

code of practice, the process of developing a regional HRH strategy for 2006-2015 was set into motion.³⁸ Both strategic plans and the declaration aimed to improve the health workforce situation in the Pacific Island region.

Despite the Samoa Commitment that led to the Pacific Code of Practice and a regional HRH strategy for 2006-2015, which has been in action for years now, the PICTs have continued to bleed their scarce specialized health workers to the wealthier nations. In this sense, the Code and thus its regional strategy have not been successful in stemming the brain drain catastrophe in the health sector.

Compared to the time before the Samoa Commitment, the Pacific Code of Practice, and the HRH strategy for 2006-2015, doctor and nurse densities in some islands continue to fall even to this date. This has created a further negative drift in demand and in the real availability of health workers. PICTs that reported lower density of nurses post-Samoa Commitment included the Marshall Islands, Palau, and Vanuatu. A lower density of doctors was recorded in Fiji, Micronesia, Palau, Vanuatu, and PNG.³⁶ Nevertheless, in the wake of the Code of Practice, many Pacific Islands have observed increases in health workforce densities. An increase in the density of doctors was recorded in Kiribati, the Marshall Islands, Nauru, Niue,

Solomon, Tonga, and Tuvalu. Similarly, the density of nurses also increased in Fiji, Kiribati, Micronesia, Samoa, Niue, Tonga, and Tuvalu.³⁶

Against such a backdrop, political determination within the countries themselves, as well as regional planning and strategies, may help forge a way to address the HRH crisis and have a common goal in achieving better health worker densities. Such a plan, if well designed and implemented across islands and wealthier recipient countries, it may be possible to halt the deterioration of the health workforce in the Pacific Islands.

Conclusion

At present, PNG, Samoa, and Vanuatu are facing critical HRH crises. Some PICTs have increased their overall densities of doctors, nurses and midwives; however, the number of countries in the region facing critical shortages has increased from 2006. Migration of skilled health personnel from the region is a major factor contributing to this situation. To ameliorate the deficit, support from destination countries to strengthen HRH in PICTs would make migration a win-win situation. In addition, the Pacific Island region must devote more resources to strengthen this key health system building block. To this end, efforts should focus on training new personnel and on retaining them with financial and non-financial incentives. The Asia-Pacific Academic Consortium for Public Health (APACPH) can provide

a platform for knowledge exchange and enhance the research capacity in the region.³⁹

Regional political commitment will play an important role to sustain and enhance these efforts toward universal access to skilled health workers in the Pacific Islands.

References

1. Samb B, Desai N, Nishtar S, et al. Prevention and management of chronic disease: a litmus test for health-systems strengthening in low-income and middle-income countries. *Lancet*. 2010;376(9754):1785-97.
2. Global Health Workforce Alliance. Negotiating for access to health workers for all. In: Sheikh M, Afzal M, editors. *Negotiating and navigating global health: case studies in global health diplomacy*. London: World Scientific/Imperial College; 2011.
3. McMichael AJ, Lindgren E. Climate change: present and future risks to health, and necessary responses. *J Intern Med*. 2011;270(5):401-13.
4. World Health Organization. *The World Health Report 2006: Working together for health*. Geneva, Switzerland: World Health Organization, 2006.
5. Scheffler RM, Liu JX, Kinfu Y, Dal Poz MR. Forecasting the global shortage of physicians: an economic- and needs-based approach. *Bull World Health Organ*. 2008;86(7):516-23B.
6. Mills EJ, Kanters S, Hagopian A, et al. The financial cost of doctors emigrating from sub-Saharan Africa: human capital analysis. *BMJ*. 2011;343:d7031.
7. Connell J. *Migration of Health Workers in the Asia-Pacific Region*. Human Resources for Health Knowledge Hub, 2010.

8. Fulton BD, Scheffler RM. Health care professional shortages and skill-mix options using community health workers: new estimates for 2015 [working paper]. 2009.
9. University of New South Wales. Mapping Human Resources for Health Profiles from 15 Pacific Island Countries. Report to the Pacific Human Resources for Health Alliance from the Human Resources for Health Knowledge Hub. UNSW, 2009.
10. World Health Organization for the Western Pacific Region (WPRO). Western Pacific Regional Action Plan for Noncommunicable Diseases: a region free of avoidable NCD deaths and disability. Manila, Philippines: World Health Organization, 2009.
11. World Health Organization. Health in Asia and the Pacific. World Health Organization Regional Offices for South-East Asia and the Western Pacific. Manila, Philippines: World Health Organization, 2008.
12. Anand S, Bärnighausen T. Health workers and vaccination coverage in developing countries: an econometric analysis. *Lancet*. 2007;369(9569):1277-85.
13. Anand S, Bärnighausen T. Human resources and health outcomes: cross-country econometric study. *Lancet*. 2004;364(9445):1603-9.
14. Chen L, Evans T, Anand S, et al. Human resources for health: overcoming the crisis. *Lancet*. 2004;364(9449):1984-90.
15. World Health Organization. Western Pacific Country Health Information Profiles. 2011

Revision. Geneva, Switzerland: World Health Organization, 2011.

16. World Health Organization. Global Health Observatory Data Repository. Geneva, Switzerland: World Health Organization.

17. World Health Organization. Western Pacific Country Health Information Profiles. 2006 Revision. Geneva, Switzerland: World Health Organization, 2006.

18. World Health Organization. Western Pacific Country Health Information Profiles. 2007 Revision. Geneva, Switzerland: World Health Organization, 2007.

19. World Health Organization. Western Pacific Country Health Information Profiles. 2008 Revision. Geneva, Switzerland: World Health Organization, 2008.

20. World Health Organization. Western Pacific Country Health Information Profiles. 2009 Revision. Geneva, Switzerland: World Health Organization, 2009.

21. World Health Organization. Western Pacific Country Health Information Profiles. 2010 Revision. Geneva, Switzerland: World Health Organization, 2010.

22. Scheffler RM, Mahoney CB, Fulton BD, Dal Poz MR, Preker AS. Estimates of health care professional shortages in sub-Saharan Africa by 2015. *Health Aff (Millwood)*. 2009;28(5):w849-62.

23. WHO Regional Office for the Western Pacific. The migration of skilled health personnel in the Pacific Region. Manila, Philippines: World Health Organization, 2004.

24. Diallo K. Data on the migration of health-care workers: sources, uses, and challenges. Bull World Health Organ. 2004;82(8):601-7.
25. Connell J, Brown RP. The remittances of migrant Tongan and Samoan nurses from Australia. Hum Resour Health. 2004;2(1):2.
26. Maron N, Connell J. Back to Nukunuku: employment, identity and return migration in Tonga. Asia Pacific Viewpoint. 2008;49:168-84.
27. Stilwell B, Diallo K, Zurn P, Vujcic M, Adams O, Dal Poz M. Migration of health-care workers from developing countries: strategic approaches to its management. Bull World Health Organ. 2004;82(8):595-600.
28. Brown RP, Connell J. The migration of doctors and nurses from South Pacific Island Nations. Soc Sci Med. 2004;58(11):2193-210.
29. Oman KM, Moulds R, Usher K. Professional Satisfaction and Dissatisfaction Among Fiji Specialist Trainees: What Are the Implications for Preventing Migration? Qual Health Res. 2009;19(9):1246-58.
30. Henderson LN, Tulloch J. Incentives for retaining and motivating health workers in Pacific and Asian countries. Hum Resour Health. 2008;6:18.
31. Willis-Shattuck M, Bidwell P, Thomas S, Wyness L, Blaauw D, Ditlopo P. Motivation and retention of health workers in developing countries: a systematic review. BMC

Health Serv Res. 2008;8:247.

32. Oman KM, Moulds R, Usher K. Specialist training in Fiji: Why do graduates migrate, and why do they remain? A qualitative study. *Hum Resour Health*. 2009;7:10.
33. WHO Regional Office for the Western Pacific. Human Resources for Health: The Pacific Code of Practice for Recruitment of Health Workers in the Pacific Region and the Regional Strategy on Human Resources for Health 2006-2015. Port Vila (VUT): World Health Organization Regional Office for the Western Pacific, 2007.
34. Wyber R, Wilson N, Baker M. New Zealand's impact on health in the South Pacific: scope for improvement? *N Z Med J*. 2009;122(1291):60-8.
35. Negin J. Australia and New Zealand's contribution to Pacific Island health worker brain drain. *Aust N Z J Public Health*. 2008;32(6):507-11.
36. World Health Organization. Global atlas of the health workforce. Geneva, Switzerland: World Health Organization, c2003-2007.
37. World Health Organization. Samoa Commitment. Achieving Healthy Islands: Conclusions and Recommendations. Manila, Philippines: World Health Organization, 2006.
38. World Health Organization. The Health Workforce Issues in the Western Pacific Region. Manila, Philippines: World Health Organization, 2005.

39. Binns, C, Hokama T, Low WY. Island Health: Hope and Challenges for Public Health.

Asia Pac J Public Health. 2010;22(1):19-24.

Table 1. Maternal mortality ratio per 100,000 live births in Pacific Islands Countries and Territories

Country	1999-2002	2003-2006	2007-2010
American Samoa	123.0	NA	NA
Cook Island	0.0	0.0	0.0
Federation of Micronesia	159.7	317.0	0.0
Fiji	35.3	50.5	27.5
French Polynesia	21.1	0.4	22.6
Guam	0.0	0.0	NA
Kiribati	103.0	158.0	0.0
Marshall Islands	73.8	0.0	143.0
Nauru	300.0	NA	NA
New Caledonia	NA	NA	0.0
Niue	NA	0.0	NA
Northern Mariana Islands	0.0	NA	NA
Palau	NA	11.6	0.0
Papua New Guinea	330.0	733.0	NA
Samoa	19.6	3.0	NA
Solomon Islands	125.0	236.0	103.0
Tokelau	0.0	NA	0.0
Tonga	78.2	83.3	36.4
Tuvalu	0.0	0.0	NA
Vanuatu	NA	70.0	86.0

NA = Not available

No data available for Pitcairn Island and Wallis and Futuna

Presented the most updated data during the mentioned period

Table 2: Under-five mortality rate per 1,000 live births in Pacific Islands Countries and Territories

Country	1999-2002	2003-2006	2007-2010
American Samoa	4.9	NA	NA
Cook Island	10.2	11.0	7.1
Federation of Micronesia	NA	41.0	39.0
Fiji	22.4	25.8	23.2
French Polynesia	9.0	14.7	6.5
Guam	12.3	10.0	NA
Kiribati	69.0	69.0	61.0
Marshall Islands	48.0	NA	28.0
Nauru	19.1	37.9	37.9
New Caledonia	9.1	NA	NA
Niue	NA	0.0	NA
Northern Mariana Islands	7.4	NA	NA
Palau	29.0	23.1	12.2
Papua New Guinea	88.0	74.7	NA
Samoa	13.7	13.0	15.0
Solomon Islands	73.0	52.0	37.0
Tokelau	0.0	NA	0.0
Tonga	13.9	NA	19.7
Tuvalu	25.4	32.4	24.6
Vanuatu	NA	36.0	31.0

NA = Not available

No data available for Pitcairn Island and Wallis and Futuna

Presented the most updated data during the mentioned period

Table 3: Latest data on density of doctors, nurses and midwives in the Pacific Island Countries and Territories

Country	Density of doctors, nurses and midwives per 1000 population
American Samoa*	2.69
Cook Island**	3.65
Federation of Micronesia	3.04
Fiji	2.48
French Polynesia	6.72
Guam***	0.84
Kiribati	4.30
Marshall Islands	2.92
Nauru	7.41
New Caledonia	7.13
Niue	12.67
Northern Mariana Islands	3.09
Palau	7.26
Papua New Guinea	0.52
Pitcairn islands	No available data
Samoa****	1.21
Solomon Islands	2.32
Tokelau	13.61
Tonga	4.43
Tuvalu	5.11
Vanuatu	1.73
Wallis and Futuna	5.21

All data corresponds to densities after the year 2006

*Data from 2003

**Data from 2004

***Density only for doctors

****Data from 2005

Figure 1: Trends in doctor density during 1996-2010 in the Pacific Island Countries and Territories

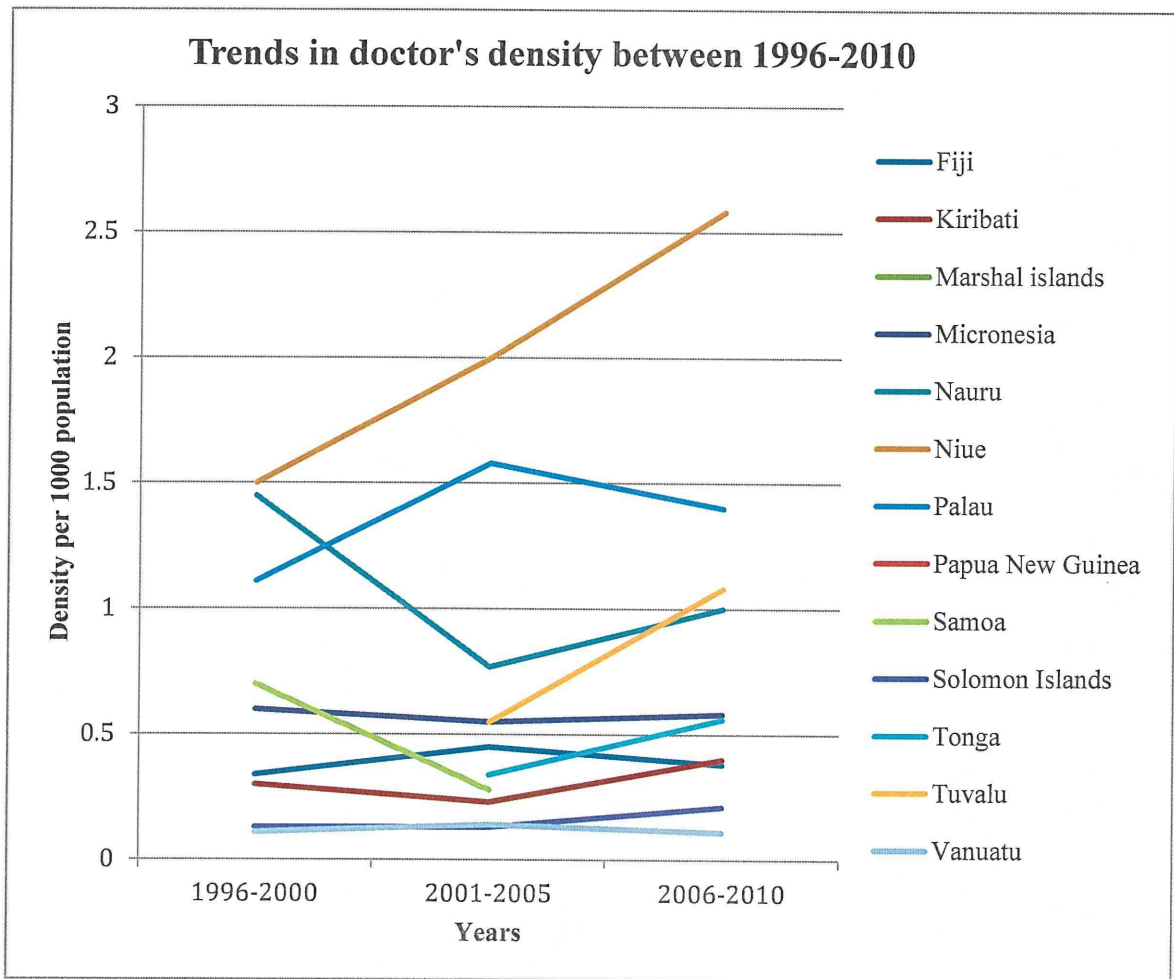


Figure 2: Trends in nurse density during 1997-2010 in the Pacific Island Countries and Territories

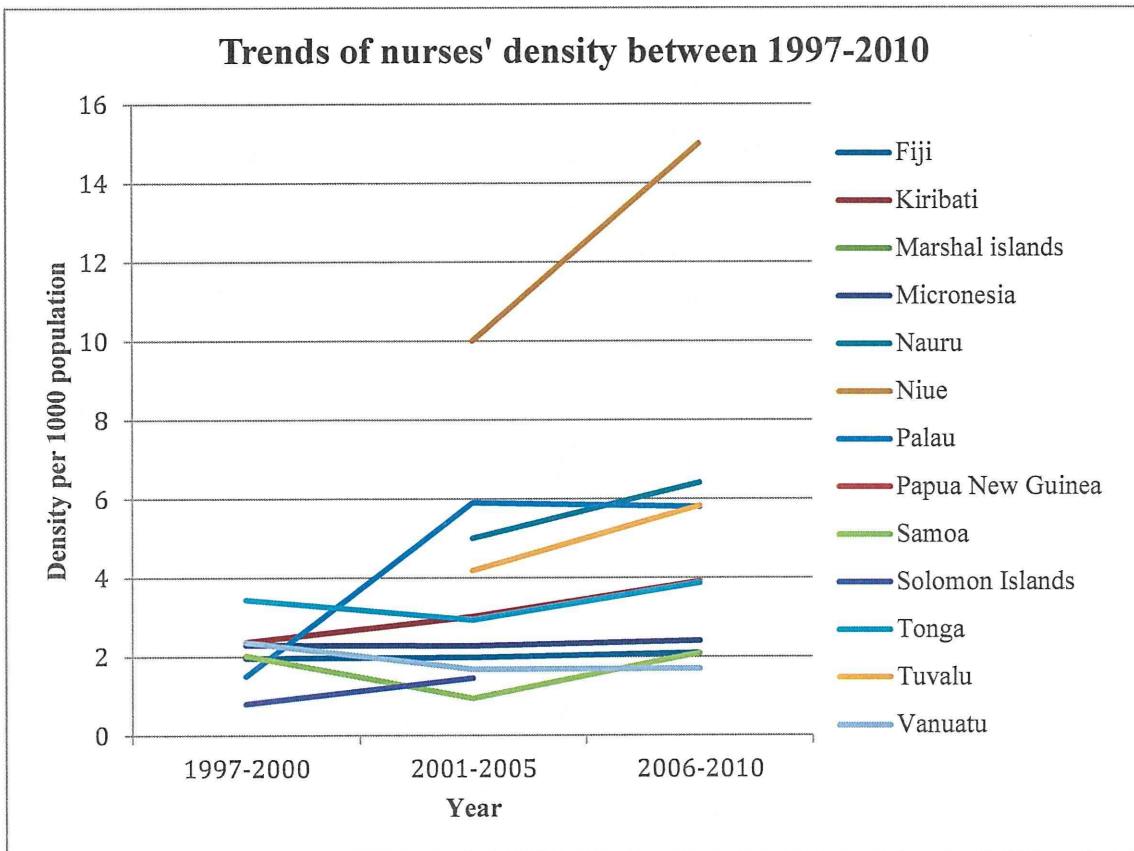


Figure 3: Doctor density levels in relation to the minimum threshold among the Pacific Island Countries and Territories

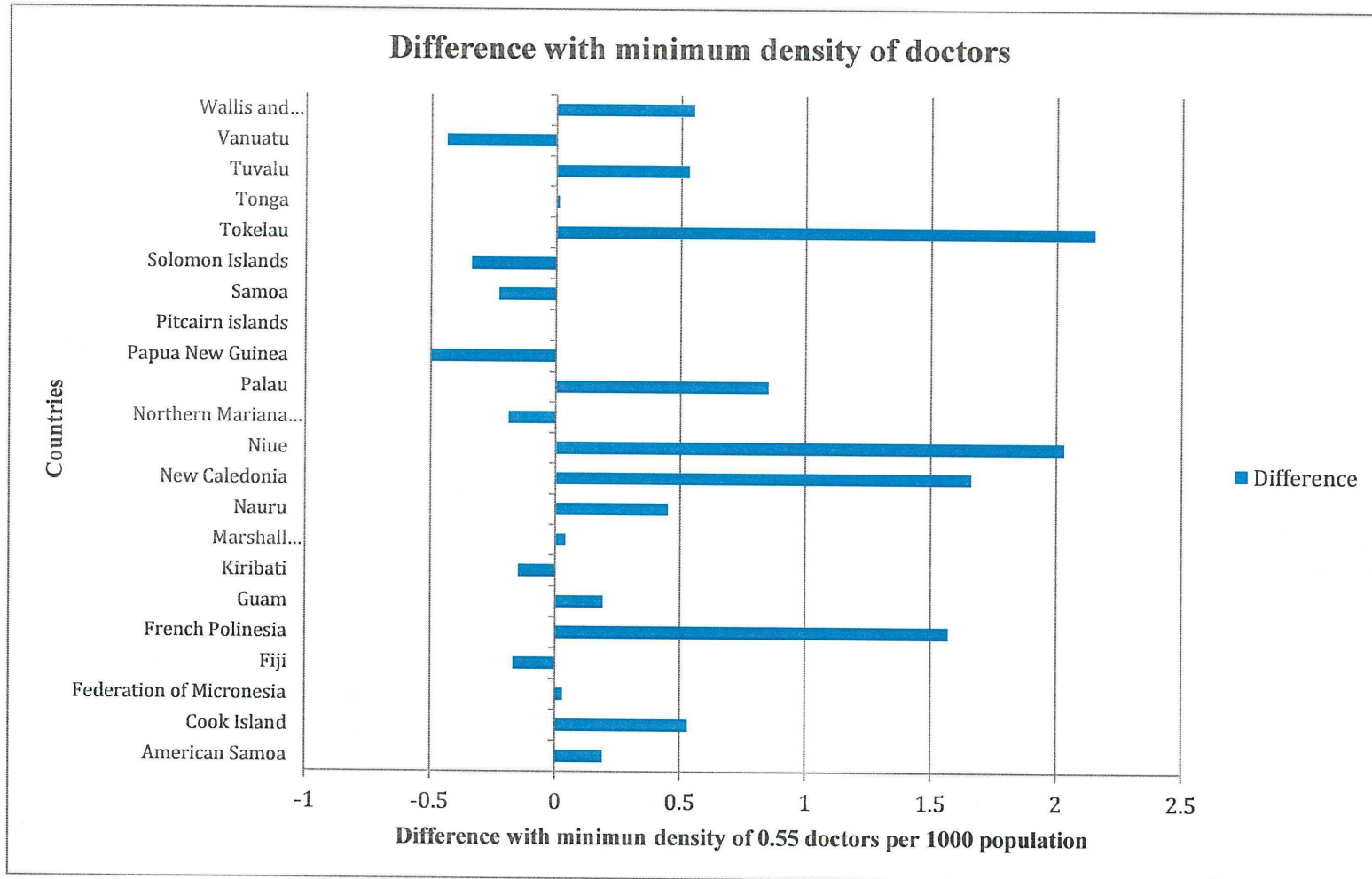
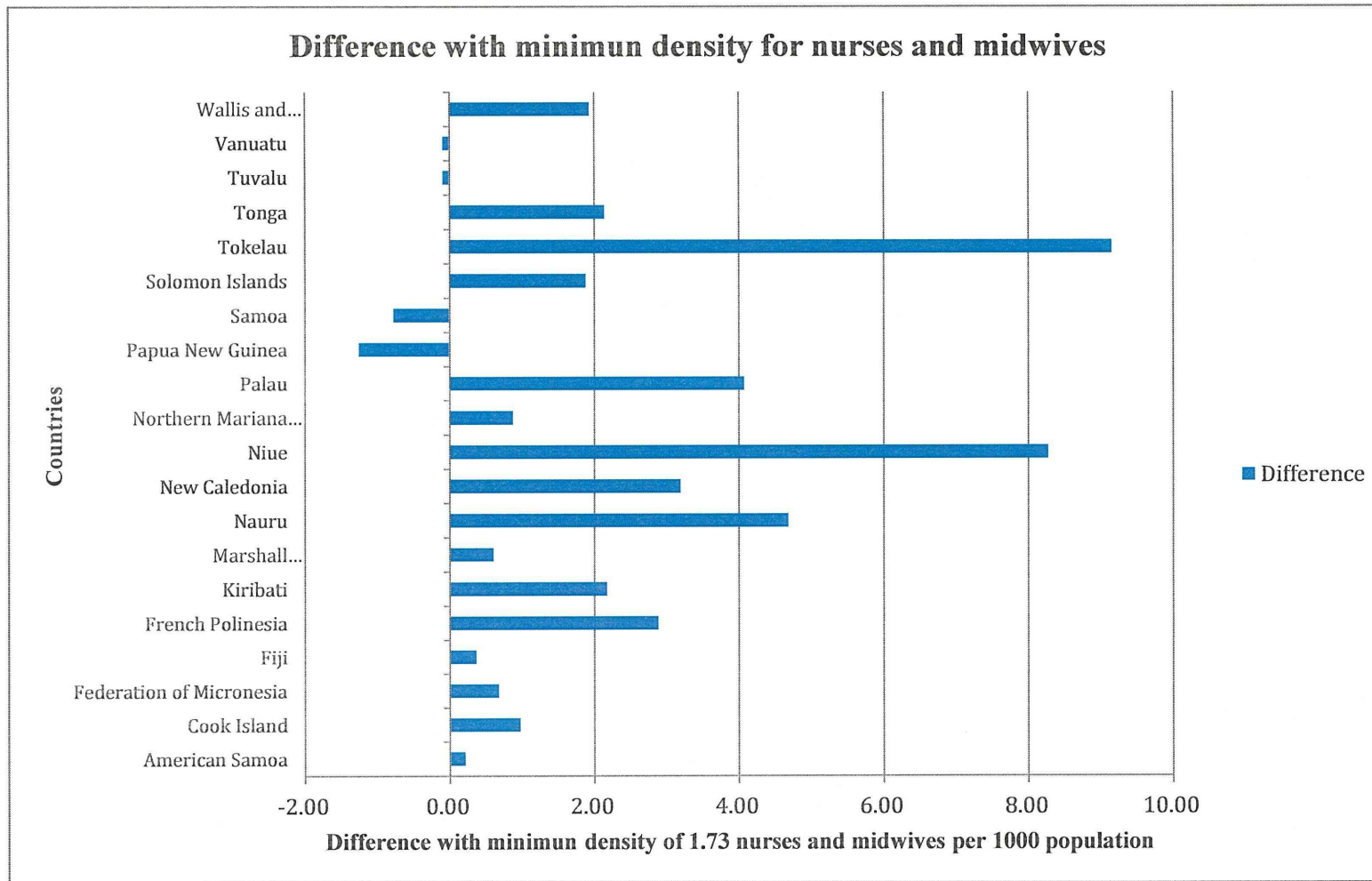


Figure 4: Nurse and midwife density levels in relation to the minimum threshold among the Pacific Island Countries and Territories



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12 April 2012

Prof Masamine Jimba

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Dear Prof Masamine Jimba,

Re: APJPH Special Section of July 2012 Issue: Migration of Health Workers in the Pacific Islands: A Bottleneck to Health Development.

We are pleased to inform you that your manuscript has been accepted for publication and it will be published in the APJPH Special Section of July 2012 Issue.

Thank you for your contribution. On behalf of the Editors of the Asia-Pacific Journal of Public Health, we look forward to your continued contributions to the Journal.

Yours Sincerely,

A handwritten signature in black ink, appearing to read "Wah-Yun Low", is written over a horizontal line. The signature is stylized and cursive.

Prof Wah-Yun Low
Editor-in-Chief

Asia Pacific Journal of Public Health
C/o Medical Education Research Development Unit (MERDU)
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RESEARCH

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Scale-up of community-based malaria control can be achieved without degrading community health workers' service quality: the Village Malaria Worker project in Cambodia

Junko Yasuoka^{1*}, Krishna C Poudel¹, Po Ly², Chea Nguon², Duong Socheat² and Masamine Jimba¹

Abstract

Background: Malaria control has been scaled up in many developing countries in their efforts to achieve the Millennium Development Goals. Cambodia recently scaled up their Village Malaria Worker (VMW) project by substantially increasing the number of VMWs and expanding the project's health services to include treatment of fever, diarrhoea, and Acute Respiratory Infections (ARI) in children under five. This study examined if the scale-up interfered with VMWs' service quality, actions, and knowledge of malaria control, and analysed VMWs' overall achievements and perceptions of the newly added health services.

Methods: Structured interviews were conducted pre scale-up in February-March 2008 with 251 VMWs and post scale-up in July-August 2010 with 252 VMWs. Comparing the pre and post scale-up survey results ($n = 195$), changes were examined in terms of VMWs' 1) service quality, 2) malaria prevention and vector control actions, and 3) knowledge of malaria epidemiology and vector ecology. In addition, VMWs' newly added health services were descriptively analysed based on the post scale-up survey ($n = 252$).

Results: VMWs' service quality and actions significantly improved overall during the scale-up of the VMW project (mean index score: $+0.805$, $p < 0.001$; $+2.923$, $p < 0.001$; respectively). Although most of knowledge areas also showed significant improvement (between $+0.256$ and $+0.499$, $p < 0.001$), less than half (10.3%-47.7%) of the VMWs correctly answered a set of questions on malaria epidemiology and vector ecology, even in the post scale-up survey. About 70% of the respondents reported that their health services to control malaria remained the same or that they were more active after the scale-up. Two-thirds (66.3%) had become more enthusiastic about serving as a VMW since the scale-up, and all but one respondent reported being willing to continue the new services.

Conclusions: The Cambodian experience clearly demonstrated that a nationwide scale-up of community-based malaria control can be achieved without degrading community health workers' service quality. The government's strategy to expand VMWs' health services, while providing sufficient training to maintain the quality of their original malaria control services, could have contributed to the improvement of VMWs' service quality, actions, and knowledge in spite of the rapid scale-up of the project.

Keywords: Scale-up, Malaria control, Community health workers, Service quality, Cambodia

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Background

There is a growing consensus that it is critical to scale-up national malaria control programmes in affected countries to meet the Millennium Development Goal (MDG) target for reducing malaria [1]. Since 2005, the concept of Scale-Up for Impact (SUFi) has also been endorsed by the Roll Back Malaria Partnership. It aims at achieving widespread coverage of a set of preventive and treatment interventions that will lead to a dramatic reduction in the global disease burden that malaria poses [2,3]. Rapid and accelerated coverage increase is considered to achieve a substantial burden reduction and added benefit from accelerated scale-up, compared to gradual incremental coverage increase [1].

Malaria control has been scaled up in a number of low- and middle-income countries during the last several years [4-8], and its effectiveness of reducing malaria mortality and morbidity has been demonstrated in several studies [3,5]. In Ethiopia and Rwanda, long-lasting insecticidal nets and artemisinin-based combination therapy that had been distributed nationwide by 2007 reduced in-patient malaria cases and deaths in children under five by > 50% [8]. Zambia has reduced child parasitaemia and severe malaria by > 50% and child mortality by > 30% through scaling up a package of malaria interventions [9]. According to a study that explored the relationship between all-cause child mortality and malaria mortality in sub-Saharan Africa, if malaria control interventions were scaled up to achieve 70% coverage, malaria mortality could be reduced by 50% [2].

Scale-up can only be achieved by substantially increasing the delivery of malaria interventions and requires an adequate number of well-trained human resources [1]. Therefore, community health workers have come to receive much attention in promoting scale-up of disease control and achieving MDGs [10-12]. However, there is a massive global shortage and mal-distribution of health workers [13-15] and hence an urgent need of task shifting by making more efficient use of the existing cadres and to train new cadres to expand the health workforce [11,16,17]. In order to approach the MDGs, sub-Saharan African countries need to triple their health workers by adding one million workers through retention, recruitment, and training [14]. All Southeast Asian countries also struggle with the mal-distribution of health workers, especially in rural areas [15].

To strengthen the national malaria control programme through training more community health workers, Cambodia's National Centre for Parasitology, Entomology and Malaria Control (CNM) recently scaled up their Village Malaria Worker (VMW) project. This project was initiated in a remote province in 2001 and gradually expanded until 2008, identifying malaria-prone villages, where two VMWs were selected through community consensus in

each village. Trained VMWs are supposed to perform rapid diagnostic tests (RDTs) on any villager suspected of having malaria, to provide anti-malarials for test-positive cases, according to the national guidelines, and to refer severe cases to hospitals. They are also encouraged to conduct active case detection, record fever cases and positive RDT results, follow up patients, and provide information on malaria preventive measures to their villagers. Their services are directly supervised by the CNM staff in two ways: 1) check VMWs' records and resupply RDT kits and medications at monthly meetings held at health centers in each region, and 2) visit each VMW village twice a year to monitor VMW activities and observe their relationship and communication with villagers [18].

The scale-up took place in 2009 with technical support from the World Health Organization (WHO) and financial support from three international donors. The VMW project was scaled up in three dimensions: the number of VMWs was increased, the number of villages with VMWs was increased, and the range of the project's health services was expanded. Approximately 2,000 new VMWs were trained in malaria prevention, diagnosis, and treatment. At the same time, the number of villages with VMWs more than quadrupled from 315 in seven provinces to 1394 in 17 provinces.

Furthermore, the health services provided by all the VMWs in original 315 villages, who had already been trained and started malaria control services by 2008, were expanded. These VMWs participated in a newly developed three-day training programme, which covered fever, diarrhoea, and ARI case management and prevention for children under five (Figure 1), in addition to a two-day refreshers' training programme on malaria control. Most of the VMWs initiated their new health services within a month or two, utilizing the training material and medicine supplied by the CNM.

Expanding the VMWs' health services was an attempt to merge the VMW scheme with the country's Integrated Management of Childhood Illnesses (IMCI) [19]. Integration of the fever, diarrhea, and ARI interventions became possible in collaboration with the IMCI programme and the National Programme for ARI, Diarrhoea and Cholera under the Ministry of Health (MoH). The necessary medications (paracetamol, oral rehydration salts (ORS), zinc, and cotrimoxazol) were procured and supplied through the MoH, utilizing funding from the WHO. This attempt reflects a recent recommendation made by several researchers to link a vertical approach that promotes disease-specific control programmes with a horizontal approach that focuses on strengthening the overall structure and functions of a health system in order to make a "diagonal approach" that could impact health systems and improve overall health status [20-23].



Figure 1 Sample artwork from VMW training material for diarrhoea treatment of children under five.

This study examined whether the scale-up of the VMW project with the additional health services interfered with the VMWs' original services to control malaria. By comparing VMWs' service quality, actions, and knowledge of malaria control before and after the scale-up, changes in their performance were detected, and determinants of these changes were identified. This study also descriptively analysed VMWs' overall achievements, perceptions, and knowledge regarding the additional health services they performed.

Methods

Data collection

This study was conducted in 7 remote provinces of Cambodia where 315 VMW villages had been established prior to 2008: Rattanakiri, Kratie, Mondurkiri, Stung Treng, Kampong Thom, Kampot, and Preah Vehear. Pre scale-up survey was conducted from February-March, 2008, as described in a previous paper [18]. Post scale-up data was conducted from July-August, 2010. In both surveys, face-to-face interviews were conducted by trained surveyors, targeting the head VMW who leads the malaria control activities in each of the 315 VMW villages.

In the pre scale-up survey, a structured questionnaire with 46 questions addressed the VMWs' 1) socio-demographic characteristics, 2) service quality, 3) actions to prevent malaria and control vectors, and 4) knowledge of malaria epidemiology and vector ecology [18]. The post scale-up survey questionnaire had 16 additional questions to examine VMWs' new health services to treat fever, diarrhoea, and ARI in children under five in terms of 1) the VMWs' overall achievements and perceptions of the new services, 2) changes in VMWs' workload for malaria control since service expansion, and 3) accuracy of VMWs' knowledge of treatment. Both questionnaires were developed in English, translated into Khmer by local malaria experts, back-translated to English by another expert, and piloted on VMWs in Kampot province.

Measures: quality, action, and knowledge indices

As described in detail in our previous paper, a "Quality index", an "Action index", and "Knowledge index" were developed, based on respondents' answers to the survey questions [18]. Briefly, the Quality index measured the quality of VMWs' services for malaria control, focusing on five items: active detection, diagnosis and treatment, prescription of anti-malarials, follow-up of patients, and dissemination of preventive measures. The score for each item was calculated as [total points divided by maximum points], so that each item was given a maximum of 1 point, and was added up to create the index. The Action index was developed to quantify the different malaria preventive and vector control measures the VMWs took. Each measure was given either 1 or 2 points, depending on its effectiveness and frequency. The Knowledge index measured quantified VMWs' understanding of malaria epidemiology and vector ecology: malaria symptoms, malaria transmission, vector species, vector active time, vector development time, breeding places, and natural enemies.

Newly added services for fever, diarrhoea, and ARI treatment

VMWs were asked about how long they had been offering the new services and the number of diarrhoeal and ARI patients they treated per month. Three questions assessed changes in their workload since the service expansion, especially on the perceived change in the activeness for malaria control and in their enthusiasm about serving as a VMW. Two questions addressed their willingness to continue the new services and support needed, and six questions examined whether knowledge of fever, diarrhoea, and ARI treatment was accurate, focusing on the prescription of medicine (correct dosage of paracetamol, ORS, and cotrimoxazole, and how to prescribe them) and the need of referring patients to a hospital, depending on patients' age and severity.