largely channelled to cover clinical and

facility based costs, including drugs and medical supplies, clinic radios, overseas referrals and pathology for patients, overseas locum doctors' fees, and operational costs of the National Referral Hospital and the National Medical Stores (Office of Development Effectiveness, 2009, p. 17).

### **3.4 Post-tensions and arrival of the Global Fund**

Shortly after Solomon Islands' malaria control efforts had contracted as a result of the Tensions, and malaria incidence was increasing, the Global Fund – which was formally established in early 2002 with malaria as one of its three disease priorities – was emerging as a major player in the Pacific region. However, as a large scale financing mechanism its relevance to the Pacific was not immediately clear. According to one interviewee, Pacific countries were told “loud and clear” that the Global Fund was not interested in small-scale grants. Undeterred, Dr Jimmie Rogers, the then Deputy Director of SPC, pursued the idea of a regional multi-country grant and secured Global Fund support for it. At a regional meeting in August 2002, Solomon Islands and 10 other Pacific island countries (excluding PNG) agreed to pursue a regional grant and formed the Pacific Islands Regional Multi-Country Coordinating Mechanism (PIRMCCM) with responsibility for overseeing the three disease-specific grants (Global Fund, 2002). At the same meeting it was decided that SPC would act as Principal Recipient for the Pacific multi-country grant. Multiple rationales were given for this choice – that SPC would be well-placed to build synergies, e.g. in procurement, and that it had experience managing regional health programs, including the AusAID-funded PRVBDP (Global Fund, 2002, p. 4). Shortly thereafter, in September 2002, the PIRMCCM submitted its first grant proposal as part of the Global Fund's Round 2 funding. The malaria portion of that proposal applied only to the Solomon Islands and Vanuatu, the only countries with indigenous malaria transmission represented on the PIRMCCM.

In making its case for funding, the PIRMCCM painted a bleak picture of the contemporary malaria control situation. Noting that while the Solomon Islands government historically funded staff and essential drugs, at the time of the proposal government staff salary remittances were routinely delayed by 2-4 weeks and no funds were available for field operations or supplies (Global Fund, 2002, pp. 150-151). Moreover, whereas throughout the 1990s support from a patchwork of donors enabled

NVBDCP to run a successful program, and key bilateral and multilateral donors assisted with the purchase of anti-malarial drugs, “[n]ow that the number of partners and levels of funding have decreased” following the Tensions, “the programme is barely able to maintain basic control activities” (Global Fund, 2002, p. 151). Notwithstanding this lack of resources, the program employed 128 officers, making it was the second-largest division of MHMS, although this number is less than half the number of officers (330) present in the 1970s and 1980s (Bakote'e, 2001).

The proposal requested US\$14.3m for the 11 Pacific island countries across HIV and tuberculosis, and for Solomon Islands and Vanuatu for malaria, with US\$2.98m of that allocated for malaria in Solomon Islands (Global Fund, 2002). This was the first of four Global Fund grants that the national malaria program has received for malaria control, as shown in Table 2, with a focus on improving diagnostics and treatment and use of bed nets. Under the Global Fund grants prior to 2015, support was channelled in a highly parallel fashion, almost entirely outside of existing systems used for health service delivery, reinforcing the siloed nature of the NVBDCP. Governance was managed by the PIRMCCM as noted above, and funding flowed through SPC and then to a trust fund. In addition, separate systems for service delivery (diagnosis and health promotion) and information were reinforced (as discussed further in Section 4.2). The one exception was the distribution of drugs, which was managed by the National Medical Stores, although when necessary the NVBDCP directly delivered drugs and supplies to clinics in parallel to the National Medical Stores with resources from the Global Fund and AusAID. However, the fact that governance of the grant was handled by the PIRMCCM outside the MHMS, and that the financing was made available directly to NVBDCP, created a situation whereby the MHMS Executive had very little formal control over the NVBDCP.

**Table 2: Global Fund grants to SI (estimated, US\$m current)**

<i>Grant Number</i>	<i>Dates</i>	<i>Proposal/initial approved budget</i>	<i>Total disbursed by GF (1)</i>	<i>Total expenditure by PR/SR (2)</i>
QUA-202-G02-M-00	2003-2007	2.98	2.54	2.45
QUA-506-G04-M	2006-2007	2.00	1.45	1.44
QMJ-507-G05-M	2007-2015	25.66	17.42	15.82
SLB-M-MHMS	2015-2017	5.59	3.39	
Total		36.23	24.8	19.71

*(1) Estimates based on split between Solomon Islands and Vanuatu in the relevant proposal. (2) PR = Principal Recipient; SR = Sub-recipient. Data only available until 2013.*

Source: For proposal/initial budget: Global Fund 2002, p. 179; Global Fund 2005, p. 64; Global Fund 2007, p. 32. For disbursed: Global Fund financial database. For expenditure: Global Fund website.

The first Global Fund grant seemed to serve as a springboard to a rapidly expanded and resourced NVBDCP. The acceptance of Global Fund support also resulted in the reshaping of some long-standing partnerships between the NVBDCP and other donors. Rotarians Against Malaria (RAM), which first became involved in the supply of materials, sewing machines, and support for the distribution of locally-manufactured bed nets in Solomon Islands in 1995 at the request of Dr Nathan Kere (a Honiara Rotarian and former director of the NVBDCP), was informed that the Global Fund would be taking over this function. RAM then shifted its focus to upgrading labs and clinics, and constructing storage sheds for nets and insecticides. Though they did not occupy a prominent seat at the table of international donors, interviews and grey literature make clear the continued value of their presence. The RAM representative in Honiara even signed off on payments of Global Fund funds for the first two years of the grant and served on the Global Fund Country Coordinating Mechanism for two terms. According to a former malaria program adviser, RAM did a lot of “strategic, off-budget work in the background that made things easy for AusAID”, such as constructing storage facilities and offices in the provinces. A 2007 Global Fund grant proposal estimates pro bono contributions by RAM of expertise for building works would total US\$1.3m over 3 years (Global Fund, 2007, p. 34).

A second successful grant proposal to the Global Fund was made, again under the PIRMCMM, as part of the Global Fund's Round 5. Solomon Islands' malaria proposal outlined a key transition in the control context, with the objective of switching to long-lasting insecticide-treated bed nets and to artemisinin combination therapies as the first-line treatment (Global Fund, 2005). The PIRMCMM was then invited by the Global Fund to apply for the Rolling Continuation Channel (RCC) – an invitation-only channel for 'high performing' grantees that enabled them to consolidate and extend their Round 5 grant, with additional funding. At the time, the Global Fund was under pressure from donors to spend money, and its Executive Director Sir Richard Feachem wrote a letter to countries asking them to be bold, be innovative and think big.

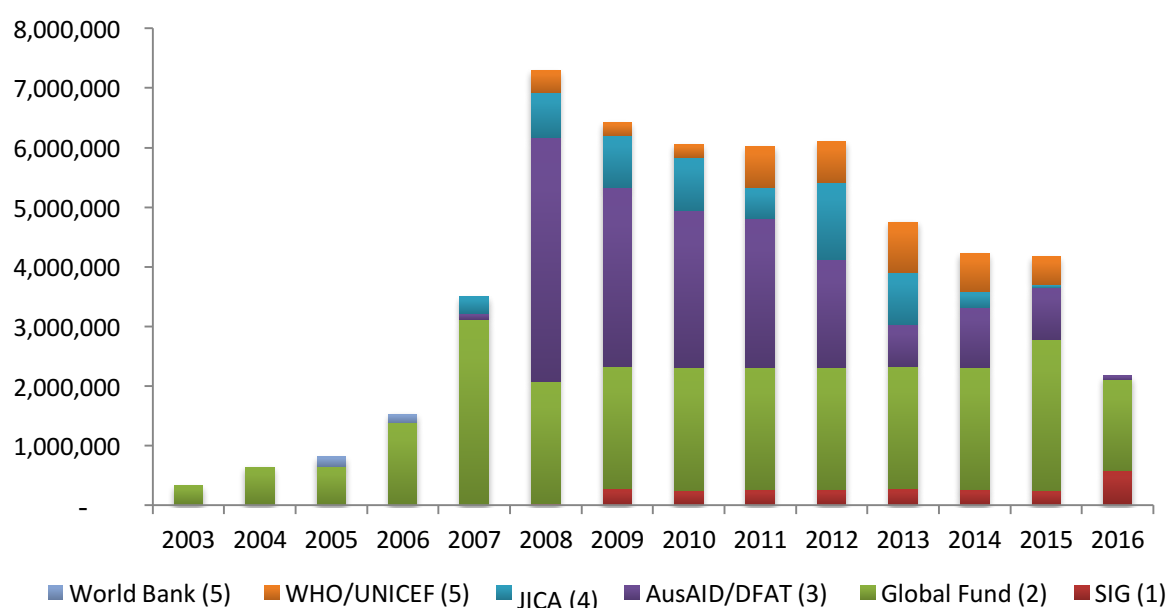
The PIRMCMM responded to the call and was eventually successful in obtaining US\$69m across each of the portfolios, including US\$25.7m for malaria control and elimination in Solomon Islands up to 2015 (Fund, 2007, p. 32; Global Fund, 2008, p. 12). The grant was approved in 2008, commencing in 2009, with bridge financing in the interim. It represented a significant increase in resources for the MHMS; by comparison the total recurrent expenditure by the MHMS in 2008 was US\$23.3m. There was good reason to expect that this significant scale-up in resources from the Global Fund would continue to drive and accelerate a decrease in malaria: from 206 in 2003, API dropped to 163 in 2005 and 132 in 2007 (refer Figure 1).

### **3.5 The scale-up and elimination agenda**

In 2007, the World Bank Health Sector Development Project and AusAID's Health Institutional Strengthening Project concluded, and the reforms introduced under both projects (especially those related to capacity-building in health planning and management, use of the Health Information System, and health service delivery at the provincial level) were expected to be carried forward under a health SWAp (World Bank, 2007, p. 7), which was at that point in early stages of development (Negin & Martiniuk, 2012). Australia played a key role in the development of the SWAp and designed a package of budget support and technical assistance, referred to as the first Health Sector Support Program (HSSP1, 2008-2012), as its major contribution to the sector, totalling AU\$60m.

However, despite the apparent awareness of and interest in supporting sector-wide systems strengthening and reform through the SWAp, Australia and also Japan joined the Global Fund in making significant additional investments in vertical programs for malaria control and elimination beginning in 2007 and increasing again in 2008. As shown in Figures 3 and 4, the national malaria program experienced a significant increase in funding between 2007 and 2012. Several interviewees indicated that during this period NVBDCP was so well-resourced (particularly between Global Fund and AusAID funding) that, to quote a former advisor: “We had more money than we could spend... We were able to give the guys as much as they wanted to go and do stuff [malaria program activities]. Whatever it took to get something over to that island over there...” This was reflected in low implementation rates (of actual to target expenditure); the implementation rate of funds for Phase 1 of the consolidated Global Fund grant was 55% in 2009 and 2010 (Global Fund, 2011).

**Figure 4: Estimates of SIG and donor contributions to malaria control and elimination from 2003 – 2016 (US\$ current)**



(1) Based on NVBDCP budget expenditures (2008-2013) and allocations (2014-2017) from 276 from the Ministry of Finance and Treasury. Estimate (2003-2007) based on trends. Some funds likely for other NVBDCP work areas. Converted to USD using UN operational exchange rates at December of the given year.  
 (2) Based on Global Fund financial database. Assumed expenditure is consistent throughout grant period. Split between Solomon Islands and Vanuatu based on the relevant proposal. (3) Based on OECD CRS (2003-2014). OECD microdata showed that 2014 funds only includes PacMI, not AICEM. AICEM expenditure added

*based on data from the AusTender database and converted to USD using UN operational exchange rates at December of the given year. (4) Based on OECD CRS. (5) Based on WHO's World Malaria Report 2016.*

According to interviewees, AusAID's funding for malaria in Solomon Islands (and in the Asia-Pacific region more broadly) from 2007 can be linked to the rapid expansion of the AusAID budget during this period, which provided an incentive to spend in new areas. The decision to invest specifically in malaria related to a number of factors, including high-level policy priorities. The 2006 White Paper on Australian aid identified the burden of malaria as a "priority development concern" in the Pacific region. Building on a recommendation in the Core Group Recommendations Report (2005) which preceded it, as well as interest in malaria control and eradication from donors such as the Bill & Melinda Gates Foundation, the White Paper set out why it made sense to target malaria at this time: "With new technologies, a new global donor campaign against malaria, and a much-increased aid program to Solomon Islands, Australia will commit to tackle malaria in Solomon Islands, Vanuatu and eventually the entire Pacific, in concert with other agencies and regional governments." (AusAID, 2006, p. 50). It also outlined the features of what would become the Pacific Malaria Initiative (PacMI), including "strengthening the capacity of national health institutions in disease surveillance and control, commodity procurement and basic service delivery", and "investments in affordable and proven measures, such as insecticide-treated bed-nets and drug treatments." (p. 51). Notably, while the Core Group Recommendations report referred specifically to malaria eradication, the White Paper only refers to "tackling malaria."

Multiple interviewees also pointed to advocacy by Sir Richard Feachem, the founding Executive Director of the Global Fund (2002-2007) and a highly-regarded malaria researcher, as bolstering AusAID's decision to pursue the elimination of malaria. Feachem, who had a personal connection to Solomon Islands through prior service as a volunteer, was able to attract resources and high-level political audiences both in Australia and Solomon Islands. In addition, Australia's exposure to, and direct experience of managing, the threat of malaria during RAMSI as well as its presence on the Global Fund board provided incentive for Australia to invest in this area. There is



little evidence that AusAID's decision to invest in malaria in Solomon Islands at this time reflected the priorities of the MHMS.<sup>7</sup>

AusAID formally launched the Pacific Malaria Initiative (PacMI) in 2007. Like the Global Fund, AusAID decided to take a regional approach, directing funding to both Solomon Islands and Vanuatu.<sup>8</sup> The initiative's objective was to support the implementation of a "single consolidated malaria workplan" that coordinated the resources and objectives of the MHMS, Global Fund, WHO and AusAID. PacMI comprised several components, including operational funding for the national malaria programs in both countries, and technical assistance through the PacMI Support Centre (discussed in greater detail below). High-level technical direction was provided by the Malaria Reference Group, a committee of international malaria experts (chaired by Feachem) and representatives of the Solomon Islands and Vanuatu Ministries of Health, WHO officers, and SPC, among others, which met semi-annually beginning in May 2007. Malaria Steering Committees in each country provided support and a coordination function for the national malaria programs. Under PacMI, A\$25m over 4 years (2007-2011) was committed to implement national malaria programs in Solomon Islands and Vanuatu. With an additional A\$5m allocated from HSSP1, the total PacMI resources for Solomon Islands were approximately A\$17.4m (Toole, Lynch, & Garcia, 2010).

Like the Global Fund grants, AusAID through PacMI largely reinforced or established parallel systems to direct funding. According to a number of interviewees, this was because the MHMS was believed to lack the absorptive capacity and staff to manage contracts and logistics effectively at that time. However, the use of parallel systems led to the further development of the "Ministry of Malaria." PacMI was managed principally from Canberra, its governance was directed by the Malaria Reference Group, and various components of the initiative were managed in different ways: while operational funds were on-budget but controlled by NVBDCP (rather than MHMS finance), technical assistance and research support provided through PacMISC was on-plan but not

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<sup>7</sup> There was no national health strategic plan during this time. However, the Ministry of Health's National Health Plan 2004-05 only references malaria control in the context of strengthening primary health care and alongside other disease control programs (Ministry of Health, 2004).

<sup>8</sup> The AusAID press release announcing the establishment of PacMI in May 2007 also indicated that the initiative would later be expanded to Papua New Guinea, but this never eventuated (AusAID, 2007).

entirely on-budget; and support provided through the Malaria Reference Group was neither on-budget nor on-plan (Thompson & Drexler, 2015, p. 35). Operational funds were largely implemented using parallel systems for service delivery (e.g.: human resources and information systems) as described in Section 4.2.

There was no initial design document for PacMI and its objectives evolved over time. In 2007 the Malaria Reference Group decided that one of PacMI's specific objectives was to drive malaria elimination beginning in Temotu (Solomon Islands) and Tafea (Vanuatu) provinces<sup>9</sup> – an objective that was largely considered by interviewees with knowledge of the context at the time to be externally driven and hotly contested. The memory of the failed global elimination campaign of the 1960s-70s remained fresh in the minds of many individuals working in Solomon Islands and internationally at the time, making elimination “a bit of a dirty word” and the cause of significant tension with WHO, which at that stage was not formally supporting elimination. Another interviewee recalled, “there was a lot of anxiety about whether [elimination] is something we should all be embracing, and whether we were setting ourselves up to fail.” Despite questions in Honiara, interest in and critical thinking about what elimination would require in practice, both regionally and globally, soon picked up.

In one of the early Malaria Reference Group meetings in 2007, it was recognised that a dedicated support centre would be required to assist with program management and implementation of malaria research, recalled a former program adviser. At the time, a global technical partner who was interviewed explained, AusAID was seeking “innovative, boutique” initiatives through which it could make a difference in the Pacific but also contribute to global leadership. While Australia already had a strong record in basic research and development in relation to malaria, many questions remained about malaria elimination in practice. Hence, in 2008 a consortium of Australian academic institutes led by the University of Queensland was contracted to deliver the PacMI Support Centre (PacMISC), with a budget of A\$5m over five years.

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<sup>9</sup> PacMI listed as a specific target “Eliminate malaria from Temotu and Isabel (Solomon Islands) and Tafea (Vanuatu) by 2014” (Toole, et al., 2010, p. 40).

Though PacMISC was originally intended to serve primarily as a research centre, it came to occupy a blended role of supporting research, technical advice and capacity building in the NVBDCP – not least because although Solomon Islands had secured substantial Global Fund funding, it still lacked operational capacity to manage this quantity of funds. Indeed, a global technical advisor reflected in an interview that this transition in role was driven at least in part by concerns within the MHMS and the donor community that PacMISC’s research agenda was diverting attention: “...at that stage AusAID was also worried and I remember them saying to us, ‘you have to help make the country’s implementation of the Global Fund grant successful otherwise they will default and will lose the funding’ because AusAID did not have a budget to pick up the nets, medications...”.

By 2010, AusAID (through PacMI and HSSP) was contributing about 35% of the NVBDCP budget, and the Global Fund about 53% (Toole, et al., 2010, p. 40). The two donors sought to fulfil complementary roles: the majority of Global Fund resources were used to procure bed nets, insecticides, diagnostic tests and drugs, and to support human resources, monitoring and evaluation, and management, while PacMI funding was channelled to the NVBDCP as operational funds to support the implementation of key interventions, as well as funding PacMISC, the Malaria Reference Group, and administrative support from Canberra (Toole, et al., 2010, p. 19). Key malaria program interventions during this period included distribution of long-lasting insecticide-treated bed nets; strengthening of case management including the introduction of artemisinin combination therapy (which was added to the essential drug list and treatment manuals in Solomon Islands in 2008) and preventive therapy for pregnant women; indoor residual spraying in elimination provinces; health promotion and behaviour change communication activities; and other activities such as mass blood surveys and mass drug administration in elimination provinces (Global Fund, 2005; Office of Development Effectiveness, 2009; Toole, et al., 2010). Research conducted under PacMISC included population-based mass blood surveys<sup>10</sup> (Pacific Malaria Initiative Survey Group, 2010), studies of strategies for vivax elimination (Kuwahata et al., 2010), studies to determine

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<sup>10</sup> The mass blood surveys also measured prevalence and severity of deficiency in glucose-6-phosphate dehydrogenase (G6PD) in populations of Temotu and Isabel, which is a potential impediment to using mass administration of primaquine as a radical cure for *P. vivax* infections.

the most effective rapid diagnostic tests and bed nets (Atkinson, Bobogare, Fitzgerald, et al., 2009; Atkinson, Bobogare, Vallely, et al., 2009; Wijesinghe, Atkinson, Bobogare, Wini, & Whittaker, 2011), vector behavioural resistance (Bugoro et al., 2011), the use of spatial decision support systems (Kelly et al., 2013), the impact of population mobility on elimination efforts and the establishment of surveillance systems (Atkinson et al., 2012; O'Sullivan et al., 2011). Nominally Global Fund funding was directed principally towards procurement and supporting malaria control, while PacMI was directed more towards research and elimination activities, but in practice the flexibility of AusAID funding helped to ensure the smooth continuation of national malaria program activities. One notable example is from 2009, when AusAID funded a large purchase of bed nets, diagnostic tests, and drugs when there were delays in the disbursement of Global Fund funding (Toole, et al., 2010, p. 14).

While the Global Fund and Australia were the primary donors involved in malaria in Solomon Islands in this period, they were not the sole donors in this space. WHO continued to provide technical assistance, although it largely relied on Global Fund and Australian support to fund this. JICA commenced its 'Project for Strengthening Malaria Control' in January 2007, which aimed to develop a surveillance system and malaria diagnosis and treatment manual, as well as improve the capacity of health workers and microscopists in rural areas, with a focus on Guadalcanal and Malaita Provinces (JICA, 2007). Overall, as during the early phases of Global Fund investment, increased donor support during this period again correlates with a further significant reductions in API, from 132 in 2007, to 46 in 2013 (refer Figure 1).

### **3.6 The scale-down and shift to health systems strengthening**

From around 2013, dedicated donor funding for malaria control and elimination began to wane in favour of a shift towards integrating aspects of malaria control and treatment into primary health services managed by the Provincial Health Offices. This was attributed by interviewees to a number of factors, again reflecting both external global developments, and challenges and changes within Solomon Islands.

First, donor enthusiasm for vertical investments in malaria elimination began to falter as it became increasingly apparent that achieving elimination would require not years but decades of sustained investment. PacMI initially aimed to eliminate malaria in

Temotu and Isabel by 2014, however by that year malaria incidence (parasite incidence rate) was still at 6.5 per 1000 persons in Temotu and 4.5 per 1000 in Isabel (MHMS, 2017, p. 70).

Second, there was increasing evidence of the limitations of the focus specifically on malaria, as opposed to broader vector-borne disease control – one interviewee pointed to the perceived limitations of the NVBDCP in responding to the 2013 dengue outbreak in Solomon Islands as a clear indication of the need to shift to an integrated approach.

Third, 2014 also marked the beginning of profound changes within the Australian aid program more broadly, which had flow-on effects on activities in Solomon Islands. Following the election of the Abbott Coalition government, AusAID was integrated into the Department of Foreign Affairs and Trade (DFAT), and there was a 20% cut to total Australian official development assistance in the 2015/16 federal budget together with a shift in institutional interests and objectives. In line with this, the volume of Australian aid to the health sector in Solomon Islands also reduced.

After several extensions, PacMI – which was rebranded in 2014 as the Australian Initiative for the Control and Elimination of Malaria (AICEM), with a budget of AU\$2.1m – was gradually wound down and closed at the end of 2016. This shift is also reflected in changes in the design of HSSP. While HSSP2 (2012 – 2016) included earmarked funds for malaria of approximately A\$3-4m of the A\$17.5m annual budget, HSSP3 (2016 – 2020) consists of an earmark-free budget of A\$16.5m per year. Through HSSP3 (75% of which is provided as budget support and 25% of which is technical assistance), support to the NVBDCP is provided indirectly through provincial health grants and broader support to MHMS reform and reintegration (e.g., through strengthening the district health information system [DHIS2]).

At the same time that Australian aid was undergoing a significant shift in direction, the Global Fund was also in the process of rolling out its New Funding Model and reassessing countries' eligibility for funding. As Solomon Islands (and Vanuatu) are classified as lower-middle income countries, with small populations and relatively small burdens of disease, under its new allocation method the Global Fund determined to grant them a similar quantum of funds as in previous grants, but for use over a longer period. This resulted in a number of significant changes in Global Fund funding to

Solomon Islands starting from 2015. With support of donors including DFAT, the MHMS decided to break from the Pacific multi-country grant managed by SPC and apply for a single-country grant as the Principal Recipient.

The MHMS wanted to be Principal Recipient from the initiation of the Global Fund support, and over the years continued to strategise on how it could achieve this goal for malaria and other grants (Aidspan, 2017). It applied unsuccessfully to the Global Fund to serve as Principal Recipient for its tuberculosis and HIV grants in 2008 (Global Fund, 2008). Led by Dr. Tenneth Dalipanda, then Undersecretary for Health Improvement and now Permanent Secretary, in 2013 the MHMS engaged a consultant to give advice on the establishment of a grant management unit to administer a national grant, with the MHMS as Principal Recipient. The consultant advised that given the complexity of management of the Global Fund grant, it was premature for the MHMS to take on the role as Principal Recipient, particularly after the discovery of a fraud ring within MHMS in 2013 which had siphoned off over a million dollars of HSSP funding. However, when decreased donor investment in the Global Fund led it to revise its funding model, with a reduced allocation for malaria in Solomon Islands and Vanuatu announced in early 2014, the scales tipped. The MHMS and the Global Fund entered into negotiations on the management for the next grant and, with the MHMS “pushing the envelope” of the options available, the Global Fund offered the MHMS the option of managing a national grant as Principal Recipient using the new Cash on Delivery model, which was only in use in two other Global Fund grants (Rwanda and Central America).<sup>11</sup>

In addition to these administrative changes, the Global Fund funding structure also changed significantly, to a “hybrid Cash on Delivery model”, discussed further in Section 4.1. Under this model, while a significant proportion of the Solomon Islands grant is expended on procurement of nets, drugs, and diagnostics handled by the Global Fund’s global Pooled Procurement Facility, the remaining portion of the grant must be pre-financed by the Principal Recipient and is only reimbursed by the Global Fund if predetermined targets are met. In the first year of the grant (2015), the performance

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<sup>11</sup> SPC continued to serve as the Principal Recipient for the PIRMCCM, covering HIV and TB grants for the 11 countries plus malaria grants for Vanuatu, until December 2014 when UNDP became the Principal Recipient.

target was based on reporting completeness; in subsequent years, annual parasite incidence was the target that determined eligibility for reimbursement. As discussed in Section 4.1, after the API stabilised at 40 per 1,000 in 2015, it doubled to 81 per 1,000 in 2016 likely due to a range of factors including improved diagnostics and surveillance, raising questions about the appropriateness of this performance target.

Other key donors who have financed malaria control in Solomon Islands have also been affected by broader trends in aid funding and global health. Though the WHO has received some funds via the Global Fund to support technical assistance within MHMS, its ability to support technical assistance on vector-borne disease more broadly is reliant on global donor contributions, which have stagnated in recent years (World Health Organization, 2016). RAM remains active in Solomon Islands, with activities now focused on its Healthy Village Program, which distributes sets of hand tools to enable communities to clear drains and other sources of standing water (thereby seeking to reduce not just malaria but to reduce vector-borne diseases and improve sanitation more broadly). Having ceased dedicated funding for malaria in 2014, JICA is also now directing its health support to broader health promotion through its Health Promoting Villages model.

The reduction in dedicated donor funds for malaria was considered by the Solomon Islands government as a "huge risk" to the program and led to a change in understanding in MHMS that the government needs to take greater ownership of the national malaria program. It led to the Solomon Islands government's first budget contribution to program operations in 2016 (which were previously entirely donor funded). The MHMS has also actively sought to maintain a broad donor pool. There was discussion in 2014 about whether it was worth applying for another Global Fund grant; according to interviewees, the work that PacMISC had done in relation to planning, logistics, and capacity-building made it more feasible that DFAT might have picked up the costs if the decision was made not to pursue further Global Fund support. However, MHMS wanted to keep a blend of donors in order to avoid dependence, which was regarded by interviewees as sensible – "it's always risky to have your whole program dependent on one donor."

## 4. Key observations

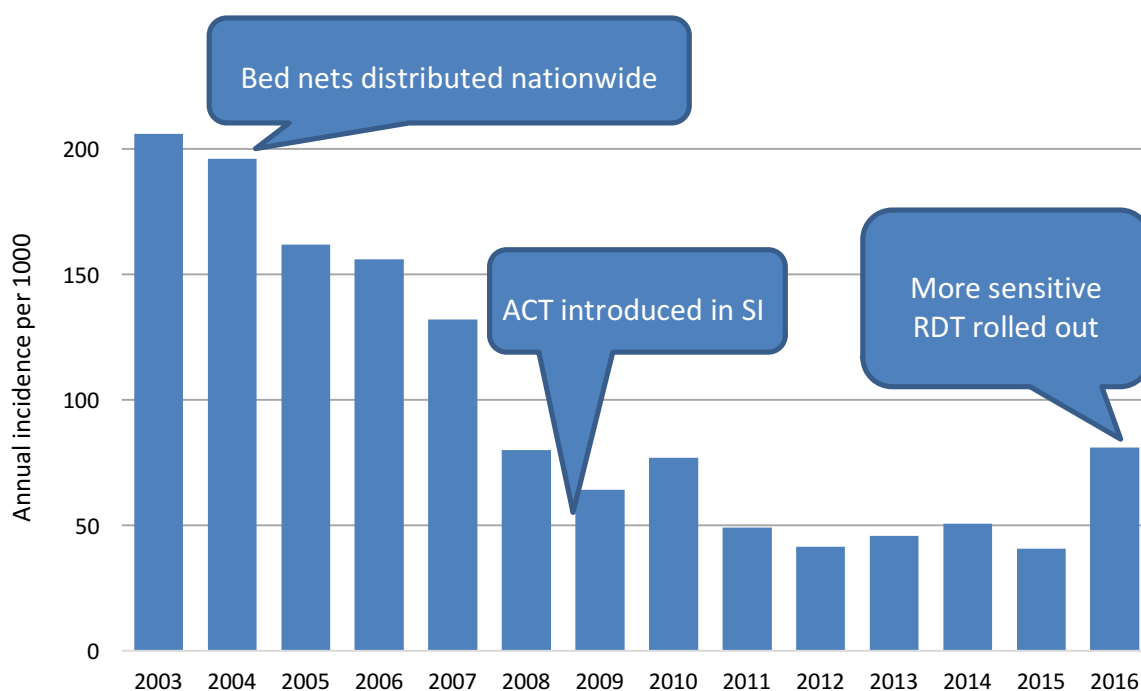
### 4.1 Aid contributed to a reduction in malaria but with limitations

While it is difficult to establish a direct relationship between the provision of foreign aid and a specific health outcome, overall the data suggest that aid did significantly contribute to a reduction in malaria in Solomon Islands. This is particularly evident when focusing on the period from about 2008 to 2013, when the volume of aid dedicated to malaria was at its height. This finding is also consistent with pre-independence efforts in Solomon Islands, where sustained resources correlated to a drop in incidence.

Among the various donor interventions, support from the Global Fund was pivotal in that it enabled a scaling-up of key technical interventions, including the distribution of long-lasting insecticide-treated bed nets, artemisinin combination therapies (ACT) as a first-line therapy and rapid diagnostic tests (RDTs). As one interviewee explained, Global Fund funding was effective in part because impact on malaria morbidity and mortality can be achieved quickly (relative to, e.g., HIV) provided that resources are provided to procure the relevant interventions and make them available in affected communities: “it doesn’t matter if there are inefficiencies being funded through that large sum of money, you’ll still make impact. Basically it’s very simple. Get the bed nets out there, spray the houses, improve testing and improve treatment. And you’ll see that impact very, very quickly.” While it is beyond the scope of this paper to determine the precise impact of these interventions on incidence, Figure 5 shows how the timing of these interventions relates to trends in incidence.



**Figure 5: National annual parasite incidence (API), 2003 – 2016 in relation to key interventions**



Source: Refer Figure 1

Prior to the entrance of the Global Fund, bed nets were available but on a smaller scale. While interviews revealed a number of concerns and uncertainties about the distribution and use of these resources, and questions regarding declining effectiveness of bed nets due to changes in vector behaviour, bed net ownership rates in Solomon Islands are now high by global standards. According to the Solomon Islands 2015 Demographic and Health Survey, on average 86% of households in Solomon Islands owned at least one treated bed net, and each household owned on average 2.5 bed nets of any kind (Solomon Islands National Statistics Office, 2017). In addition, there is a relatively high compliance with ACT (with 86% of confirmed malaria cases receiving anti-malarial treatment in line with the national treatment guidelines) and the proportion of health facilities conducting blood tests has increased as a result of the distribution of the new rapid diagnostic tests with increased sensitivity (NVBDCP, 2017).

In addition to funding effective interventions, there also appears to have been reasonable coordination among various donors, with evidence that the Global Fund

grants were successful in 'leveraging' support from other donors, as they were intended to do (Global Fund, 2007, 2014). The Australian aid program complemented the support from the Global Fund by providing both direct (PacMI/AICEM) and indirect (HSSP) support to MHMS for implementation. A positive example which directly extended the work funded under the Global Fund is AusAID technical support for the adoption of highly effective artemisinin-based drugs as the first-line treatment for malaria in 2008 (Global Fund, 2007, p. 4). The work of advisors funded under PacMISC also came to be seen by those involved as "critically linked" to Solomon Islands' ability to secure the next Global Fund grant.

Beyond specific activities implemented under the national malaria program, Australian aid also appears to have contributed significantly through its support for human resources capacity and operational capability within MHMS, and its provision of budget support. An interviewee specifically identified the flexibility and consistency of this funding stream as key to effective implementation: "It was the consistent, year-in year-out, 'here is \$16m in budget support and you guys can program it and you can plan it.' ... it was HSSP money coming to the rescue when Global Fund finance hasn't flown through, or bed nets weren't there so emergency supplies needed to be purchased, etc. It was just the consistency of budget support and the fact that it was all on-plan and on-budget, helping to strengthen that public financial management system which was absolutely critical to any progress that was made on the ground, in malaria and more upstream health systems elements."

However, there were some aspects of the way in which aid was designed and delivered that limited effectiveness. Management challenges within MHMS (particularly at the provincial level) were recognised by the Global Fund and PacMI, but were not adequately addressed. This information seems to have been regarded as an open secret, and while there is documentation in past project evaluations and Global Fund proposals that the capacity of MHMS to manage and monitor large, intensive grant programs was limited, neither the Global Fund nor PacMI grants were informed by a formal analysis of the capacity to implement. Donor funding has increasingly catered for capacity building and health systems strengthening activities, but this is taking place in the context of a national malaria program which has historically favoured technical over operational skills, as discussed further in Sections 4.2 and 4.3.

There are also lingering questions about the effectiveness of some modalities of aid. While some interviewees were critical of the Global Fund's Cash on Delivery model introduced in 2015, one indicated that the Global Fund has provided effective support for health systems strengthening under this grant, which provided funding to recruit 12 staff in MHMS. Other interviewees pointed to two further perceived issues with the Cash on Delivery model. The first is uncertainty over financing and the likelihood of reimbursement from the Global Fund, as discussed in Section 4.3. Second, some interviewees challenged both the decision to make the reimbursement of funds dependent on just one performance indicator, and the choice of indicator: completeness of reporting for 2015, and annual parasite incidence for 2016 and 2017. The reporting indicator in 2015 was met only after an ad hoc effort led by the national malaria program to improve reporting from facilities after the initial deadline had passed.

Lastly, the documented rise in API in 2016 – coinciding with a drop in overall donor funding for malaria – might seem to suggest a direct relationship between the amount of donor funding available and malaria incidence. While it is true that reduced resources have curtailed some interventions (notably indoor residual spraying), there is also evidence that various factors – including faulty bed nets,<sup>12</sup> improved reporting, the use of more sensitive RDTs, as well as possibly the impact of the 2014-16 El Niño event – are primarily responsible for the increase in incidence in 2016. Improved reporting and diagnostics, made possible through aid, mean that the increased API likely better reflects the true burden of disease than did prior years' estimates. However, it also raises questions about the appropriateness of using API as the primary indicator of performance for a short term funding model. The current targets under the Cash on Delivery grant make it challenging to fairly evaluate the national malaria program's performance, especially at this stage of moving from a vertical, centralised program to integrating and decentralising within the MHMS.

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<sup>12</sup> The NetProtect® long lasting insecticide treated nets procured by the MHMS in 2013 were recommended by WHO at the time they were ordered and distributed, but were since found to have a premature depletion of insecticide, leading the WHO Pesticide Evaluation Scheme withdraw its recommendation (WHO Pesticide Evaluation Scheme, 2013).

## **4.2 Parallel approach alone shows little long term contribution to health system performance**

Vertical programs, which invest in a response to a specific disease or health condition, have a mixed track record in health systems strengthening (World Health Organization Maximizing Positive Synergies Collaborative Group, 2009). One of the key criticisms that has been levelled at donor support to vertical programs is that they have often been delivered through parallel systems, rather than working through countries' existing systems.

While both Global Fund and DFAT now invest in malaria control through country systems, the majority of support to the national malaria program has been provided in a highly vertical manner, with implementation reliant upon parallel systems for governance, financing and service delivery (including human resources, supply and information) used by the NVBDCP but different to those used within the broader health system. These are described in Table 3 below. This approach was considered by an international program advisor as essential to successful implementation at the time that the scale up in donor funding for malaria commenced, as the existing MHMS systems were viewed as lacking capacity to support the program. Because it was believed it would take much longer to achieve results using MHMS systems, the initial Global Fund investment in Solomon Islands was regarded as an appropriate "emergency response to an emergency situation".

Interviewees had mixed perspectives about the merits of the largely vertical and parallel approach taken in Solomon Islands. Its supporters described it as requisite for implementation, and suggested that it provided an effective division of labour between the MHMS and NVBDCP, which created space for the MHMS to focus on other health challenges. But the questions of whether the gains made by the malaria program in reducing incidence could have been achieved through strengthening existing systems, and at what pace, drew mixed responses from interviewees. Some supporters of the parallel approach acknowledged that more should have been invested in existing systems, such as the health information system. Whether or not the approach taken was advantageous to the MHMS more broadly also elicited mixed responses, several of which noted the administrative burden that accompanies Global Fund grants.

Interviewees who were supportive of an integrated approach viewed the national malaria program’s continued success (including progress towards elimination) as being ultimately dependent on the strength of the broader health system. As discussed further below, there is little evidence of any positive spill-over from the vertical approach to the broader health system. In addition, many interviewees suggested that this approach was not reflective of MHMS priorities or of the burden of disease; an anecdote recalled by several interviewees was that even though it was housed within the NVBDCP, the program failed to strengthen systems in order to respond to vector-borne diseases other than malaria – a weakness which came to light during the seasonal dengue outbreaks in 2013 and 2016 where more children died of dengue than of malaria and required "the same vector control team... to stand up so less kids died."

The MHMS itself began to pursue reforms involving integration and decentralisation of public health programs (disease programs as well as maternal and child health and rural water supply and sanitation) from 2011 as part of its efforts to strengthen its service delivery model (MHMS, 2011, 2016b). A role delineation policy and associated service delivery package were piloted and revised, and prioritised in the current National Health Strategic Plan 2016 – 2020 (MHMS, 2016a). Alongside this process, DFAT integrated its support to malaria into HSSP2 and HSSP3 from 2012 onwards and Global Fund switched its approach with the change to the Cash on Delivery grant in 2015. The changes involved in integrating the national malaria program back into the broader health system are also summarised in Table 3.

**Table 3: Parallel systems established by the national malaria program (2003-2013) that are being integrated in the broader health system**

Building block	Parallel system	Current integration efforts
Governance	<p>Decision making through PIRMCCM and Malaria Reference group (and then Malaria Steering Committee)</p> <p>One malaria plan, but separate (donor aligned) planning and budgeting cycle</p> <p>Program specific supervision visits to facilities</p>	<p>Decision making through MHMS Executive Board and national Country Coordinating Mechanism</p> <p>One malaria plan, integrated into national and provincial planning and budgeting cycle</p> <p>Integrated supervision by Provincial Health Office</p>

	Program specific assets (boats, outboard motors, vehicles)	Integrated management of assets by Provincial Health Office
Financing	Funds disbursed to development partner account but managed by the NVBDCP (PacMI) or funds managed a private trustee (Global Fund)	Funds flow to development partner account and managed in accordance with Solomon Islands government systems, but with additional controls on spending due to 2013 fraud
Service delivery	Diagnostic testing administered by community-based microscopists financed by the program (PacMI)  Program specific community based health promotion	Diagnostic testing administered by nurses financed by health system  Integrated Healthy Village program led by MHMS health promotion unit
Human resources	Donor funded staff in malaria program management (approx. 7) and service delivery (approx. 100), specifically for community based microscopy  Program specific international TA contract	Some program management positions have been incorporated into the MHMS payroll within the human resource and finance divisions. The community based microscopists program ended (i.e., none transitioned to MHMS payroll)  TA reduced and integrated into broader MHMS/DFAT TA contract
Supply	Procurement by Global Fund  Diagnostics and treatments distributed through national supply chain (National Medical Stores to Second Level Medical Stores, and Provincial Health Office to facility), but with informal program support from second level stores to facilities  Bed nets shipped by Global Fund directly to Provincial Health Office, then program distributes to communities	Continued but program now ordering directly through online Global Fund platform wambo.org  Malaria program no longer supports distribution from second level medical stores to facilities but is now collecting stock levels from facilities  Continued, but province is now responsible for distribution
Information	Data specified by program, collected by microscopist or community-based microscopists at facility and entered into Malaria Information System by malaria information officers at Provincial Health Office	Data specified by program (using malaria case management register), collected by nurses at facility and entered into DHIS2 by malaria information officers, health information officers or nurses at Provincial Health Office

While these parallel systems are present, to varying extents, within public health programs across the MHMS, the malaria program faced a number of specific challenges related to integration. As reduced funding for the malaria program coincided with implementation of the reforms, the malaria program was mandated by the Permanent Secretary to lead implementation of a number of the reforms which means that it needs to resolve early implementation bottlenecks. (However, no template or ‘road map’ was provided for this process – the NVBDCP had to make its own way and undertake its own trials of how to implement the new rules.) At the outset of the reform process the malaria program was better resourced and more siloed than other programs. One of the key challenges, therefore, has been addressing the perception held by nurses and MHMS officials that the malaria program was not part of the health service or their responsibility: nurses “look at [the] malaria [program], going, ‘they go get their own boats, go and do things and then come back’. So now, when we integrate, that’s the biggest challenge.”

With respect to the process of integration, how the supply chain for malaria commodities (rapid diagnostic tests and treatments) functioned was the most contested and confused space amongst interviewees, and serves as a useful case study to illustrate the challenges of re-integration, summarised in Box 1.

**Box 1: The national malaria program, the National Medical Stores and the supply system**

The National Medical Stores (NMS) is responsible for conducting an annual quantification for essential supplies and then manages the tendering process.<sup>a</sup> The quantification and procurement of Global Fund-supported supplies is managed separately by the national malaria program.<sup>b</sup> NMS and Provincial Health Offices jointly manage the supply chain for all supplies, other than bed nets, in a two-step process. First, the NMS receives orders from hospitals and second level medical stores (SLMS) through an electronic system, *mSupply*, and distributes supplies to these facilities. Second, the SLMS receives orders completed by nurses at primary health care facilities using a paper based system and Provincial Health Offices distribute these supplies. Interviews suggested that the malaria program previously supported this second step – getting malaria commodities from the SLMS to facilities – in an informal way, making use of the large amount of donor resources that were available for logistics, but this has now ceased.

Reports of stock-outs – particularly of ACTs – have frustrated the malaria program; significant rationing of pharmaceutical stocks and, in some cases, RDTs was necessary during 2016. The main constraint of the current supply management system is that the system to record and monitor stock and deliver those

supplies to primary health care facilities, is still in development. This is partly due to the fact that there is no telephone or internet connectivity in most primary health care facilities. Delivery is also impeded by logistical constraints of reaching the majority of primary health care facilities. Notwithstanding these contextual constraints, the state of the current system is a source of frustration for a number of interviewees, both national and international, and most agreed that it could be strengthened within the current parameters (e.g., earlier, regular ordering by nurses).

Some interviewees were highly critical of NMS' failure to strengthen the system, noting that the malaria program had received recent reports of malaria commodity stock-outs. One interviewee noted: "the NMS did not perform at the level required of them... Until the situation is rectified at the provincial levels, the malaria program will always struggle to reach its API [incidence target]." Others acknowledged the limitations of the current supply chain between SLMS and facilities, but pointed out that this part of the supply chain is the responsibility of Provincial Health Offices. They also noted that NMS has not been involved in the malaria program's planning processes, nor has the program allocated any financial or other resources (such as boats and outboard motors) to strengthen the supply management system.

The issue of quantification and procurement were also raised. Some interviewees challenged the NMS practice of supplying malaria treatment to the small number of private facilities and pharmacies in Honiara and thought that it was impacting on supply to the public sector. However, the NMS takes supply to the private sector into account in its quantification and is a practice that was previously agreed to by partners to ensure the quality of supply, as documented by media reports (McPherson, 2012). Other interviewees also suggested Global Fund delays in procurement had contributed to stock-outs and pointed to anecdotal evidence that other essential medicines procured by NMS were less likely to be stocked out; the NMS reports that 82% of essential medicines were available at facilities in 2016.

The malaria program is trying to grapple with how to respond to health system challenges in these new circumstances where it does not have funding to act on its own. It has recently revised its malaria case management register form (which is now used to collect data for the health information system) to include information on stock levels of malaria commodities at the facility level in an attempt to better understand stock-outs. However the utility of this data is unclear as it is only available to the NVBDCP after a two to three month delay.

A number of observations can be drawn from the interaction between the malaria program and the NMS. Firstly, the weakness of the supply management system still remains, notwithstanding the program's informal support to the lower end of the supply chain over the years.

Secondly, there is a need to improve trust and communication between the national malaria program and the NMS, with leadership from the MHMS executive team and clear allocation of responsibilities, in order for integration to succeed. A stronger relationship would help avoid misunderstandings (for example as related to the issue of supply to the private sector) and move towards problem solving that strengthens systems.



Thirdly, as also noted by a number of interviewees, there is evidence that AusAID/DFAT's investment in HSSP helped build a base for the integration of the national malaria program. The progress made in improving the supply management system using *mSupply*, as well as the health information system using DHIS2, and their associated workforces, are two examples of this. The architecture of HSSP (to support policy dialogue and technical assistance) also provided the MHMS and DFAT with a mechanism through which they could carefully integrate the program over time. This was further enabled by key individuals within PacMI and AICEM who were aware of the tensions inherent in the vertical program, and attempted to build the MHMS' leadership of the malaria program over time.

<sup>a</sup> *It is unclear what support technical partners provide for quantification, e.g.: UNICEF and vaccines*

<sup>b</sup> *Ordering is now done electronically in country via the Global Fund platform wambo.org (NVBDCP 2017, p. 23)*

### **4.3 Sustained effectiveness will be dependent on strengthening provincial capacity**

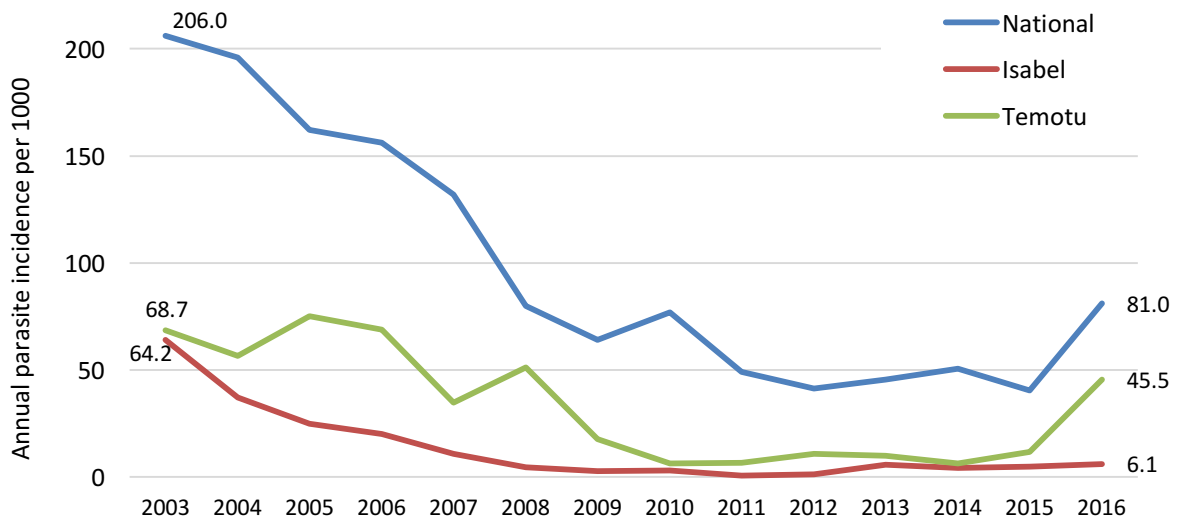
Aid provided for malaria appears to have been spent largely on effective technical interventions, channelled through the national malaria program. However, with reduced donor funding in recent years and little prospect of a significant increase in the availability of domestic sources, the focus should now be on strengthening the capacity of provincial malaria programs to plan, budget, and deliver interventions appropriate to their provinces.

This represents a significant contrast from earlier ways of working. The design of Global Fund/SPC grants (2003-2014) and PacMI/AICEM (2007-2016) were based on a centralised model. Provincial Health Offices and the provincial malaria teams had very little involvement in the national malaria program at the strategic level, and were effectively a "body shop" used to deliver bed nets and indoor residual spraying. Although provinces were involved in annual NVBDCP planning meetings, they were largely present to provide provincial sign off on pre-developed plans. The parallel systems referenced in Table 3 largely circumvented the need to engage with Provincial Health Offices outside of delivery of bed nets and supplies to conduct indoor residual spraying directly to communities. Interviewees identified a number of limitations of this approach: it missed an opportunity to build capacity in the provinces which is now broadly recognised as essential to the control and elimination efforts. Additionally, as the national malaria team was unable to spend the donor funding that was available at

the peak of the program and had to give some funds back every year, implementation may have been more effective with greater involvement of Provincial Health Offices.

With the limitations of a highly centralised model now widely acknowledged, Provincial Health Offices are now overwhelmingly seen as key to the national malaria program's continued success. This is apparent in the respective results of elimination efforts in Isabel and Temotu. Though in 2003 the two provinces recorded a similar incidence rate, since then progress has been uneven in Temotu and incidence has recently increased there in line with the national trend. By contrast, incidence in Isabel declined quickly and remained low, and the province now has the lowest incidence in the country (Figure 6). Whereas elimination efforts in Temotu were described as a "disaster" (and were likely also negatively impacted by Cyclone Pam in 2015), Isabel is broadly seen as "unique" case where successful community-based prevention programs are supported by effective partnerships – a tripartite agreement between the provincial government, Council of Chiefs, and Church of Melanesia women's group ("the Tripod") – and leadership by the Provincial Health Director and program manager. This has been described as a "home grown" model with limited support from donors (although surprisingly has not been formally documented). The attribution of success to good leadership and the "willingness of the [provincial malaria] team" in Isabel was echoed in other provinces that are viewed as better performing in certain areas than others (e.g., Guadalcanal province has a higher reporting rate; Western province has pooled the assets of public health programs).

**Figure 6: Temotu, Isabel, and national API, 2003-2016**



*Data sources: (Garcia, Lynch, & Hewitt, 2014; MHMS, 2005, 2017; Office of Development Effectiveness, 2009; Over, Bakote'e, Velayudhan, Wilikai, & Graves, 2004; World Health Organization Western Pacific Region, 2011)*

As part of its broader reform efforts, the MHMS is in the process of delegating powers to the provinces so that they are effectively responsible for planning, managing and monitoring service delivery, including implementation of the MHMS' new service delivery model, as well as management of finances, human resources, assets and information systems. In 2013, the MHMS committed to increasing the proportion of its recurrent budget allocated to the provinces (37% in 2016 under the HSSP3 performance agreement). As noted above, the NVBDCP was mandated to lead a number of the MHMS reforms. As such, the national malaria program team started implementing these changes in 2016, taking responsibility for “technical support, policy and strategic guidance for planning, advocacy, monitoring and evaluation” while the Provincial Health Directors (with the support of the provincial malaria teams) are responsible for implementation (NVBDCP, 2017). Provinces have been increasingly involved in planning over time and additional changes that were introduced in 2016 include: changing reporting lines for provincial malaria staff from the national malaria team to the Provincial Health Director; and shifting responsibility for bed net distribution from the national to the provincial malaria teams (NVBDCP, 2017). In addition, the MHMS is likely to undergo restructuring in 2018, in which the NVBDCP is likely to become part of

the Environmental Health Division, and thus the head of the NVBDCP would no longer report directly to an Undersecretary (NVBDCP, 2017).

Like the shift from parallel to MHMS systems, these reforms require the national malaria program team to "let go" and hand-over some responsibility to provincial teams. However at the same time implementation of the reform has revealed numerous weaknesses within both national and provincial level systems, which creates a conundrum for the NVBDCP in leading the reform process. With respect to financing, malaria teams within Provincial Health Offices remain dependent on funding allocations from the NVBDCP; unlike other programs, provincial malaria programs do not receive an allocation from MHMS grants to the Provincial Health Office. This means that the provincial malaria teams are uniquely dependent on their grants from the NVBDCP. Previously the NVBDCP paid for individual activities undertaken by each provincial malaria team. In 2017 the national malaria program commenced a new approach to transferring resources to the province: allocating block grants directly from the national program to provincial malaria teams in order to give them greater flexibility and control over their resources.<sup>13</sup> However, the disbursement of these grants has been slow (due to delays in the Ministry of Finance) and there is still uncertainty at the provincial level around the process of raising and disbursing these funds. This means that leadership in Provincial Health Offices has been reluctant to fund malaria activities from sources other than the NVBDCP grants. As noted by one MHMS advisor, "the Ministry says [to provinces], 'just use the [provincial health] grant first, and when funds are released we will reimburse you.' But this raises two questions: how to account for this in the books, and lack of certainty around whether reimbursement [for the performance component] will actually happen."

With respect to the approaches taken by DFAT and Global Fund to strengthen provincial level management and administrative capacity, interviewees had mixed perspectives.

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<sup>13</sup> Additionally, the Independent Performance Assessment of HSSP3 in 2016 notes that the transition to provincial malaria grants (which were previously held under the national malaria program budget) and a deliberate strategy of funding malaria grants from the 276 rather than 376 budget, helped MHMS to maximise their provincial allocations under the 276 budget, and thus to meet DFAT's criterion for a performance payment in 2017 (Specialist Health Service, 2017).

One interviewee noted that the much of the donor effort at the provincial level has rested on the assumption that there are already provincial planning, budgeting, finance and information functions in place to strengthen, which is not necessarily the case. Some thought that the MHMS was being held by donors to very high “Australian standards or Geneva standards”, without full appreciation of the context and the capacity gaps that exist, and the expectations for improvement each year are excessively ambitious.

One interviewee was critical of DFAT’s approach, perceiving that they had failed to allocate sufficient resources at the provincial level to strengthen management and administration, and buttress MHMS reform efforts. DFAT has three “Primary Health Advisors” serving three provinces and Honiara, but they are responsible for supporting health service planning as well as acting as a co-signatory on all payments (as SIG and donor funds are co-mingled at the provincial level), which absorbs a large amount of their time. DFAT has also engaged a local accounting firm to act as a co-signatory in the other six provinces. This investment has led to the perception that DFAT is primarily concerned with “looking after their funds in the provinces” rather than building capacity at the provincial level to manage basic, day-to-day operations.

However, others took a more optimistic view, expressing the opinion that there is now greater awareness of the variation and gaps in the provincial capacity, which should lead to improved targeting of aid in the future. While there may have been gaps in the past, they suggested, DFAT and Global Fund are now better able to contribute to strengthening provincial level management and administrative capacity, particularly before Solomon Islands graduates from eligibility for Global Fund grants.

#### **4.4 Evidence for assessing efficiency of aid is limited**

As discussed in Section 4.1, aid was spent on effective interventions that reduced the burden of malaria in Solomon Islands. However, the volume of aid funding, and speed with which the volume of aid scaled up, raises the question of how efficiently this aid was spent.

An argument made by some interviewees is that there were supply side factors which encouraged the continued flow of earmarked funds for malaria control – some

interviewees suggested that, for a number of years, donors such as DFAT continued to fund malaria control and elimination because it reflected donor interests and priorities, which were not necessarily based on an objective evaluation of the most efficient use of funds or on priorities identified by the Solomon Islands government. Again, however, it is difficult to assess these claims based on data available in the public domain. It is certainly true that the decision to establish PacMI and scale up funding for malaria in the Pacific region was a high-level priority for the Australian government (that emerged out of the 2006 White Paper process). Malaria was also a topic that was attracting increased attention from donors globally at the time. However, it is equally true that the burden of malaria in Solomon Islands was high at the time that donor funding was scaled up, and so donor investment was warranted.

The question of whether or not those funds were efficiently spent in country is also contentious. As noted under Section 4.1, some interviewees suggested that there were “inefficiencies being funded through the large sum of money.” According to one former program adviser, the substantial influx of donor funds served to smooth cultural and interpersonal tensions within the NVBDCP, and enabled malaria program activities to continue in spite of misuse or mismanagement. If indeed this was the case, while it certainly doesn’t qualify as efficient spending by conventional standards, given the post-conflict context a pragmatic analyst might well accept the loss of some efficiency in the interest of keeping activities running. However, it was not a sustainable approach, nor one which fostered a culture of accountability.

The efficiency and cost-effectiveness of malaria-related research spending funded under PacMISC/AICEM is another area that is difficult to assess, but there were suggestions in interviews that the efficiency of spending may have been less than optimal.

Interviewees indicated there was clearly appetite among NVBDCP staff for these types of evidence to be produced, and to be involved in generating that evidence, and an understanding of the rationale for funding research: “when [AusAID] advocate, they need evidence. And the evidence comes from researchers. And that is very powerful for convincing the government of Australia.”

However, the research was perceived as very expensive, which caused some contention within AusAID at the time. For example, the mass blood survey in Temotu cost over A\$800,000 (Toole, Lynch, & Garcia, 2010). One interviewee commented with reference

to the survey, “AusAID said, ‘well we can’t do this kind of survey again, they’re very expensive.’ But it’s a catch-22. Do you really want to throw money at something that you don’t really have the evidence whether it’s working or not?” There are also suggestions in the grey literature that some of the research was not well prioritised and that the heavy involvement of expatriate researchers in research activities such as surveys made them more expensive undertakings than they need have been (Toole, et al., 2010, p. 24).

Overall, while some interviewees suggested that the aid-funded malaria research contributed to improved program management in Solomon Islands (and Vanuatu) at the time, arguably much of this work is better regarded as a global public good, and so its cost-effectiveness better measured in the context of the global fight against malaria. A full assessment of this is beyond the scope of this paper. However, based on the limited available evidence it seems reasonable to argue—as some of our interviewees did—that while research was needed, at least some of the aid allocated to malaria research in Solomon Islands might well have been more efficiently spent if allocated to service delivery. The technical and efficiency challenges associated with pursuing elimination are discussed in greater detail below in Section 4.6.

#### **4.5 MHMS has taken increasing ownership of the malaria program**

Before about 2012 the MHMS had little ownership<sup>14</sup> over the initiation or governance of donor funding for malaria. However, as donor recognition of the importance of recipient country ownership evolved globally, the MHMS worked with development partners and took advantage of changes in how donors were designing their support to increase its involvement in the leadership and management of the national malaria program. Reduced donor funding led the Solomon Islands government to gradually increase its financing of the malaria program from 2009 onwards, while maintaining broad donor support.

Interviewees expressed a number of frustrations, common to Global Fund grant recipients elsewhere, around reduced MHMS’ ownership of the national malaria

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<sup>14</sup> Ownership includes many aspects including the development of strategies and policies; ensuring alignment of donor investments with these strategies, institutions and systems; and building the capacity and commitment of its institutions (OECD, 2017).

program, the establishment of parallel systems (discussed in Section 4.2), and lack of alignment with efforts to build national institutions (AusAID, 2012). There were also frustrations associated with the specific Global Fund multi-country model led by SPC, which impeded communication and local ownership of grant design. The MHMS was able to exercise some control through their membership on the PIRMCCM and through managing how the national malaria program interfaced with the rest of MHMS, but had limited input into the design and implementation of Global Fund grants for malaria. One interviewee noted that with respect to the design of the Round 2 grant, there was not much discussion at the time about the merits of the vertical approach; the national malaria program “just followed what SPC as the [Principal Recipient]... advised us to follow”. SPC, also learning in its role as regional Principal Recipient, served as an intermediary between the countries and the Global Fund, and discouraged the MHMS from engaging in direct dialogue with the Global Fund. This was related to a perceived lack of country-specific contextual knowledge within the Global Fund – the NVBDCP felt that the Global Fund did not fully understand and was not briefed on the operational constraints that it faced, and that this may have impacted upon the extent to which officials within the MHMS judged the Global Fund support as reflecting its interests.

Similarly, the ‘carrot’ of Global Fund support had the positive effect of encouraging the development of annual strategies and plans by the MHMS. However, this can alternatively be interpreted to mean that Global Fund requirements drove the development of strategy and planning within NVBDCP, not the other way around. As an interviewee indicated, until Round 5 the Global Fund put very little emphasis on national strategy; rather, because of their comprehensive requirements, the proposals themselves became the default national strategy.

One of the ways in which the MHMS sought increased ownership of the Global Fund support was by becoming Principal Recipient, as described in Section 3.6. Interviewees also expressed the view that the Cash on Delivery model enhanced ownership by channelling funds directly through the MHMS systems in support of MHMS plans, and incentivised MHMS performance. However they also acknowledged that, to some degree, the incentive rests on the Solomon Islands government bearing the responsibility for frontloading (paying upfront) the performance component of the grant so that it carries the risk of non-payment if it did not meet its targets. This has not



necessarily been the case in practice – in 2015, DFAT funds were used to frontload the grant on behalf of the Solomon Islands government, using a surplus of HSSP funds in the donor account (376), and in 2016 and 2017 the surplus of Global Fund money from prior years was used, leading one MHMS official to conclude that the "the frontloading is not a huge burden for us..."

While the shift to greater MHMS ownership of the Global Fund grant emerged from a specific set of circumstances, the shift to greater ownership in relation to DFAT funding took place over a longer term with support from both DFAT and program advisors, and was enabled by the greater flexibility in the design of PacMI and HSSP.

There is little evidence of ownership in the initiation of PacMI. As the initiative lacked a formal design process (Toole, Lynch, & Garcia, 2010), the partners involved – the Malaria Reference Group, AusAID Canberra, AusAID Honiara and MHMS – were very hands-on in directing the initiative in its early stages. The Malaria Reference Group visited Solomon Islands every six months and, with access to decision makers in Solomon Islands and Australia, had a high degree of influence over the direction that the national malaria program should take. These visits were in addition to annual planning meetings involving other partners such as SPC and WHO. An international advisor noted that MHMS officials “did not feel comfortable” discussing operational issues with the Malaria Reference Group and felt “railroaded” by the decisions made based on the group’s advice, which was well-intentioned but provided without clear understanding of the day-to-day operational constraints facing the MHMS and NVBDCP.

Over time, the MHMS and its allies worked to “morph” PacMISC from a support centre for research on elimination, to a blend of implementation research and technical and operational capacity building support. The advisor quoted above described helping the MHMS in “navigating the space” within PacMISC’s crowded governance structure to better prepare for and influence the outcome of Malaria Reference Group visits. Program advisors described “repackaging” what was actually being done to meet official purposes, taking advantage of the flexibility of PacMI. As noted above in Section 3.6, for a variety of reasons the Australian aid program’s malaria funding was gradually transitioned to broader health sector support in HSSP2 and HSSP3, which gave the MHMS greater control over the use of these resources. An example of this is the use of HSSP funds to frontload the Global Fund grant in 2015, as mentioned above.

To their credit, the transition to increasing use of country systems by DFAT and, over the last three years by the Global Fund, is counter to the trend amongst other donors in the health sector in Solomon Islands, so the malaria program is arguably further advanced than other public health programs under MHMS with respect to this measure of ownership. Most development partners (including GAVI, JICA and UN agencies) have been slow to use the SWAp in the way it was intended, that is, to provide a coordinating function and space for policy dialogue. This was described by interviewees as stemming from limited institutional incentives to coordinate, as well as a lack of knowledge about the government's planning and budgeting cycle. The latter means that many development partners are not in a good position to support the government's planning and budgeting cycle, and may well end up hindering it. A Partnership Coordination Unit that is being established to support coordination between the MHMS (including the Provincial Health Offices), development partners, and the Ministry of Development Planning and Aid Coordination, is donor-funded (by the Global Fund) and took two years to be staffed and develop a work plan.

#### **4.6 Need to reassess the goal of malaria elimination**

As discussed in Section 3, the goal of eliminating of malaria from Solomon Islands has a long and contentious history. Though the failure of the Global Malaria Eradication Program silenced discussion of elimination for an extended period from the 1970s through the early 2000s, it returned to the malaria agenda in Solomon Islands (and elsewhere) about 10 years ago.

Although the notion of malaria eradication was raised in discussions about potential Australian aid investments as early as 2005 (AusAID, 2005) – investments which led to meaningful advances in malaria control and reduced burden of disease – the elimination timeframes set out by the Malaria Reference Group under PacMI were contested almost from the outset. The fact that those timeframes have been repeatedly rolled back, and that interviewees broadly remained sceptical about current elimination timeframes, indicates that they were not technically or operationally realistic.

Despite setbacks, the political appetite for pursuing elimination has proven remarkably resilient. The prime minister and other high-level representatives of the Solomon Islands government have made public statements of commitment to regional and global

objectives of malaria elimination by 2030. Yet while most interviewees agreed that the idea of elimination is “strong in the minds of the [national malaria] program and the ministry” and that the government is politically obliged to “go along” with regional and global malaria elimination initiatives, all interviewees in-country acknowledged that a 2030 deadline is unrealistic. Many also pointed to an apparent gap between political aspirations and health systems capability; “[Solomon Islands government] signed for it, but they don’t understand it – what is required in order to actually carry out or enter into elimination”, one interviewee remarked.

Interviewees cited a number of barriers currently precluding the pursuit of nationwide elimination. As discussed in Section 4.3 above, many of these barriers reflect operational and health systems constraints at the provincial level, including the reporting system and surveillance systems, supply chain management, and low human resource capacity (both in terms of number of staff and their training/experience to manage malaria program activities). One interviewee, for example, was adamant about the role of Provincial Health Offices: “The provinces are the weak link. They just haven’t got the management capacity to implement, regardless of how much cash you give them, they just can’t do it. That has to be the key element of strengthening.”

The vagaries of Solomon Islands’ geography (i.e. remoteness in Temotu Province, high population movement between provinces) also challenge NVBDCP’s ability to sustain both control and elimination activities. In addition, there are unresolved technical challenges, notably the burden of vivax malaria and relatively high proportion of the population with G6PD deficiency (a genetic condition which complicates efforts to treat and eliminate vivax malaria) (Kuwahata et al., 2010). Even if operational and management issues are rectified, in the view of a development partner interviewed, given the five-year trend elimination of malaria by 2030 will not be feasible unless significant new tools for the treatment of vivax malaria and detection of G6PD deficiency become available within the next five years. (Moreover, as another interviewee pointed out, even if those tools became available, it’s not clear that donors would support Solomon Islands to procure and implement them, as the desire to pursue elimination aggressively must be weighed against the potential ethical and safety implications of deploying new tools.)

For these reasons, and assuming that the Solomon Islands government intends to honour the high-level commitments to malaria elimination that it has already made, a nuanced and evidence-informed policy dialogue on elimination over the long-term needs to take place between MHMS and partners. This dialogue will need to take into account how elimination and control activities can be implemented in a complementary and cost-effective way. In addition, consideration will need to be given to how malaria fits with other pressing vector-borne disease and broader health priorities, and with current MHMS reform processes. According to a WHO official, although the NVBDCP has the desire to move quickly on elimination, they are currently constrained by the still-unfolding MHMS reforms to see how the system will be structured, before it is able to move its functions into the system. Of particular importance will be building strong provincial leadership and management, which was cited by a global technical advisor interviewed as a key factor in those areas which rapidly lowered incidence to pre-elimination levels (as discussed above in Section 4.3).

Though the argument can be made (as it was by some interviewees) that the cost of elimination should be weighed against the human and financial costs of *not* eliminating, others reiterated the reality that elimination does require substantial and flexible funding over an extended period. Even wealthier nations which have succeeded in achieving elimination, e.g., Sri Lanka, relied on external resources to do so. Resourcing must be a key consideration in the discussion on planning elimination, given that dedicated donor funds are not expected to increase and that current levels of investment will not be sufficient to sustain elimination. The 2016 annual parasite incidence rate of 81/1000 places Solomon Islands at 2010 incidence levels. Between 2010 and 2015 incidence was lowered from 80 to 39/1000, but this was achieved with much higher levels of investment than can be expected over the next six years: between US\$7-11 per person from 2010 and 2015, versus US\$3 per person in 2016 based on our estimates. There is also evidence suggesting that the observed increase in API in 2016 reflects both a genuine increase in transmission related to the faulty bed nets distributed in 2013, and a significantly strengthened surveillance system – meaning that the 2016 API is a more accurate estimate of the true burden of infection than previous years' estimates have been.

One of the key lessons learned from prior elimination efforts that must be retained is the necessity of sustaining those efforts once they are started. As one interviewee explained, deciding to pursue elimination means making a commitment to communities that the malaria program and its partners will be there for the long-term. If that commitment falters due to a change of direction or loss of interest among donors, that can cause substantial long-term damage to relationships and potentially jeopardise future partnerships between NVBDCP and communities. It can also lead to increased mortality, when people who have lost their immunity to malaria are exposed to the parasite again. The commencement of the journey to elimination thus creates an ethical obligation to see it to its conclusion.

Achieving elimination will require sustained, long-term (in the magnitude of 20 years or more) financial commitment from development partners. Several interviewees expressed concern about the risk of donor fatigue; “It’s great when malaria is at high levels because you get a lot of headline news for relatively little investment. When you have to maintain that investment for three cases of malaria, it’s a hard sell”. At this point, most dedicated sources of donor funding for malaria in Solomon Islands have already ended. One of the last remaining is the Global Fund. Critically, though there is no transition plan in place as yet, the Global Fund is anticipated to withdraw funding support from Solomon Islands within the next five to ten years. This funding transition will need to be carefully managed.

A final key factor which has historically affected the success of pre-elimination and elimination efforts in Solomon Islands is community support. As noted in Section 4.4, the success of Isabel Province, which has come closest to elimination, was attributed by a number of interviewees to active community participation, coordinated by government, church and tribal structures. By contrast, several interviewees remarked, in various ways, that addressing malaria is viewed by few Solomon Islands citizens as a priority issue, either for their government (political commitments notwithstanding) or in their day-to-day lives. If the Isabel experience is anything to go by, finding ways of engaging and fostering community enthusiasm for elimination – as well as taking into consideration the differing administrative and governance capacities of each province – will need to figure into any future policy dialogue on elimination.

## 5. Conclusion

In this paper, we have reviewed the history of donor support for malaria control and elimination and Solomon Islands, and outlined key observations related to the effectiveness of that support and the interactions between donors, the national malaria program, and the MHMS.

Among these observations, we noted that while foreign aid has contributed significantly to a reduction in malaria, it has not always done so in the most effective or efficient manner possible (though the evidence for these points is mixed). Ownership of the national malaria program by the MHMS and the Solomon Islands government more broadly is increasing, and though it was fought for by the MHMS and remains a work in progress, this country ownership has also been encouraged by donors themselves. Similarly, while donor support for malaria has predominantly relied upon a vertical and parallel model, concerted efforts are now being made to integrate the 'Ministry of Malaria' back into the MHMS. As this process of reintegration and reform continues, we suggest that donors should pay special attention to the tasks of strengthening provincial capacity and assessing if and how elimination efforts can be appropriately pursued. While this paper has not focussed specifically on the role of the MHMS, the NVBDCP stands to benefit from a MHMS road map for reform, considering sequencing and capacity issues.

While the case of donor support for malaria in Solomon Islands does not represent a model example of aid effectiveness, it's important to bear in mind the context and the advances that have been made against the odds. Solomon Islands has been a trailblazer when it comes to donor support for malaria – particularly with respect to the Global Fund, with its participation in the first multi-country grant and as one of the first recipients of a Cash on Delivery grant, but also as the setting for novel malaria elimination research. It's also notable that much of the progress that has been made in malaria control in Solomon Islands came directly off the back of a period of protracted ethnic violence.

Bearing in mind the past, what about the future? To what extent can the gains that have been made – the rise in incidence in 2016 notwithstanding – be sustained, and how can donors best support Solomon Islands in malaria control and elimination going forward?

One important point to reiterate is that Solomon Islands, like many other malaria endemic countries, has experienced a pattern of cycles of resurgence. Though this can be interpreted to mean that gains in malaria control can be lost, equally it represents hope that even a rise in cases can be overcome given concerted support and strategy. The gains that have been made in reducing malaria with donor support over the last 25 years are substantial; many lives have been saved and morbidity dramatically reduced. Numerous anecdotes shared in interviews as part of this study attested to how differently malaria is regarded now compared to 20 years ago. For many Solomon Islanders, it has transitioned from presenting a pervasive and serious threat to health and well-being, to a relatively minor inconvenience.

This transition generates its own problems, particularly with respect to the pursuit of elimination. Donors and development partners wishing to continue to support Solomon Islands to move towards progressive malaria elimination will need to recognise that doing so requires a differentiated model of support from control efforts, and that doing so is dependent on establishing strong health service provision at the provincial level. It will therefore necessarily be a long-term project.

We also note there is a clear, unresolved tension between the merits of pursuing rapid improvements through the use of vertical programs and parallel systems, versus the more time-consuming but perhaps ultimately more efficient approach of building an integrated primary health service, with effective management and administrative systems. Yet, as the history of donor support outlined in the first section of this paper has shown, key donors – particularly Australia, Japan, WHO, Rotarians Against Malaria, and more recently the Global Fund – have already demonstrated a long-term commitment to malaria control and elimination efforts in Solomon Islands, having been involved for decades. While the nature of their involvement has changed over time and on relatively short-term cycles, reflecting (as we have noted numerous times throughout this paper) the influence of global breakthroughs, trends and ideas on local activities and priorities, now that a number of joint government-donor mechanisms for governance, policy dialogue, and system improvement are in place, there is a promising platform upon which to sustain and build upon the gains that have been made in the fight against malaria in Solomon Islands.

## Acronyms

ACT	Artemisinin combination therapy
AICEM	Australian Initiative for the Control and Elimination of Malaria
API	Annual parasite incidence rate
AusAID	Australian Agency for International Development
BSIP	British Solomon Islands Protectorate
CoD	Cash on Delivery (Global Fund model)
DDT	dichloro-diphenyl-trichloroethane (insecticide)
DFAT	Australian Department of Foreign Affairs and Trade
DHIS2	District Health Information System 2
G6PD	Glucose-6-phosphate dehydrogenase
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HISP	Health Institutional Strengthening Project (Australian aid, set up in 2001)
HSSP	Health Sector Support Program (Australian aid, from 2008)
HSTA	Health Sector Trust Account (Australian aid account, set up in 2001)
JICA	Japan International Cooperation Agency
MHMS	Ministry of Health and Medical Services
MIS	Malaria Information System
MRG	Malaria Reference Group (under PacMI)
NMS	National Medical Stores
NVBDCP	National Vector-Borne Disease Control Program
PacMI	Pacific Malaria Initiative
PacMISC	Pacific Malaria Initiative Support Centre
PNG	Papua New Guinea
PIRMCCM	Pacific Islands Regional Multi-Country Coordinating Mechanism
RAMSI	Regional Assistance Mission to Solomon Islands
RCC	Rolling Continuation Channel (Global Fund)
RDT	Rapid diagnostic test
SIMTRI	Solomon Islands Malaria Training and Research Institute (now sometimes referred to as Solomon Islands Medical Training and Research Institute)
SPC	Secretariat of the Pacific Community (now, Pacific Community)
SWAp	Sector-wide approach
TA	Technical assistance
UNICEF	United Nations Children's Fund
WHO	World Health Organization



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