

Pacific Diabetic Retinopathy Programme

Evaluation report

Report prepared for The Fred Hollows Foundation (NZ)

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We were impressed with the dedication and commitment of the FHFNZ staff and health sector personnel to reducing the impact of diabetic retinopathy in their communities.

List of abbreviations

Abbreviation	Description
CEO	Chief Executive Officer
CHW	Community Health Worker
CWM	Colonial War Memorial Hospital (Fiji)
DFAT	Department of Foreign Affairs and Trade (Australia)
DON	Director of Nursing
DR	Diabetic Retinopathy
FHFNZ	Fred Hollows Foundation New Zealand
FNU	Fiji National University
GNI	Gross National Income
GP	General Practitioner
HDI	Human Development Index
IDF	International Diabetes Federation
KEQ	Key Evaluation Questions
METI	Metuaileoo Environment Trust Inc (Samoa)
MFAT	Ministry of Foreign Affairs and Trade
MHMS	Ministry of Health and Medical Services (Solomon Islands and Kiribati)
MMed	Master of Medicine (Ophthalmology)
MOH	Ministry of Health
MoU	Memorandum of Understanding
MTII	Malietoa Tanumafili II Hospital (Savai'i)
NCD	Non-communicable disease
NGO	Non-Governmental Organisation
NHS	National Health Service (Samoa)
NRH	National Referral Hospital (Honiara)
PEEK	Portable eye examination kits
PEI	Pacific Eye Institute
PEN	Package of Essential Noncommunicable Disease Interventions
PGCDEC	Post-graduate Certificate in Diabetic Eye Care
PGDEC	Post-graduate Diploma in Eye Care
PGDO	Post-graduate Diploma of Ophthalmology
PIC	Pacific Island Country
REC	Regional Eye Centre (Solomon Islands)
RMT	Results Measurement Table
TTM	Tupua Tamasese Meaole Hospital (Samoa)
UNDP	United Nations Development Programme
VCH	Vila Central Hospital
WHO	World Health Organization

Contents

1. Executive Summary	6
1.1 Introduction and background.....	6
1.2 The evaluation.....	6
1.3 Findings	7
1.4 Recommendations	9
2. Background.....	11
2.1 Context	11
2.2 Overview of the FHFNZ DR Programme	13
2.3 The Pacific Diabetic Retinopathy Programme	14
2.4 Evaluation purpose, objectives and scope	16
2.5 Key evaluation questions.....	17
2.6 Design and methods.....	17
2.7 Strengths and limitations	18
2.8 Structure of the report	19
3. Relevance.....	20
3.1 Population health factors	20
3.2 Governments’ health priorities	21
3.3 Relevance of programme activities	22
4. Impact and sustainability.....	23
4.1 Impact.....	23
4.2 Sustainability	25
5. Effectiveness and Efficiency	30
5.1 How the Trust DR programme has enhanced their existing DR programme	30
5.2 Changes to the implementation of the programme	30
5.3 Factors which have influenced the success of the programme	31
5.4 Factors which have impeded the success of the programme	31
5.5 Measurement of results	32
5.6 Efficiency	40
5.7 Integration and collaboration.....	44
6. Equity and Access	48
6.1 Gender.....	48
6.2 Geographically isolated populations	49
7. Conclusions.....	51
7.1 How successful has the programme been in integrating DR into existing Government health strategies and improving the sustainability of services?	51
7.2 To what extent has the programme met its planned results and targets?	52

7.3 What changes to the programme would improve its effectiveness?	53
7.4 What lessons can be learnt from this programme that could guide future integrated programmes?	54
8. Recommendations.....	56
8.1 Recommendations for the DR Programme	56
8.2 Recommendations for integrated programmes in the future.....	58
9. Case Studies.....	60
9.1 Samoa.....	60
9.2 Vanuatu	61
Annexe 1: Glossary	61
Annexe 2 Queen Elizabeth Diamond Jubilee Trust - Theory of change	63
Annexe 3: Evaluation Framework.....	64
Annexe 4: Evaluation Participants	66
Annexe 5: What has been provided under the Trust funding	68
Annexe 6: Bibliography and References	72

Tables

Table 1: Human development context for the six Pacific Island countries covered.....	11
Table 2: Relevant health indicators of the target countries.....	20
Table 3: Priority given to NCD, diabetes and DR in national health plans and reports.....	21
Table 4: Quantitative results against the RMT.....	33
Table 5: Summary of activities against key outputs.....	33
Table 6: The extent to which eye health services are integrated.....	44
Table 7: Country specific recommendations.....	57
Table 8: Evaluation Framework.....	64
Table 9: Evaluation participants.....	66
Table 10: What has been provided under Trust Funding.....	68

Figures

Figure 1: Results Framework of the Pacific DR programme.....	16
Figure 2: Total spend of Trust funding as compared to planned spend.....	42
Figure 3: DR screenings by gender.....	47
Figure 4: Queen Elizabeth Diamond Jubilee Trust – Summary Theory of Change.....	63

1. Executive Summary

1.1 Introduction and background

This evaluation was commissioned by The Fred Hollows Foundation (NZ) (FHFNZ) to assess the contribution of the Pacific Diabetic Retinopathy Programme ('the DR Programme'), funded by the Queen Elizabeth Diamond Jubilee Trust ('the Trust') between 2015-2018, to developing a sustainable future for DR service provision across six Commonwealth countries in the Pacific region over the period. The programme continues until June 2019.

The Fred Hollows Foundation (NZ) is a registered charity and charitable trust in New Zealand that works to further and expand the work of Fred Hollows, the world-renowned Kiwi eye surgeon and humanitarian. FHFNZ has worked in the Pacific for many years to eliminate blindness and reduce visual impairment by providing access to sustainable, high quality, comprehensive care. FHFNZ works in the Pacific where 4 out of 5 people who are blind don't need to be as their condition is preventable or treatable. FHFNZ restores sight to the needlessly blind and trains local eye health specialists to provide eye care services in their own communities. Every year, Foundation-trained eye health specialists perform thousands of sight-restoring surgeries at our clinics and through our surgical outreach programme.

In 2009, FHFNZ initiated a diabetes eye-care programme in Fiji to focus on strengthening and treatment of diabetic retinopathy (DR) and developed training programmes in diabetes eye care for clinicians across the Pacific. The programme was subsequently rolled out in other Pacific countries. In 2015, FHFNZ was granted £1,040,855 funding from the Trust to upscale and expand their programme in Fiji, Kiribati, Solomon Islands and Vanuatu. This was increased to £1,500,000 in 2016 to extend the programme to Samoa and Tonga. This funding was augmented by contributions from The Fred Hollows Foundation and FHFNZ to a total programme budget of £2,289,460.

One size does not fit all. The Pacific DR programme is tailored to each country's capacities to implement key activities. It has supported specialist eye health training in DR for nurses and medical practitioners, shorter workshops and training in DR awareness for nurses, community health workers, consumers and general practitioners; a range of health promotion activities and development of resources; and provision of equipment for screening and treatment of DR. The delivery of the programme is managed by FHFNZ with local DR coordinators appointed in each country to manage the specific activities in their countries.

The Fred Hollows Foundation is a registered charity in Australia which seeks to promote and continue the work of late Professor Fred Hollows, pioneering ophthalmologist and social activist, particularly in relation to eradication avoidable blindness and in ensuring that the poorest people can access and receive quality eye health services. The Fred Hollows Foundation works with partners in developing countries to build sustainable eye health systems and with partners in Australia to improve both the eye and general health of indigenous people. The Fred Hollows Foundation is the grant manager of the programme.

1.2 The evaluation

The evaluation was carried out between June and November 2018. It examined the progress of the programme from 2016 – June 2018 towards meeting the long-term outcomes and analysed the impact of the programme model in establishing a long-term sustainable system to tackle diabetes and its associated threat on blindness in the Pacific.

The objectives of the evaluation were:

1. to evaluate the success of the programme in integrating DR into existing government strategies and improving the sustainability of the National health systems in the region
2. to evaluate the programme outcomes against their intended results and country specific targets
3. to identify any changes required to meet targets and improve effectiveness, detecting any risks to the overall programmes and the achievement of their targets, and
4. to identify learnings that can be shared across the region, specifically with Ministries of Health, and globally, to guide the development and implementation of integrated DR health systems.

The primary intended users of the evaluation findings are FHFNZ, The Fred Hollows Foundation and the Queen Elizabeth Diamond Jubilee Trust. It is expected, however, that the evaluation will contribute to the evidence base for international eye health non-governmental organisations (NGOs) working to eliminate avoidable blindness in many parts of the world. They will also be shared with the Ministries of Health and eye care workforces of Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu - the respective programme countries.

The evaluation, in order to study the extent of service strengthening, covered not only eye health services, particularly DR eye health services, but also examined the impact of the programme on services and outcomes for diabetes and the relationship between the two.

The evaluation focused on four main areas:

1. to what extent have the programme activities been incorporated into the health service plans and service delivery in the target countries
2. how the DR programme has contributed to the observed results and what contextual factors may affect the achievement of results
3. what factors were most significant in driving improvement at different levels in the health system, and
4. what can be further done to sustain the gains made?

To explore issues of how and why the DR programme made a difference, the evaluation drew on a contextual review and analysis of the disease burden in the target countries, and evaluative judgements on the relevance, impact, sustainability and effectiveness of the investments. A prospective focus includes recommendations both for the remaining period of the current activity and also, more broadly, for future investments.

The evaluation methodology included a review of documents, an analysis of health service delivery and outcome statistics from FHFNZ and the countries involved; interviews with 89 key stakeholders plus FHFNZ staff with fieldwork in Fiji, Samoa, Solomon Islands and Vanuatu; and a sense-making workshop with FHFNZ staff following the fieldwork.

1.3 Findings

The evaluation has concluded that the DR programme has increased the momentum towards achieving sustainable approaches to addressing diabetic retinopathy in the target countries: Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu. Overall, the programme has had a significant impact on strengthening and expanding DR services through increasing the capability and capacity of the workforce and equipping health workers to provide effective DR services. The key achievement is a significant increase in awareness and knowledge about DR and its relationship to diabetes which has increased the demand for DR services and the expansion of the services to meet the demand.



Relevance of the programme is high in all the target countries due to:

- the high prevalence of diabetes
- reported high levels of undiagnosed DR
- loss of productivity and costs of health service provision, and
- alignment with some government health policies.

The programme activities are relevant to the needs of the countries.



The **sustainability** of programme activities is dependent on a source of funding, the inclusion of DR in national plans and strategies, and sufficient staff capability and capacity.

Most activities will likely be sustainable in the short and medium term to some extent, with the services being supported by FHFNZ and PIC governments.



The programme's **impact** varies significantly between countries depending on when the programme was introduced.

It has significantly strengthened and expanded DR services and increased awareness amongst health professionals and members of the public.

The evaluation was unable to assess the proportion of diabetes patients presenting for screening and treatment as there was not enough data to undertake this assessment.

The key indicator of the programme's **effectiveness** is overall increases in DR screening and treatments (in some countries more than others).

The programme has enabled FHFNZ to build on their existing DR Programme to increase the gains through:

- funding training of the eye health workforce
- providing equipment
- increasing access to and provision of healthcare services, and
- increasing community and health workforce awareness.



Success factors included:

- Tailoring delivery to the specific conditions in each country
- the appointment of DR coordinators in each country
- the strengths of the DR coordinators.

The **efficiency** of the programme is difficult to measure, but factors contributing to efficiency include:

- collaboration between diabetic and NCD services
- targeting awareness and health promotion activities, and
- contextualising the implementation of the programme.

Return on investment is estimated to be quite high in terms of preventing avoidable blindness.



There has been an underspend to date, due to delays in some countries and budget re-assigning when planned projects proved non-viable. We understand that the full budget is expected to be acquitted by the project end in June 2019.



Integration and Collaboration of DR services with diabetic and other health services has improved, but more integration would increase effectiveness, efficiency, and sustainability.

Referral systems have been established and improved in some countries, but could be strengthened further and require robust data collection processes (which are currently lacking).



Equity and Access in this evaluation was limited to gender and geographic access as information on other parameters was not available.

- More women than men presented for DR screening, and
- Screening and treatment for remote populations remains an issue in all countries, despite regular outreaches.

Changes that may have improved the programme's effectiveness

FHFNZ has monitored the progress of the programme and amended the activities over its lifespan to accommodate new information and emerging issues which has helped to keep the programme relevant and effective. The evaluation identified the following factors that would have strengthened the programme:

- Strengthening the integration between non-communicable diseases (NCD) and eye health services in relation to DR
- Developing clear patient referral pathways
- Increasing involvement and communication in programme planning and monitoring
- Improving data collected and reported, and
- Increasing awareness training, particularly in larger population centres.

Lessons to guide future integrated programmes

Reflecting on the experiences of FHFNZ in implementing the DR programme, the following lessons applicable to other integrated programmes in the Pacific and also wider afield have been identified.

- The Pacific is not a case of 'one size fits all'
- Building leadership and country ownership takes time, but is critical for sustainability
- Long term success is more likely when activities leverage off established systems and processes, and
- Activities need to be well-supported by robust monitoring and reporting.

1.4 Recommendations

The evaluation includes two sets of recommendations: one for short-term amendments to the current programme which finishes in June 2019 and one to guide the development of future programmes.

Recommendations for the DR Programme

FHFNZ is already aware of many of these issues and is currently addressing them within the final six months of the programme or in their proposals for further activity to address DR. The evaluation recommends that FHFNZ:

1. Focuses on planning for the DR programme that follows the Trust funded programme
2. Works with governments to strengthen the inclusion of DR in national plans and strategies; and strengthen partnerships with NCD unit/department and diabetic services
3. Strengthens partnerships with NCD and diabetic services
4. Focuses awareness training programmes in areas that have not been covered
5. Considers developing training programmes in screening for DR that are more accessible to nurses who are not specialist eye health nurses
6. Gives priority to treating patients who have been screened and identified as needing treatment
7. Works with governments to ensure that funding is released to purchase all planned equipment, and
8. Increases health promotion activities with particular investment in resources and initiatives that are likely to have the most benefit.

Country specific recommendations

Specific recommendations for each country are set out in Section 8.1 of the report.

Recommendations for such integrated programmes in the future

There are two recommendations for future programmes:

- Tailoring the programme to the individual country, and
- Ensuring that the eye health and diabetes services work together in the most effective way possible.

2. Background

This section provides some context for FHFNZ's interest in diabetic retinopathy in the Pacific, and provides information on the purpose of the evaluation, its associated methodology and an overview of the structure of the report.

2.1 Context

The countries that the DR Programme targets - Fiji, Solomon Islands, Vanuatu, Kiribati, Samoa and Tonga - are quite diverse with different social determinants of health, health service organisation and administration, economies and cultures.

The geographic distribution of the populations of these small island countries, with many inhabited islands spread over hundreds of thousands of square kilometres of sea, creates immense challenges in providing health services with some islands very remote and only accessed by boat. For example, Fiji has over 100 inhabited islands and Solomon Islands over 90. Kiribati is one of the most remote and geographically-dispersed countries in the world, with 33 islands spread over 3.5 million square kilometres of ocean.

Table 1: Human Development Context for the six Pacific Island countries covered¹

	Fiji	Kiribati	Samoa	Solomon Islands	Tonga	Vanuatu
Human Development Index ²	High	Middle	High	Low	High	Middle
HDI Rank	92	134	104	152	98	138
Population ³	910,000	110,000	196,000	600,000	100,651	272,500
Life expectancy (years)	70.4	66.5	75.2	71	73.2	72.3
Gross National Income (GNI) Category	Upper Middle	Lower Middle	Upper Middle	Lower Middle	Upper Middle	Lower Middle
Gross National Income per capita	\$8324	\$3042	\$5909	\$1872	\$5547	\$2995

Diabetes

Diabetes is a global epidemic. The Pacific has some of the highest rates of diabetes in the world. While the global prevalence is 8.5%,⁴ the prevalence in the Pacific is generally much higher. Owing to the limited accessibility to primary health services, inadequately established public health systems, lack of access to healthy food choices and the geographical isolation of these small islands developing states, the damaging impact of diabetes is, and increasingly will be, the most on these vulnerable populations.

¹ United Nations Development Programme (UNDP) *Global Human Development Indicators: 2018 Statistical Update* cited from <http://hdr.undp.org/en/2018-update>

² The Human Development Index is a statistic composite index of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development. Countries are ranked out of 189.

³ These figures are taken from the latest census in each country, cited in https://en.wikipedia.org/wiki/List_of_Oceanian_countries_by_population (17 August, 2018)

⁴ <https://data.worldbank.org/indicator/SH.STA.SIAB.ZS?locations=KI&view+chart> (accessed 9 August, 2018)

Diabetes is a chronic, progressive disease characterised by elevated levels of blood glucose. Diabetes is among the top ten causes of disability and death internationally. Diabetes is also a major cause of visual impairment and blindness - due to retinopathy - and other complications such as renal failure and lower limb amputation. Occurrence of complications, including retinopathy, can be prevented by early diagnosis and effective management and treatment of diabetes.

Globally, the number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014 and it is estimated that 75% of people with diabetes live in lower or lower middle income countries.⁵ Diabetes caused 1.5 million deaths in 2012 with high blood glucose causing an additional 2.2 million deaths. Diabetes imposes large economic burdens on healthcare systems and the economy of the country. The costs include the direct medical costs of preventing and treating diabetes and its complications and indirect costs of loss of productivity, disability and premature death. WHO estimates that people with diabetes require at least two to three times more in healthcare resources and may account for up to 15% of national health care budgets.⁶

Diagnosis and treatment of diabetes is particularly challenging in lower and lower middle income countries, where World Health Organization (WHO) reports only one in three countries have the most basic technologies for diabetes diagnosis and management available in primary health-care facilities and many countries lack access to affordable insulin for treatment and prevention of complications.⁷ Clear illustrations of some of the challenges in the region are provided in the NCD Roadmap report.⁸

- The estimated average cost of dialysis for patients with renal failure in Samoa was \$38,686 per patient per year in 2010/2011 (more than 12 times the GNI per capita of Samoa).
- Glucose testing strips for a diabetes patient in Vanuatu cost \$0.45 cents per day which equals \$164 per patient per year, more than the total government expenditure on health per capita.
- One patient requiring insulin absorbs the equivalent notional drug allocation of 76.4 other citizens in Vanuatu which means that only 1.31% of the population could be treated with insulin before the total Government pharmaceutical and medical supplies budget is expended.

Diabetic Retinopathy

Every person with diabetes is at a risk of developing DR which is a cause of visual impairment and irreversible blindness worldwide but particularly in the Pacific. There is, therefore, a high economic cost of not addressing DR. Blindness from diabetes results from damage to blood vessels in the retina. In addition, patients whose diabetes is uncontrolled to the extent of having DR, are also vulnerable to other complications of diabetes, such as renal failure and circulatory problems requiring amputation.

It has been estimated that 4.5% of severe vision impairment or blindness globally is caused by DR. Among people with diabetes the prevalence of DR ranges from 35%⁹ - 75%¹⁰. The International Association on the Prevention of Blindness (IAPB) estimates that 145 million people had some form of DR and 45 million people had significant loss of vision in 2015.¹¹

People with DR whose sight is at risk can be treated, usually by laser photocoagulation, to prevent visual impairment and blindness. In low resource countries, such as the Pacific countries studied, treatment options are limited with laser treatment being the main (or, in many cases, only) treatment

⁵ IDF (2017) The Diabetic Retinopathy Barometer Report: Global findings, Brussels

⁶ WHO (2010) Global status report on non-communicable diseases, cited in FHFNZ, Programme Design Document.

⁷ WHO (2016) Global Report on Diabetes

⁸ World Bank (2014) *NCD Roadmap Report*, p.15.

⁹ WHO (2016) Global Report on Diabetes.

¹⁰ Yau, J et al (2012), cited in Vanuatu Non-communicable disease policy and strategic plan 2016-2020, p.11.

¹¹ International Diabetes Federation, (2017) IDF Diabetes Atlas. Eighth edition.

available. There is no treatment, however, that can restore vision that has already been lost. Early intervention and vigilant treatment as well as effective management of the person's diabetes can reduce the incidence and progression of DR.

People at risk of DR are often not aware of the risks of developing it and have limited access to screening and treatment. Unless they are aware of the risks, (and aware that they have diabetes) patients may only present for screening when their vision impairment starts to impact on activities daily living.

“People only come when they cannot read their bible”
(Quote from Samoa Health Services Manager)

Vision impairment can impact on a person's ability to manage their underlying diabetes, such as monitoring glucose levels, operating an insulin pump, and taking medication. This means that people with limited or no access to diagnosis or treatment for DR often need to rely on family members or others for assistance, or have difficulty managing their diabetes which increases the risk of further complications or death.

Screening for DR has wider impacts in controlling the effects of diabetes. For example, early detection of DR can identify previously undiagnosed diabetes which provides an opportunity to manage and treat the diabetes to prevent other complications arising. For this reason, the management of eye health services for DR and medical services for diabetes go hand-in-hand.

Information from the FHFNZ indicates a significant need for the Pacific DR programme. For example,¹²

- More than 75% of people who have had diabetes for more than 20 years will have some form of DR (WHO, 2005).
- Over the next 20 years as the number of people with diabetes in lower middle income countries increases, the contribution of DR to blindness can be expected to increase.
- The vast majority of patients who develop DR have no symptoms until the very late stages by which time it may be too late for effective treatment.

2.2 Overview of the FHFNZ DR Programme

FHFNZ aims to eliminate avoidable blindness and reduce visual impairment in the Pacific Islands and Papua New Guinea by providing access to sustainable, high quality, comprehensive eye care. The organisation has a pragmatic approach to eye health that reflects the values of its founder, Professor Fred Hollows. It switches the belief of access to affordable, quality eye-care from being a privilege to a basic human right.

Apart from treating visual impairment in the Pacific, growing the local workforce has also been a significant part of its strategy. Due to a shortage of eye doctors and nurses in the region, training, resourcing and supporting a regional workforce employed by local Ministries of Health is a prerequisite for a sustainable solution. Investing in training and improving locally-provided eye care has a significant immediate impact and is a cost-effective way to improve quality of life and health outcomes across the region both now and for many years to come. FHFNZ takes a long-term view by operating within, thereby strengthening, public health systems rather than delivering parallel,

¹² FHFNZ, (October 2014) *Tackling Diabetic Retinopathy in the Pacific*, Programme Design Document.

privately-managed eye care. FHFNZ works within public health systems to strengthen and support them to the point of taking responsibility for a well-equipped, high quality eye care service. This approach takes time and is not without significant challenges but ensures that the outcome is appropriate for local communities, effective, locally-owned and sustainable in the long term.

The organisation has a four-pillar approach which aims to:

1. restore and preserve sight
2. train and support the regional eye care workforce
3. strengthen the local health systems, and
4. drive innovation and research.

In 2009, FHFNZ responded to the lack of information about diabetes and eye health in Fiji by undertaking a population-based diabetes and eye health survey to determine the presence and extent of DR. The FHFNZ research team concluded that given the high prevalence of diabetes and the poor control once diagnosed that was found in the survey, developing screening and management systems for DR was a priority. This was the context for the Fiji Diabetes Eye Care Programme, which involved strengthening and expanding DR screening and treatment in Fiji accompanied by the development and implementation of training programs in diabetes eye care for nurses and doctors from across the region at Pacific Eye Institute (PEI), Fiji.¹³

The FHFNZ programme collaborates with Ministries of Health and various other stakeholders across Pacific island countries. The PEI and Colonial War Memorial (CWM) Hospital has been providing diabetes eye care screening and treatment services in Suva since 2009. PEI has also been training local doctors and nurses from other Pacific island countries in diabetic eye care as a part of the overall FHFNZ programme. Through this training, FHFNZ seeks to increase capacity for the management of patients with diabetic retinopathy as a part of the standard health check for people with diabetes across the Pacific. This allows for early detection, patient education and follow-up treatment for diabetic retinopathy as appropriate. Having said that, providing screening and treatment services for DR and building the local DR workforce have always been key components of the FHFNZ programme.

After Fiji, the DR Programme was rolled out in other Pacific island countries including Solomon Islands, Tonga, Vanuatu, Samoa and Kiribati, primarily focusing on the first two FHFNZ pillars. Additional funding from development partners including the Trust, then helped to scale up the existing activities in the DR space and take the in- country programmes to the primary and secondary level of care by drawing focus on strengthening referral systems, health promotion, primary health clinician training, community health worker training and applying an overall integrated sectoral approach to tackling diabetes and its complications.

2.3 The Pacific Diabetic Retinopathy Programme

The DR programme is implemented by FHFNZ. The design of the programme was based on the Trust experience of DR and the programme that FHFNZ had rolled out in the Pacific from 2009. It is leveraged off other FHFNZ eye health activities.

¹³ Note that FHFNZ designed, built and operates the PEI in conjunction with the Ministry of Health and Medical Services (MHMS), Fiji.

The Queen Elizabeth Diamond Jubilee Trust programme

The Trust has recognised that although services and support for sight threatening retinopathy are available, there can still be significant barriers to access for patients.¹⁴ Multiple reasons, such as cost, transport, or poor understanding about the possibility of vision loss, may prevent people with diabetes from accessing screening and treatment. The Trust points out that as diabetes requires patients to engage in continual management and monitoring of complications, interventions need to be continuous and not one-time events. The diabetes management system needs to provide continuous care including screening, referral, triaging, treatment and ongoing management. Service provision needs to become more accessible at the community level to strengthen health systems, improve technical resources and build comprehensive pathways for people with diabetes.

The Trust programme aims to reduce the incidence of avoidable blindness due to diabetes through management of diabetes, primary and secondary prevention of diabetic retinopathy and creation of supportive policy framework, evidenced by the integration of DR into national NCD and eye health plans. The long-term outcome is an increase in the number of patients with sight threatening retinopathy treated in targeted Commonwealth countries. The programme aims to achieve these through:

- support for lifelong management of diabetes following initial diagnosis
- training for physicians and patients to help people with diabetes to manage their condition
- improved health information and referral systems
- provision of equipment and mobile technology for screening and treatment and
- training for eye health workers.

A summary of The Trust's Theory of Change is attached as Annexe 2.

The DR Programme

The goal of the DR programme '*Tackling Diabetic Retinopathy in the Pacific*' is to reduce the incidence of avoidable blindness due to diabetes amongst people living in the Pacific. The Trust supports this activity of FHFNZ in six Commonwealth countries.

The Trust funding has enabled FHFNZ to enhance and expand its focus on DR, with the intention that such scaled up investment will enable DR services to become embedded into the diabetes and eye health services in the countries targeted and therefore achieve sustainable benefits that will be ongoing.

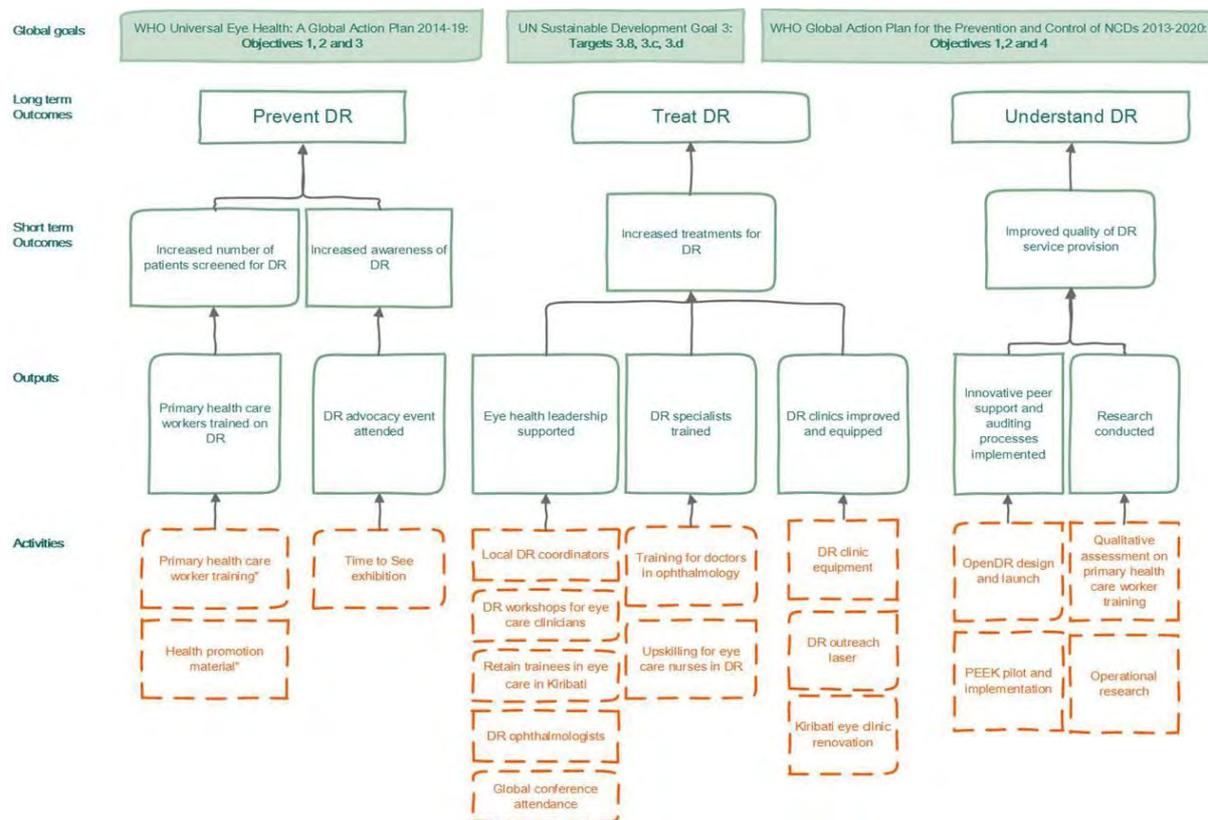
The programme commenced in 2015 and is due to be completed in June 2019. The programme was initially rolled out in Fiji, Solomon Islands, Vanuatu and Kiribati, as a part of the original grant proposal in 2015. An expansion of the programme was introduced in 2016, which included the countries of Samoa and Tonga. The programme has a total budget of £ 2,289,460.

The Pacific DR activity is contextualised in relation to each country's capacities to implement key activities. Existing strong and well-established partnerships with respective country governments further support the long-term sustainability of this programme model in the region. Establishment of DR coordination networks within local ministries was anticipated to lead to the emergence of a strong leadership stance in the DR space, ensuring the establishment of sustainable eye care models in these countries.

The outcomes of the DR Programme, were varied in 2016 and are presented in the Results Framework. (Figure 1 below)

¹⁴ The Queen Elizabeth Diamond Jubilee Trust - Theory of Change

Figure 1: Results Framework of the Pacific DR Programme



Since 2015, the DR Programme has supported specialist eye health training in DR for nurses and medical practitioners, shorter workshops and training in DR awareness for nurses, community health workers, consumers and general practitioners; a range of health promotion activities and development of resources; and provision of equipment for screening and treatment of DR. A full list of everything funded by the Trust up to June 2018 is attached as Annexe 5.

The delivery of the programme is managed by FHFNZ, with local coordinators appointed in each country to manage the specific activities in their countries. These coordinators are either employed directly by FHFNZ (Fiji and Solomon Islands); or by the local health services (Samoa) or Ministry of Health (Vanuatu, Tonga and Kiribati), with salaries subsidised by FHFNZ.

2.4 Evaluation purpose, objectives and scope

This evaluation provides an independent assessment of the contribution made by the FHFNZ Pacific DR programme, supported by the Trust, to developing a sustainable future for DR service provision across the Pacific region. In particular, the evaluation examined the progress of the programme from 2016 – June 2018 towards meeting the long-term outcomes and analysed the impact of the programme model in establishing a long-term sustainable system to tackle diabetes and its associated threat on blindness in the Pacific.

The objectives of the evaluation were:

1. to evaluate the success of the programme in integrating DR into existing government strategies and improving the sustainability of the national health systems in the region
2. to evaluate the programme outcomes against their intended results and country specific targets
3. to identify any changes required to meet targets and improve effectiveness, detecting any risks to the overall programmes and the achievement of their targets, and

4. to identify learnings that can be shared across the region, specifically with Ministries of Health, and globally, to guide the development and implementation of integrated DR health systems.

The primary intended user of the evaluation findings is FHFNZ, The Fred Hollows Foundation (FHFA) and the Queen Elizabeth Diamond Jubilee Trust. However, it is expected that the evaluation will contribute to the evidence base for international eye health non-governmental organisations (NGOs) working to eliminate avoidable blindness in many parts of the world.

Evaluation scope

This evaluation includes consideration of the wider context of service development in the target countries and FHFNZ wider activities in the region.

The scope of the evaluation covered the six Commonwealth countries supported under the programme - Fiji, Vanuatu, Kiribati, Solomon Islands, Samoa and Tonga. Fieldwork was undertaken in Fiji, Samoa, Solomon Islands and Vanuatu which received particular in-depth focus. The evaluation covers Tonga in less detail due to the delays in formalising the arrangements with the Ministry of Health in Tonga.¹⁵

The evaluation, in order to study the extent of service strengthening, covered not only eye health services, particularly DR eye health services, but also examined the impact of the programme on services and outcomes for diabetes and the relationship between the two.

2.5 Key evaluation questions

The objective of this evaluation was to increase the evidence base on the factors that have contributed to improvements in both eye health and diabetic services in the target countries. The evaluation addresses four key evaluation questions which relate to relevance, impact, sustainability and effectiveness. The key evaluation questions (KEQs) are:

1. How successful has the programme been in integrating DR into existing Government health strategies and improving the sustainability of services?
2. To what extent has the programme met its planned results and targets?
3. What changes to the programme would improve its effectiveness?
4. What lessons can be learnt from this programme that could guide future integrated programmes?

The evaluation framework is presented in more detail in Annexe 3.

2.6 Design and methods

The evaluation focused on four main areas:

1. to what extent have the programme activities been incorporated into the health service plans and service delivery in the target countries
2. how the DR programme has contributed to the observed results and what contextual factors may affect the achievement of results
3. what factors were most significant in driving improvement at different levels in the health system, and

¹⁵ Although a country workshop took place in June 2017, it has taken a year to obtain a signed Agreement with the Ministry of Health. This means that, although FHFNZ has provided support for DR, including training and equipment, to the tune of £75,000, the programme has only recently been formally commenced.

4. what can be further done to sustain the gains made.

To explore issues of how and why the DR programme made a difference, the evaluation drew on a contextual review and analysis of the disease burden in the target countries, and evaluative judgements on the relevance, impact, sustainability and effectiveness of the investments. A prospective focus includes recommendations both for the remaining period of the current activity and also, more broadly, for future investments.

To ensure this evaluation provides accurate and useful findings, a range of methods were used to answer the questions. These included:

- **Document review**, including Trust documents; FHFNZ programme documents; progress reports; Pacific Island government national health plans, including NCD and eye health plans, and reports; and reports from WHO, UNDP, and IAPB
- **Analysis** of health service delivery and outcome statistics, including statistics collected on-site during fieldwork
- **Interviews** with key stakeholders including programme staff, Ministry and relevant health sector managers and officials, eye health staff, staff working in NCD, including diabetes; and other donors including Ministry of Foreign Affairs and Trade (MFAT), Department of Foreign Affairs and Trade, Australia (DFAT), and WHO constituting: a group interview as part of the regional workshop in Auckland (16 participants); stakeholders in Fiji (23 individuals); Samoa (15 individuals); Solomon Islands (20 individuals); and Vanuatu (15 individuals), and
- **A sense-making workshop** with FHFNZ staff.

The stakeholders who participated in the evaluation are listed in Annexe 5. The analysis drew on multiple sources of information and methods to answer each question. The evaluation identified emerging themes from looking across the information sources, triangulating data to cross-verify findings, testing and validating emerging findings with other members of the evaluation team, including FHFNZ staff, to make credible evaluative judgements.

2.7 Strengths and limitations

The main strengths of the evaluation approach and methodology are that it captures both specific findings relating to the Trust's investments in DR and also rich information on the wider context for the performance of these investments. The range of stakeholders who engaged in the evaluation provided multiple perspectives on NCD (diabetic) and eye health activities including from specialist doctors, nurses, health service planning and management, NGOs and other Pacific development partners. A large number of stakeholders were very knowledgeable about activities in their area which contributed to a strong evidence base.

The involvement and co-operation of FHFNZ programme staff throughout the evaluation was a major strength. We appreciate their readiness to provide information and clarify queries and issues as they arose.

The major limitations to the evaluation are:

- Data limitations impede the ability to determine accurately the effectiveness of the programme and the level of services being provided. For example, in some cases baseline figures are not available, and the data is not always available at a national level due to data collection barriers.
- Difficulty in obtaining accurate information on the number of people with diabetes and therefore the number either at risk of developing DR limits the ability to determine the extent

to which the programme is addressing health needs in reducing the incidence and prevalence of DR and the complications of diabetes, improving the identification or management of diabetes or improving the quality of services.

- It is difficult to assess the extent to which the results can be attributed to the Trust funded DR programme as opposed to other service changes or programmes. This is FHFNZ previous activities in countries had already established a good platform for the DR Programme and provided momentum off which the programme is leveraged and their current activities are also supporting the eye health services which deliver the programme.
- The inclusion of the Programme Coordinator in the evaluation team and most stakeholder meetings may have influenced the responses received. This was done after consultation with a view to raising the profile of the programme. While this risk was partially managed by non-participation in interviews where a clear conflict of interest was identified, such as FHFNZ staff, the impact of such involvement on the independence of the evaluation is difficult to estimate.
- Finally, the constraints of the arranged timeframes, prevented meetings with some key stakeholders who were unavailable during the planned visits.

2.8 Structure of the report

The remainder of this report is set out as follows:

- **Sections 3-6** set out the main evaluation findings, addressing the questions relating to relevance, impact, sustainability, effectiveness, efficiency and equity.
- **Section 7** summarises the main evaluative conclusions.
- **Section 8** identifies good practice and areas where it is important to learn from in any future support for DR activities and provides recommendations in two parts
 - Recommendations for implementing in the final seven months of the programme, and
 - Recommendations relating to delivery of such integrated programmes generally.
- **Section 9** presents case studies of implementation of the programme in Samoa and Vanuatu, selected to enable two different programme models to be compared and contrasted.

3. Relevance

Relevance is the extent to which the activity is suited to the priorities and policies of the target group, recipient and donor.¹⁶

Relevance has been assessed in terms of the following two questions:

- How well aligned are the activities, planned results, and targets with Pacific Island Countries' (PIC) health department work programmes in terms of both diabetes and eye health?
- Are the current programme activities the most appropriate to make the intended impact of reducing the incidence of blindness from diabetes?

The programme is assessed as highly relevant in all the target countries due to the high prevalence of diabetes and reported high levels of undiagnosed DR. Stakeholders interviewed in the four countries studied in-depth (Fiji, Samoa, Solomon Islands and Vanuatu), regardless of whether they came from health service planning or management, eye health services or NCD services, highly valued the DR programme.

3.1 Population health factors

NCD are a major health and economic challenge for the Pacific. They cause chronic ill health and disability and contribute to 70% of all deaths of which many are preventable.¹⁷ They also impose broader economic costs on loss of productivity and costs of health service provision

As stated on p.9, the Pacific has some of the highest rates of diabetes in the world. Of great concern is the fact that the prevalence of diabetes in the target countries seems to be increasing. It is urgent to arrest the increase of diabetes which is a huge problem and, more importantly, invest in early detection of the disease and good management to prevent complications.

Table 2: Relevant health indicators of target countries

	Fiji	Kiribati	Samoa	Solomon Islands	Tonga	Vanuatu
Prevalence of Diabetes ¹⁸	14.5%	22.7%	9.2% ¹⁹	18.7%	15.4%	12.0% ²⁰
NCD as a percentage of all deaths	77%	69%	70%	60%	74%	70%

In Fiji, for example:

- As of 2011, NCD accounted for 40% of all healthcare costs for diseases, with the figure expected to continue to rise with an increase in NCD.²¹

¹⁶ OECD, DAC Criteria for evaluating development assistance. <http://www.oecd.org/dac/evaluation/49756382.pdf>

¹⁷World Bank (2014) NCD Roadmap report.

¹⁸ Based on proportion of population aged 20-79 <https://data.worldbank.org/indicator/SH.STA.DIAB.ZS?locations=KI&view=chart> (accessed 9 August 2018)

¹⁹ Stakeholders in Samoa estimate that the prevalence of diabetes is significantly higher than this, but no relevant statistics were obtained.

²⁰ Stakeholders in Vanuatu consider there to be a high rate of undiagnosed diabetes.

²¹ Ibid.

- The WHO STEPS Survey in 2011 found that the percentage of the population with raised fasting blood glucose (capillary whole blood value ≥ 6.1 mmol/L or currently on medication for raised blood glucose) rose from 19.6% in 2002 to 29.6%.²²
- In 2016, however, a re-analysis gave a figure of 15.6% after a finding that the whole blood glucose cut-off had been used for the STEPS survey rather than the plasma glucose.²³
- Population based surveys in Fiji in 2010 found 27% of 424 diabetic eyes had evidence of retinopathy or maculopathy and in 2012, 27% of new patients presented with sight threatening retinopathy (STR)²⁴

A diabetes diagnosis is the obvious antecedent to screening for DR. International evidence, however, suggests a relatively frequent late diagnosis of diabetes. Many research participants in the International Diabetes Federation (IDF) survey were already symptomatic (e.g., visual impairment due to retinopathy) when they were diagnosed. For a substantial minority, diabetes was only identified once complications, including vision impairment, had occurred.²⁵ The evaluation found that this is also the case in Pacific in the countries studied. In particular, the evaluators heard several examples of patients presenting to the eye clinic with visual impairment due to DR, whose diabetes had not previously been diagnosed or treated.

3.2 Governments' health priorities

One measure of determining relevance to Government's health priorities is to examine the priority given in relevant strategies and health plans. A study of the relevant documents shows that NCD, including diabetes, are a high priority for countries in the Pacific, with DR specifically a priority in three of the target countries.

Table 3: Priority given to NCD, diabetes and DR in National health plans and reports

Country	
Fiji	Fiji <i>National Strategic Plan 2016-2020</i> identifies NCD, including diabetes, as a priority for action.
Kiribati	Kiribati <i>Ministry Strategic Plan 2016-2019</i> identifies NCD as a priority and a specific objective is to strengthen initiatives around prevention, detection and management of diabetes and its complications. It also includes the number of diabetic retinopathy cases treated as one of the health indicators The <i>National Eye Care Strategy Plan 2015-2018</i> recommends monitoring the coordination of DR through annual plans, strengthening initiatives to reduce the prevalence of risk factors for NCDs, and sets a target for DR screening of 3% diabetic patients per year.
Samoa	No current strategic plan although a draft NCD plan is in development.

²² Australian Aid and Fiji Ministry of Health (2014) *Non-communicable Diseases Strategic Plan 2015-2019*, p.9

²³ Taylor, R, et al (2016) Erroneous inflation of diabetes prevalence: Are there global implications? *Journal of Diabetes*. **8**. Pp766-769

²⁴ Cited in Bhikoo et al (2017). P.790.

²⁵ IDF (2017) The Diabetic Retinopathy Barometer Report: global findings, 2017 Brussels

Country	
Solomon Islands	<p><i>National Health Strategic Plan 2016-2020</i> identifies NCD, including diabetes, as a key priority for action.</p> <p>The <i>National Eye Care Strategic Plan 2015-2019</i> specifically refers to DR and identifies DR as one of the leading causes of avoidable blindness and low vision. There are some specific objectives addressing DR such as training diabetic eye care nurses, strengthening the central and provincial diabetic eye services by the establishment of a diabetic eye unit within the tertiary eye centre, improving and strengthening screening, management and advocacy of diabetes and diabetic eye disease at central and provincial levels.</p>
Tonga	<p><i>National Health Strategic Plan 2015-2020</i> identifies NCD as a key priority. Both ophthalmology and diabetes services have been addressed separately and included in the proposed recurrent budget increase, however there is no specific mention of DR.</p>
Vanuatu	<p><i>Vanuatu Health Sector Strategy 2017-2020</i> has a strong focus on NCD, including diabetes.</p> <p>The <i>Non-communicable Disease Policy and Strategic Plan 2016-2020</i> has a specific strategic objective on eye health, including DR, which feature strongly in planned activities.</p>

3.3 Relevance of programme activities

The programme activities are focused on increasing awareness of DR through awareness programmes primarily targeted to health professionals, including primary care and NCD nurses, and health promotion activities primarily targeted to the general population. Given that lack of knowledge about diabetes and the potential for causing DR is a key reason for patients not seeking screening, raising awareness is a relevant intervention.

Increasing the capacity and capability of clinicians and providing equipment to enable them to screen and treat DR is also very relevant, in the context of the difficulties that these developing countries have in meeting health care costs and providing specialist training for their health workforce.

The way the programme has been contextualised to the specific countries has enabled FHFNZ to target the activities to ensure that they are relevant to the particular country. For example,

- In the Central Division in Fiji, focusing on health promotion for the community and raising awareness of DR among primary health care workers was assessed as being the most relevant activity, given the infrastructure already in place.
- In Vanuatu, focusing on training an ophthalmologist to reduce the reliance on outreach specialists for treatment was the most relevant activity. It was also very important to focus on setting up the infrastructure – the positioning of the DR coordinator in the Ministry.

4. Impact and sustainability

There is a close relationship between impact and sustainability as the factors that contribute to making an impact, such as integration of programmes with mainstream government programmes and increasing workforce and services capability and capacity, are also important for ensuring sustainability. As integration and collaboration are also important for effectiveness and efficiency, it is covered in more detail in the next section.

Impact includes the positive and negative changes produced by a development intervention, directly or indirectly, intended or unintended. This involves the main impacts and effects resulting from the activity, including the effects of external factors. **Sustainability** is concerned with measuring whether the benefits of the activity are likely to continue after FHFNZ has expended the Trust funding.²⁶

Impact and sustainability have been assessed against the following questions.

- What new programmes, initiatives, and services to prevent and treat DR have been introduced under the DR Programme?
- What positive and negative changes have occurred from the DR Programme both intended and unintended?
- What impact has the DR programme had on improving the PICs' capacity and capability to address diabetes associated visual impairment in their populations?
- To what extent would activities and gains as a result of the DR Programme be able to continue without the current level of funding?

Overall, the DR programme has achieved its objective of boosting the work done by FHFNZ in collaboration with the respective Ministries of Health of PICs in DR significantly so that the very real gains from the programme are likely to be sustainable into the future. Its impact is in significantly strengthened and expanded DR services, leveraging off the FHFNZ eye health services and DR services already introduced.

4.1 Impact

A full list of the services funded under the DR Programme is attached as Annexe 6.

Increased awareness amongst other health professionals and members of the public through workshops, presentations and health promotion activities introduced through this DR programme has increased significantly the number of patients presenting for screening and treatment where indicated.

The evaluation was unable to assess the impact of the DR programme on the primary and secondary prevention of the complications of diabetes. As the Trust identified in India, it was very difficult or impossible to obtain statistics on the prevalence of diabetes or estimate the rate of undiagnosed diabetes in the countries studied due to lack of robust data.

²⁶ OECD, DAC Criteria for evaluating development assistance. <http://www.oecd.org/dac/evaluation/49756382.pdf>

“In India there are some issues in obtaining robust estimates of the number of people with diabetes and therefore the number of people with diabetic retinopathy. Many people have diabetes but have not been diagnosed, and even those that are aware of their diabetes may not have been diagnosed with retinopathy. Diet and lifestyle changes also means that the prevalence of diabetes in India is rapidly increasing”²⁷

Due to the widespread use of paper-based records in government-run health services, there is no efficient way of tracking patients with diabetes who presented for screening or treatment for DR and the evaluators were unable to do this. Better collaboration or integration of the diabetes and DR services would considerably increase the ability to do this. While the DR programme has increased the collaboration between eye health and NCD services and increased referrals of diabetic patients to eye health services for screening, what is lacking is a systematic collection of data on the impact of these systems and analysis of the results. Although there is little evidence to support the impact of the increased awareness on the management of diabetes, anecdotal evidence from the countries studied did suggest that identification and management of diabetes has improved through the improved awareness and increase of screening services.

The impact of the DR programme to date varies significantly amongst countries as the DR programme was rolled out in different countries at different times. For example, the implementation of the DR programme has only just begun in Tonga and its effects are yet to be realised, however there has been a significant impact in Fiji which has received programme support and funding since 2015. Also, the extent to which the programme can build on existing services affects its implementation and its impact, as can be seen in a comparison between the countries studied.

Some case studies of current programmes are presented below for illustration.

Fiji -The DR programme has had significant impact in Fiji, the first country in which the programme was implemented. Because PEI is based in Suva, and therefore the service is well staffed and equipped, the greatest impact of this specific DR programme has probably come from the awareness training provided to community health nurses and subsequently rolled out to community health workers and general practitioners. Use of different print media and multimedia platforms such as television adverts and radio talk back shows and other health promotion campaigns and awareness workshops have helped in raising awareness about the disease and spreading information about availability of services in the country. This has had a positive impact on the number of patients presenting for screenings

The increased demand from the raised awareness has led to PEI increasing its number of outreaches to the outlying towns in Central Division quite considerably with consequent flow-on effect.

Kiribati – The appointment of a DR coordinator under the DR programme and additional equipment have increased the DR service delivery. After the DR Coordinator of Kiribati resigned from her position in 2018, the country shifted to a sustainable, shared DR coordination model (like Samoa) where the responsibilities are shared amongst 3 eye nurses employed by the Ministry of Health. The collaboration of the DR coordinators with the NCD staff on diabetes outreaches has increased the numbers screened and also raised awareness of DR.

²⁷ Queen Elizabeth Diamond Jubilee Trust – Theory of Change.

Samoa - A significant benefit of the DR programme is the way in which it has persuaded management to restructure the deployment of eye health nurses to increase the co-ordination of DR services and enable all districts to work together to utilise the available resources to the maximum effect.²⁸

The programme commenced in Samoa in 2016 and seems to have had a very good impact. There is much greater awareness of DR and the number of screenings has increased substantially. The provision of a camera for Savai'i and the more efficient deployment of staff have both contributed to this impact. Treatment services have yet to match the increased demand of screening, due in part, to the absence of the lead ophthalmologist on maternity leave. The availability of laser treatment only in Apia reduces access for people from outlying districts and Savai'i.

Solomon Islands - The appointment of a full-time DR coordinator has boosted the capacity of staff to focus on programme development, increasing awareness and setting programme plans in place. Close collaboration with Ministry staff in eye health, NCD, and health promotion units has increased the impact as they all work together to address DR. The increase of awareness of DR as a complication of diabetes and the need for screening and treatment at an early stage, both by the general public and nurses, has had a major impact on the numbers presenting for screening and treatment. It was noted that following health promotion initiatives and awareness training, the numbers of patients presenting to the eye clinic for screening increased.

Vanuatu - The full impact of the programme has yet to be realised in Vanuatu. In 2016 when the programme commenced, Vanuatu faced significant barriers to providing eye health services, in particular, the lack of any in-country ophthalmologists, with total dependence on outreach and international specialist visits, and significant shortages of trained eye health staff and equipment. The priority for the programme from 2016 was to establish the infrastructure, including the appointment and positioning of the DR Coordinator within the Ministry of Health, the training of an ophthalmologist and building of relationships with key stakeholders. With these in place, plus additional trained eye health nurses, the DR programme is well positioned to take advantages of the appointment of a full-time ophthalmologist and the opening of the new eye clinic with new DR equipment provided by the Trust funding at the end of 2018.

4.2 Sustainability

In the short and medium term most activities will likely be sustained to some extent, with the services being supported by FHFNZ and PIC governments. Longer-term sustainability, however, without further donor investment is unclear.

The evaluation has identified the importance of the following factors to sustainability:

- **A source of funding** – the extent to which there is long-term funding support for the services, ideally the PIC government
- **Inclusion of DR in national plans and strategies** – the extent to which DR is prioritised, adequately resourced, and reported on (summarised in Section 3.2)
- **Sufficient staff capacity and capability** – the extent to which the workforce delivering the service is sustainable with ongoing training available to replace outgoing staff

²⁸ Previously services were fragmented with eye health staff employed in different districts. Without screening equipment, the eye health nurses were unable to use their DR training and were often re-deployed by district managers into general health areas to meet staffing shortfalls.

- **Integrated services** – the extent to which eye health services are integrated into other health services in the country and also the extent to which diabetes, NCD, and eye health services are collaborating to work towards the same objectives.

Circumstances affecting sustainability vary between programme countries. These are described below:

Fiji – In Suva, eye health services are delivered at PEI, largely funded and provided by FHFNZ, although the Ministry of Health and Medical Services (MHMS) and Colonial War Memorial (CWM) Hospital are involved. Because PEI is seen as providing effective eye health services, there has been limited involvement of the MHMS in planning or providing DR services and neither eye health nor DR feature in the *National Health Strategy* or the current *Operational Health Plan*, although diabetes treatment does. The service is highly valued by senior health officials and there is strong support from WHO for continuation and prioritisation of DR activities. The government, through the Associate Health Minister, is interested in considering proposals to continue the programme and the DR coordinator position will continue to be funded by FHFNZ after 2019, however the permanence of this position longer-term is unclear.

The MHMS has now taken over responsibility for the DR services in the Western and Northern Divisions which may help to ensure that the gains are sustainable. In the Western Division, however, the future impact of a planned change in management of Lautoka Hospital on eye health services cannot be predicted with any certainty.

The addition of 11 eye health staff, trained through the DR programme, increases the sustainability of the DR service.

Kiribati – Two DR eye care nurses, whose training in DR was funded under the DR programme and who were employed in 2016 with financial support by FHFNZ, have been employed and funded by the MHMS since 2017 and this is likely to continue.

Samoa - No firm predictions can be made on sustainability due to the current major restructuring of the health sector.²⁹ The programme co-ordination is undertaken by the eye health team, however, who are all employed by Samoan health services, suggesting that the gains made will be sustained after the current funding.

Solomon Islands – Eye health services are delivered from the Regional Eye Centre (REC) where most staff are employed by the MHMS and this is expected to continue. There is also an eye health coordinator based in the MHMS which will contribute to ongoing sustainability. The DR coordinator position, based at REC, which is currently funded under the DR Programme, will be discontinued in 2019. Currently there are discussions with the MHMS about how the co-ordination can be continued after the programme ends but no decisions have yet been made. Strong support from WHO will support the continuation and prioritisation of DR activities. In the Solomon Islands, continuation of training in DR awareness to all new graduate nurses, a great initiative set up by the DR Coordinator with the support of nursing education staff, will help to ensure sustainability.

Tonga – Due to the recent formalisation of programme agreement in Tonga, the evaluators were unable to assess the sustainability of activities. It seems likely, however, that the delivery of the programme within the government funded eye health services will facilitate its sustainability.

²⁹ The National Health Service (NHS) which currently runs all the public health services is being re-integrated with the Ministry of Health and the legislation which will enable this is currently being given urgency in the Parliament with an expected enactment at the end of 2018.

Vanuatu – As the programme in Vanuatu has focused heavily on setting up a solid platform for future delivery of eye health services, including DR, it is expected that the benefits of the programme will be sustainable. The focus on training Vanuatu’s first resident ophthalmologist provides a major future and ongoing benefit for Vanuatu. The Ministry of Health (MOH), which employs the DR Coordinator based within the NCD Unit in the policy division, currently under secondment, has indicated that the position will be made permanent. The new eye health centre currently under construction and funded by FHFNZ from other donor sources, including MFAT, is due to open in February 2019 and will be fully equipped for DR screening and treatment under the DR programme. Strong support from WHO will support the continuation and prioritisation of DR activities. DR is included in national planning documents, and will therefore be resourced, reported against, and remain on the government’s health agenda.

The programme has increased capacity and capability for screening and treatment, through increasing the number and skills of clinicians able to competently deliver these services and equipping them to deliver services. Despite the training supported under the DR Programme, there is still a shortage of nurses in Vanuatu with the skills and equipment to undertake DR screening, particularly in the outer islands. Without ongoing training, sustaining the necessary levels of screening may be challenging. Currently, only nurses in Port Vila are capable and equipped to screen patients with the fundus camera although eye health nurses in two other provinces can identify DR with ophthalmoscopes and refer for follow-up screening and treatment as necessary. Building on the benefits achieved under the DR programme by increasing the nursing capability and equipment in the provinces would be a recommended next step towards making the service truly sustainable. The presence of an ophthalmologist in place from the end of the year provides a good platform for such expansion of services if the support was available as the screening could be followed up by more timely treatment if warranted.

The new eye centre will provide training facilities which should facilitate ongoing training. FHFNZ will also continue to support the Vanuatu MOH with continued training at PEI until adequate eye nursing and medical coverage is achieved.

Equipment

The provision of a significant amount of equipment for screening and treatment under the programme will leave sustainable benefits in the PICs supported. FHFNZ has undertaken significant research into low-cost and easily portable screening tools, (portable eye examination kits (PEEK)) with the objective of purchasing equipment that is cost effective and fit for purpose. While this may not have been as successful as anticipated, it illustrates that impact, sustainability and value for money have been key considerations when purchasing equipment.

National eye centres are generally well equipped for screening and treatment. Concerns about the lack of equipment in peripheral hospitals and health centres were raised in Samoa, Vanuatu, and the Solomon Islands as it greatly limits the services that can be provided there, even when trained staff are available.

While some stakeholders interviewed identified specific equipment needs, it was clear that equipment is purchased with careful consideration of whether it is fit for purpose, can be housed in an appropriate environment, and can be properly utilised by appropriately trained staff. This will promote sustainability in the short and medium term, however funding for repairs and replacements in the long term will need to be planned for.

The purchase of an HbA1c analyser under the DR Programme for measuring blood glucose for the Vanuatu NCD clinic is much valued by the clinicians who use it. However, as the World Bank noted,

the cost of consumables and other, less accurate test strips, needs to be factored into health budgets in an ongoing way to ensure that such equipment can be used continuously.³⁰

Training

The programme has had a significant impact in terms of building workforce capacity and capability in DR screening and treatment. In total, the Trust funding has sponsored:

- 15 nurses to complete a Postgraduate Certificate in Diabetic Eye Care (PGCDEC)
- one medical practitioner to complete a Postgraduate Diploma in Ophthalmology (PGDO), and
- two medical practitioners to complete a Masters in Medicine (Ophthalmology) (MMed), with a further four studying towards their specialist qualification in 2018.

The six-month PGCDEC has provided excellent development of nurses in awareness, screening and diagnosis and thirteen eye health nurses and two NCD nurses have been funded through the Trust fund to complete this programme. The PGCDEC has been discontinued following careful consideration by FHFNZ. It has been replaced by integrating the DR components of the PGCDEC into the one-year Post-graduate Diploma in Eye Care (PGDEC).

The principal reasons for this were:

- the Fiji National University (FNU) no longer supports nor recognises any six-month certificate programmes
- there was insufficient content to justify a full year course exclusively in DR
- it was inefficient to offer the training to eye health nurses who had already completed the PGDEC, as there was too much overlap of content³¹, and
- integrating it into the diploma increases the quality of specialist eye health training for nurses.

Many stakeholders interviewed were concerned that the cessation of the PGCDEC from 2018 significantly reduces opportunities for nurses to obtain DR capability to the same level³² and also that it is not so accessible due to the longer length. The PGDEC is targeted to produce specialist eye health nurses and is not relevant nor appropriate for NCD nurses who wish to gain specific skills in DR. There are concerns that the change in training may jeopardise the ability to maintain sufficient replacement nursing capacity and capability into the future if a suitable alternative is not developed.

An alternative training model operating in the Solomon Islands has been deemed successful. It takes the form of one to two-month attachments for NCD nurses at REC, providing nurses with intensive training in screening for DR and an increased understanding of the type of patient that should be screened more intensively. NCD nurses from all provinces except one have completed attachments. While these attachments have not been funded under the DR programme to date, FHFNZ propose to support the final ones in the future in both SI and nationwide. This training facilitates effective service integration and collaboration and ensures that DR skills are included in provincial health work forces.

³⁰ World Bank, (2014) *NCD roadmap report*.

³¹ Note that FHFNZ have been providing 'top up' short courses in DR for eye health nurses who have completed the PGDEC without the DR component. These have not been funded under the Trust programme.

³² There are different levels of screening for DR. Nurses with the highest competency level (who have completed the PGCDEC) can use fundus cameras competently to not only identify DR but also grade the severity of the DR. DR can also be identified with other equipment such as BIO ophthalmoscopes and SmartScope with referral of these patients for further assessment and treatment.

These nurses are equipped with screening equipment such as Snellen charts, pinhole occluders and a pen torch but not DR screening cameras, as the environments are not necessarily conducive for these.

Raising awareness

Overall, the raising of awareness of DR through the support of the programme has contributed towards sustainable benefits. Provision of awareness training has had a significant impact in terms of increasing the knowledge and understanding of DR and diabetes in health professionals, community health workers, and diabetic patients. It has increased the referrals for DR screening and improved collaboration between services. This training has been fully supported by the Trust and consists of one or two-day workshops that teach the participants about DR and its relationship to diabetes, the need for diabetic patients to receive ongoing regular monitoring and some programmes cover testing visual acuity and provide the participants with Snellen charts for their future use. The focus on building knowledge and awareness among clinical and support staff will ensure that referrals for screening and treatment are likely to continue, at least in the short and medium term. For long term sustainability in the context of staff leaving the service, there needs to be an ongoing focus on staff development.

The evaluation established the importance of health promotion in raising awareness of DR, increasing the number of people presenting for screening, and encouraging people to prevent and manage diabetes to avoid DR and other complications.

Examples of successful health promotion activities include:

- DR awareness outreach events in outlying islands,
- radio shows, tv advertisements, and health promotion campaigns for World Sight Day and World Diabetes Day,
- the delivery of advice at diabetes groups, posters and pamphlets, and billboards.

The evaluation was unable to assess the sustainability of the funding for health promotion activities following the end of the programme. WHO is a valuable partner for FHFNZ in the support of these activities.

5. Effectiveness and Efficiency

Effectiveness is a measure of the extent to which an activity attains its objectives. **Efficiency** is an economic term which measures the outputs – qualitative and quantitative - in relation to the inputs. It looks at return on investment.³³

Effectiveness and efficiency have been assessed against the following questions.

- How has the DR Programme enhanced existing DR programmes?
- How successfully is each PIC tracking against the targets in the results measurement table?
- What changes could be made to the Programme before June 2019 that could improve its effectiveness?
- What factors have influenced its success?
- What factors have impeded its success?

As can be expected with a programme that is delivered across a range of countries with differing conditions and contexts, effectiveness varies across countries and what is an effective intervention in one country may not produce good results in another. Although effectiveness cannot be generalised, this evaluation focuses on factors which are common across the countries and draws upon key common factors.

5.1 How the Trust DR programme has enhanced their existing DR programme

The Trust funding has enabled FHFNZ to build on their existing DR Programme in the Pacific to increase the gains. They have done this through funding training of the eye health workforce; providing equipment; developing health promotion materials and improving the capability of the DR workforce in health promotion through the provision of a regional health promotion workshop; and increasing community and health workforce awareness of DR and its relationship to diabetes.

“We know what we need to do. The DR Programme has enabled us to achieve it”³⁴

5.2 Changes to the implementation of the programme

FHFNZ have worked with the leaders of the programme in-country to monitor the programme closely. This has enabled them to introduce changes throughout the period of the programme as necessary to improve it. Annual targets have been re-assessed along with the budget in conjunction with DR coordinators and eye health leaders to develop annual workplans. This flexibility has helped to keep the programme relevant and effective. Changes introduced include:

- the expansion of the DR awareness training workshops in Fiji to include general practitioners and primary health training for community health workers
- changes to training programmes offered by terminating the PGCDEC and integrating its content into the PGDEC (not funded by the DR Programme) as previously described
- regular re-assessment of equipment needs and planned purchases, such as the planned equipment of the new eye clinic in Vanuatu, and

³³ OECD, DAC Criteria for evaluating development assistance. <http://www.oecd.org/dac/evaluation/49756382.pdf>

³⁴ Quoted by Dr Lucilla Ching-Sefo in telephone interview, Monday 15 October, reproduced with permission.

- Pilot trial of Smartscope which is a portable screening equipment, in Fiji and Solomon Islands to be considered as a suitable option for quality mass screenings for DR.

5.3 Factors which have influenced the success of the programme

Factors influencing the success of the programme include:

- the flexibility to vary how the programme is delivered to suit the specific conditions in each country
- the appointment of DR coordinators in each country to plan and co-ordinate the activities and expand the understanding and awareness of DR amongst primary level clinicians, community health workers and community members through presentations, workshops and developing health promotion materials
- the strengths of the DR coordinators (They are all nurses with varied backgrounds, in Kiribati, Samoa and Vanuatu they are experienced eye health nurses who also provide DR services while in Solomon Islands and Fiji, they are very experienced nurses who have previously held senior positions in government with broad experience and networks in the wider health sector)³⁵
- the positioning of the coordinator role in Vanuatu (in the NCD Unit in the Ministry of Health), and
- the established eye health service in most countries built from the support received from FHFNZ over the previous years which provided a solid base for implementation of the DR Programme.

5.4 Factors which have impeded the success of the programme

Factors that impeded the success of the programme include:

- the management of the financing through the governments which often resulted in long delays in accessing the funding for planned activities or equipment (all countries except Fiji, particularly Samoa and Kiribati)
- shortages of staff (for example, lack of ophthalmologists in Tonga and Vanuatu), and equipment (for example, screening cameras in outlying areas in the outlying areas in Solomon Islands, Vanuatu and Samoa)
- Ministry of Health deployment of staff away from DR services (particularly in the Solomon Islands)
- lack of data to enable full measurement of all the results, (for example, while eye health services have well-established data collection/patient database systems, there is a challenge matching this to the data from NCD services and there is not data available on screening and treatment from Fiji outside of PEI services.)
- lack of involvement of wider stakeholders in planning, setting targets and monitoring of them

³⁵ The coordinators are all nurses with varied backgrounds. In Kiribati, Samoa and Vanuatu they are experienced eye health nurses who also provide DR services while in Solomon Islands and Fiji, they are very experienced nurses who have previously held senior positions in government with broad experience and networks in the wider health sector.

- the delays in obtaining a formal agreement for the programme with the Tongan government, and
- less effective collaboration with services for diabetic patients particularly in Vanuatu and Solomon Islands. (To some extent, this is outside of the DR Programme's control as services are configured and run by the Government.)

5.5 Measurement of results

The evaluation has not undertaken a comprehensive assessment against all the elements of the results framework and results measurement table (RMT), as these have been reported in the regular reporting to the Trust.

The evaluation found that very few of the wider stakeholders in the countries visited were familiar with the targets, had been involved in setting them or knew the extent to which they had been met. This particularly applied to wider stakeholders outside of the eye health services, but the evaluation found that eye health staff were also often unaware of the targets. A notable exception was Solomon Islands where there was higher awareness among eye health staff. The lack of awareness may have been due to the DR programme target setting taking place within wider planning sessions, thus reducing the awareness of the specific targets. In some cases, eye health staff set their own DR targets. Improving this communication may increase the effectiveness of the programme.

Overall, the DR programme is exceeding the targets set, although this varies between individual countries. While it has met the outcomes identified which are not quantified, it is difficult to assess the extent to which the outcomes are being achieved due to lack of information, as discussed previously in this report. There are some general issues that complicate interpretation of the results that are acknowledged by FHFNZ.

- The baseline figures are not complete.
- Targets are not clear for all countries and have been set conservatively, for example, the target in Fiji for screening was less than the baseline figure.
- The targets and results for Fiji reflect only the services provided from PEI with little information available from the rest of the country.
- Some data is incomplete and therefore the results are not a true reflection of the actual service delivery.

The results framework

The results framework is presented in section 2.3. The long-term outcomes are to prevent, treat and understand DR. Overall, the targeted results have been exceeded. A deeper analysis of the effectiveness of the programme shows variation in the results amongst countries, which will now be discussed with reference to the factors that have impacted on the results.

Table 4: Quantitative results against RMT

Baseline	Target	Numbers achieved
Screening for DR³⁶		
2015: 4,845	2016: 6,600 2017: 8,550	2016: 6,454 2017: 10,614 2018: 6,752 (to June 2018)
Treatments for DR		
2015: 1,432	2016: 660 2017: 885	2016: 1,556 2017: 1,522 2018: 1028 (to June 2018)
Primary health care workers trained		
2015: 57 (in Fiji)	2016: 100 2017: unclear	2016: 371 2017: 327

Table 5: Summary of activities against key outputs

Output	Activities
Primary health care workers trained in DR	<ul style="list-style-type: none"> One or two-day DR awareness training workshops provided to registered nurses (district, provincial, NCD and diabetic clinic nurses etc), and extended to community health workers and general practitioners Development of the Community Health Worker Training Facilitator Manual and Community Health Nurses Manual Provision of equipment such as Snellen charts, pin hole occluders and pen torch to nurses to assist them to test visual acuity and refer on for further screening as necessary. Health promotion activities, campaigns and material developed
Eye health leadership supported	<ul style="list-style-type: none"> DR coordinators appointed and supported Ophthalmologists employed in Suva Coordinators supported to hold wider stakeholder meetings and engagement Twelve DR workshops held for eye-care clinicians Attendance at global eye health events and a regional health promotion workshop in Auckland supported.
DR specialists trained	<ul style="list-style-type: none"> Nurses supported to complete the PGCDEC Medical Practitioners supported to complete PGDO and MMed (Ophthalmology)
DR clinics improved and equipped	<ul style="list-style-type: none"> Equipment provided as listed in Annexe 6. Kiribati eye clinic refurbished

³⁶ All these figures only relate to screening done by use of the fundus camera.

Output	Activities
Research conducted	<ul style="list-style-type: none"> • Qualitative assessment of DR awareness training in Fiji • Research on primary health care nurses
Innovative peer support and auditing processes implemented	<ul style="list-style-type: none"> • PEEK pilot underway (implementation delayed due to technical developments at PEEK)³⁷ • Smartscope pilot underway in Fiji and Solomon Islands and subsequent roll out to follow

Fiji

In Fiji, while the DR Programme has been delivered in Central, Western and Northern Districts, FHFNZ has had difficulty obtaining data from services delivered by the Government managed services in the Western and Northern Divisions. The results management table (RMT), therefore, only reflects targets and actual screening and treatment numbers at PEI. While, the lack of data compromises our ability to evaluate quantitatively the true effectiveness of the DR programme, it is fairly clear that the programme has resulted in a significant increase in both screening and treatment.

The target for screening at PEI was set lower than the baseline of 4231 screened in 2015 at 4,000 per year. The rationale for this was the uncertainty of the impact of the regional training delivered at PEI on the programme. This target was not met in 2016 and met in 2017 by a small margin. We were informed, anecdotally, that there had been a significant increase in the number of patients screened but there is little evidence for this, given the lack of information.

Proportion of diabetes patients screened - There is little information on the proportion of diabetes patients being screened as this information has been difficult to obtain. The RMT estimates that 13% of diabetic patients in the Central Division received an annual screening in 2016.

The referral systems set up in collaboration with the diabetic hub appear to work well as there are feedback loops built in to follow up on whether patients referred have actually attended the eye clinic for screening. However, there were no data provided to enable an assessment of the effectiveness of this referral system. Some patients are missed because they do not present to PEI for screening after being referred. In Lautoka the numbers of referrals from general practitioners in Western Division are low.

Of the patients presenting for screening in 2018: 65% were referred, which is an increase from 38% in 2016. The rest are self-referred.³⁸

Treatment – The Baseline in 2015 was that 1334 patients were treated for DR by laser. This total includes PEI, PEI outreach and the Mobile Eye Clinic (MEC) in the Western Division. The staff considered the target was 1000 per year, and this was agreed in the Country Plan for 2017 although not reflected in the RMT. This target was not met in 2017.³⁹ In 2016, a total of 1,160 patients were treated at PEI. In 2017, only 969 patients were treated and in the first six months of 2018 a total of 631 patients have been treated. The numbers reported in the RMT, however, do not include the Western or Northern Divisions. In Lautoka the treatment numbers have recently been limited by a

³⁷ Implementation was delayed as the retinal images produced by PEEK during the pilot were not of adequate quality and hence it is not ideal to roll out PEEK on a larger scale at this stage.

³⁸ Information received from FHFNZ, 11 September 2018.

³⁹ Figures from RMT.

breakdown of the generator in April and May this year, the recent re-location of the Mobile Eye Clinic and the closure of the operating theatre.⁴⁰

Data on the proportion of patients screened and found to require treatment that were actually treated is very incomplete. FHFNZ estimates that a high proportion of the patients attending the DR Clinic at PEI that needed treatment received it, based on a study of 207 patients referred for treatment from nurses with 92% receiving laser treatment. The proportion of outreach patients complying with referrals for treatment cannot be confirmed, but it is believed that a considerable number do travel into Suva for treatment. The ability and flexibility of staff to treat patients at PEI in the same visit as screening, due to the medical personnel based there, is likely to have had a positive effect. This patient-centred approach demonstrates the caring and commitment of the staff involved in the service.

Awareness– There has been a significant focus in Fiji on awareness training. In total, 386 primary health care and diabetes nurses (estimated as 80% coverage) and 271 community health workers have participated in training workshops. This significantly exceeds the target of 100 set in 2016. The focus on awareness training has been a considerable strength of the programme in Fiji. The building of knowledge and capability throughout the sector is likely to ensure that the results are sustainable, as discussed earlier.

Of the nurses that lead peer groups for diabetes patients in Fiji, 58% (seven out of twelve) have been trained by the DR coordinator in DR awareness which has resulted in better understanding along with improved compliance and patient management of diabetes and its complications such as DR. The DR coordinator has also been available to present to community groups and regularly works in partnership with Diabetes Fiji to reach out to diabetic community members.

A television advertising campaign, sessions on talkback radio and development of posters and brochures have all been effective health promotion initiatives that have helped in increasing community awareness as evidenced by the significant increase in self-referrals for screening following the media publicity. A similar television campaign is planned for later in 2018. Providing more health promotion materials to Lautoka hospital would increase the effectiveness of health promotion in the Western Division.

The development and publication of the Community Health Worker Training Facilitator Manual and Community Health Nurses Manual by the DR Coordinator is a major and lasting achievement which is being shared throughout the region.

Case study: Following DR awareness training, one registered nurse from an outlying village in Fiji took the initiative of arranging for a carrier to collect a group of diabetic patients from her area and transport them to Lautoka Hospital for screening and treatment where indicated and then transporting them home.

Kiribati

The extent to which Kiribati has increased its screening and treatment for DR under the programme is largely unknown due to the absence of baseline data. There are indications, however, that there has been a significant increase in service, helped by the training of two nurses under the programme. Kiribati met its targets for screening in 2016, exceeded its 2017 target by over 100% and was over the target for 2018 by June 2018. In terms of treatment, there was no target for 2016 and 22 treatments were carried out. In 2017, Kiribati exceeded its target by 17% and in 2018 had almost achieved the

⁴⁰ The MEC is, however, still in use in the Western Division.

same number of treatments as the whole of 2017 by the end of June. The total is helped by the ability of the coordinators to conduct outreach clinics in conjunction with the diabetes outreach service.

Samoa

The programme has been very effective in Samoa, with the targets consistently significantly exceeded. Anecdotally, there has been a major increase in the provision of DR services. In the absence of baseline information, we were unable to accurately assess the difference.

Screening – While the baseline numbers of screening prior to the commencement of the programme are unknown, in 2016, a total of 495 patients were screened, compared to the target of 200. In 2017, a total of 2,181 diabetic patients were screened compared to the target of 600. In the first half of 2018, 1144 patients have been screened. These are excellent results, particularly in the context of the staff shortages experienced. The RMT estimates that nine percent of diabetic patients in Samoa received an annual eye exam in 2017.

While anecdotal evidence indicates that a high proportion of patients referred present for screening, there is no formal tracking of this. A current project by the MOH to develop a coordinated electronic patient record system throughout the districts will facilitate the monitoring of referrals.

There needs to be more awareness of the benefits of screening among the community. Most people tend to present for screening only when vision problems get to the stage of impacting on their daily activities and not earlier. The NHS of Samoa charges a fee of ST\$10 per outpatient visit and this may be a barrier for clients. The eye health staff address this by aiming to screen as many patients with diabetes as they can while they are inpatients.

Treatment – The number of treatments given has also increased since 2016, although we have no data on the number treated prior to 2016 with which to compare. Laser treatment can only be provided in Apia as there is only one laser in Samoa and it is old and is not portable. According to the RMT, laser treatments have increased from 68 in 2016 to 159 in 2017 which significantly exceeded the 2017 target of 60 treatments. In 2018, 49 laser treatments have been provided up to the end of June. There is no information on the number of patients needing treatment who do not get it but there is considerable anecdotal evidence that patients in outlying areas have difficulty accessing treatment.

Awareness – The focus for awareness training has been on health professionals, with workshops and presentations delivered for GPs, new graduate nurses and 129 primary care workers. Stakeholders identified the need for more focus on community awareness to increase the number of self-referrals. There does not appear to have been a strong emphasis on health promotion to date. However, a campaign for World Diabetes Day in November is being planned and billboards are currently being developed.

Training - The DR programme has funded the training of one eye health nurse to complete the PGCEC and other nurses have been trained in DR under the FHFNZ programme through other funding sources. While there is a shortage of nurses in Samoa and more trained nurses would be useful, it was generally felt that the major barrier to DR services is lack of equipment in the peripheral hospitals and health centres, which limits the services that can be provided out there. For this reason, the programme initiative of bringing the nurses based in the districts into Apia to work for some of the time has been effective in increasing services. Their re-deployment by hospital management to general areas to fill

staffing gaps tends to occur through increasing their time rather than taking them away from eye health services, although this does happen from time to time.⁴¹

Solomon Islands

The targets for screening have been exceeded by a significant margin. The 2015 baseline was 572. In 2016, a total of 1,885 patients were screened, compared to the target of 1,400. In 2017, a total of 2,031 diabetic patients were screened compared to the target of 1,750.

The target set by the MHMS is that all patients seen at the diabetic centre have access to eye health services. The evaluation attempted to estimate the proportion of diabetic patients who accessed eye health services, but although good data is available from WHO on the number of diabetic patients attending outpatient clinics, no conclusions can be reached without information on the pathway of individual people. Figures provided by the WHO⁴² on the number of diabetic outpatient visits show that a total of 5,555 diabetic patients attended outpatient clinics across Solomon Islands in 2016, rising to 10,840 in 2017. Of these, 3,611 diabetic patients were seen at the National Referral Hospital (NRH) in Honiara in 2017.⁴³ FHFNZ estimates that 4.7% of diabetic patients in the Solomon Islands received an annual eye exam in 2017.

Treatment – The number of treatments given has also increased since 2015. No data is available on the proportion of diabetic patients screened and found to require treatment that were actually treated. We heard that a significant proportion of patients screened by outreach do not come to REC for recommended treatment but were unable to access data to support this. An ophthalmologist with a laser machine has attended some outreaches to provide treatments, however this has not been possible for recent outreaches due to staffing shortages.

According to the RMT, laser treatments for DR have increased from 81 in 2015 to 272 in 2016 and 261 in 2017. This significantly exceeds the 2017 target of 175 treatments. In 2018, 203 laser treatments have been provided up to the end of June. Failure of the laser machine in 2017 stopped treatments until a new one was provided and negatively impacted on the numbers treated in 2017. Where possible, patients are treated and screened at the same visit but this is not always possible with staffing restrictions.

Awareness – Over 75% of the provinces have been covered in terms of providing awareness training, with over 10 training sessions conducted. We were informed that lack of understanding from provincial managers and difficulties releasing staff have reduced the impact. Since 2016, the DR coordinator has conducted awareness training with nurses, community health workers, and other health practitioners. This was considered to have been effective, with interviewees reporting positive feedback from attendees and a significant increase in referral numbers following these sessions. Emphasis more recently has been on working with the nursing education division to present sessions to new nursing graduates and having DR included into undergraduate nursing training. Monthly workshops have been presented to nurses at NRH hospital.

Workshops that were previously run in conjunction with NCD unit and eye health outreach visits to the provinces has stalled as a result of internal politics, and the reduction of MOH funded outreach visits due to resource and funding issues. While REC has replaced these with separate outreach visits

⁴¹ For example, eye health nurses reported working 'double shifts' with one duty in the eye health department and a further shift in a general area in one day. Some nurses are working these hours several times a week. This practice is not sustainable in the long-time.

⁴² Provided by personal email from Dilip Hensman on 21 September, 2018.

⁴³ The reason for the major difference between these two figures is not clear.

to some provinces, the awareness training associated with these have been limited over the past year. This has been a setback for the programme.

The DR Coordinator has worked with the Health Promotion Department in the MHMS to implement DR campaigns and is currently collaborating with them on development of health promotion resources such as posters, leaflets, billboards, and bookmarks. Radio was emphasised as being an effective way of reaching people, including remote communities in the provinces and peripheries and a radio campaign was very effective.

Training - Three nurses have been supported to complete the PGCDEC, two of which are NCD nurses, and one medical practitioner has been supported to complete the MMed in ophthalmology. This training has supplemented the earlier training provided by FHFNZ. More qualified nurses are required, particularly in the provinces. Unfortunately, the NCD nurses are no longer available to use their skills in DR screening as they have been re-deployed by the Nursing Division responsible for the allocation of staff, to areas where higher priority staffing needs were identified. This means that they are only available for one day a week for DR screening at the REC.

A good initiative is the provision of NCD attachment training, usually for two months, at the REC for NCD nurses. During this training, they develop screening skills in using the cameras to assess the level of DR. These attachments have not hitherto been funded under the DR programme.

Tonga

There have been delays in implementing the DR programme in Tonga and a Memorandum of Understanding has only recently been agreed with the Tongan Government. A desk review only revealed an apparent increase in screening in 2018 but there is no available data against which to compare this number.

Vanuatu

As discussed in previous sections, FHFNZ has had to invest considerably in Vanuatu to establish an eye health service and this has delayed the full implementation of an effective DR programme. The full benefits of the investment to date are yet to be realised. FHFNZ is aware of this and is addressing it by their efforts to place a fully trained ophthalmologist in Vanuatu and build and equip a new eye centre. The focus on training an ophthalmologist has the potential to be a very effective strategy as, in the view of the evaluator, the provision of an in-country ophthalmologist in Vanuatu is the intervention most likely to achieve results.

A full-time DR coordinator has only been in place since June 2017 with efforts prior to that being put into working with the MOH to establish the position.

Screening – The targets for screening have not been met, although the numbers screened are still significantly higher than the baseline of 42 in 2015. What is of more concern is the reduction of screening in 2017 and the first half of 2018. Staff have set an informal target of screening 30 patients a day but most days are screening fewer than 10. Informants interviewed highlighted that fewer patients were presenting for screening than in 2016 and the first part of 2017 but could not identify any reasons for this. In 2016 a total of 433 patients were screened, compared to a target of 500 and in 2017 363 patients were screened compared to a target of 700. A further 174 patients have been screened in 2018 up to the end of June, with a further four in July and six in September.⁴⁴ These results are only from Port Vila and relate to the use of the fundus camera.

⁴⁴ These numbers include 59 patients screened by Dr Biu during an outreach in late April and early May. The reductions in July and August possibly reflect the absence of the experienced eye health nurse and the lack of confidence and skills in DR screening of the remaining eye health nurse who has not had much experience in the use of the cameras for DR screening.

The stated government policy is to screen every diabetic patient who has had diabetes for 10 years or more. The MOH annual report for 2017⁴⁵ states that 5,601 diabetic patients were seen at health facilities (859 new cases and 4742 repeats). There is not enough information on the characteristics of diabetic patients to assess the extent to which this is being met. Looking simply at the numbers screened for DR, indicates that the majority of these patients were not screened for DR. The significant reduction in referrals in 2018 reinforces this.

Although referral systems have been set up to encourage referrals from the NCD clinic, referrals are currently manual. There is no clear referral pathway and no monitoring of the extent to which patients referred present for screening. Shared patient records would considerably assist staff to ensure that diabetic patients were screened.

Of the patients presenting to the eye clinic for screening in 2017: 88% were referred by the NCD clinic, nine percent were self-referrals and three percent were referred by the Vila Central Hospital (VCH) Medical Clinic and VCH Outpatient Clinic. There was a marked difference in 2018 where of the patients presenting for screening in 2018: only 26% were referred by the NCD clinic and 73% were self-referrals.⁴⁶

Treatment – Access to treatment services, as previously mentioned, is very poor with very few laser treatments being carried out. The targets for treatment services set out in the RMT have not been met although the numbers of treatments have exceeded the baseline of 17 treatments provided in 2015. According to the RMT, the laser treatments for DR have increased to 23 in 2016 and 34 in 2017, with six in 2018 (up until the end of June). This compares with a target of 70 in 2016. Targets were unspecified for 2017 and 2018.

An analysis of the data from the eye clinic identifies that there were 52 patients screened and identified as needing urgent follow up in 2017.⁴⁷ Only 23 laser treatments were done (not necessarily from this cohort of patients) and in 2018, to date, 26 patients have been identified and only six laser treatments (also not necessarily from the same cohort). The low numbers treated can be attributed to the lack of an ophthalmologist. The laser has also not been functioning well. The conclusion drawn is that, although there are wider benefits from screening such as raising awareness of DR so that the diabetes can be better managed to reduce progression of the disease and other complications, the lack of treatment services to follow up the screening significantly reduces the effectiveness of screening. The return of the ophthalmologist to Vanuatu shortly, plus the provision of new laser equipment, will address this issue and significantly increase the number of treatments performed both in VCH and on outreach.

Awareness – The focus for awareness training has been the outer islands with five workshops being conducted, training a total of 60 people (two nursing services managers, two NCD vocal point persons, one health promotion officer, 14 nurse practitioners, 17 midwives and 24 registered nurses). The decision to target the awareness training in the outer islands rather than in Port Vila has probably limited the effectiveness and impact of the training due to the lack of access of screening and treatment services in the outer islands. Targeting Port Vila and surrounding areas in Efate is likely to have increased the numbers of referrals for screening. Such awareness training is currently being planned.

⁴⁵ Vanuatu Ministry of Health Annual Report 2017, p 23.

⁴⁶ Information received from the eye clinic, 12 September 2018.

⁴⁷ Defined as having scores higher than M4 or R4 on screening.

Training – The training of one eye health nurse in the PGCEC and the ophthalmologist, due to complete training shortly, has increased the capacity and capability of the DR workforces significantly and will have great benefit for Vanuatu in the future.

5.6 Efficiency

Efficiency is related to relevance, impact and effectiveness. While we were unable to assess the extent to which the available funding was allocated to achieve maximum benefit, we can, however, draw some conclusions on efficiency by examining the expenditure and the way services are delivered. For example, an integrated service will usually be more efficient than a fragmented one. For this reason, the evaluation has examined the extent to which the DR service is integrated with other services.

Efficiency of service delivery

This is a complex issue to assess as there are a range of factors to consider.

The DR services (screening and treatment) are currently delivered by the eye health services. There is a strong argument that they could be delivered more efficiently through the diabetes/NCD services. The evaluation examined this position. **A key limitation for FHFNZ is that service configuration is outside their control and their implementation of the DR Programme has to be planned and implemented within the existing service constraints.**

Interestingly, it was noted that in Solomon Islands, a fundus screening camera that was previously stationed in the Diabetic Clinic prior to the introduction of the DR programme, was removed when the staff member operating it was away and not replaced on her return with the nurse being subsequently re-deployed. The reasons given for these changes were that the camera was needed in the eye clinic or was often under-utilised in the diabetic clinic.

In Lautoka, which is not funded by FHFNZ, the Diabetes Hub which was opened in 2013, was originally intended to be a ‘one-stop shop’ and an eye nurse was based there in 2015, prior to the programme. However, following an equipment breakdown in 2016, the machine was removed when repaired and the eye health nurse returned to the eye clinic.

A range of stakeholders across all countries expressed a wish for a ‘one-stop-shop’ with DR screening being done in the Diabetic Clinic with diabetic patients presenting for management of their diabetes to be screened for DR at the same visit. This would ensure that screening was performed and avoid the challenges faced by the lack of attendance of referred patients to the eye clinic for screening. There are several barriers to integrating DR screening into NCD clinics, including:

- lack of space in the diabetic or NCD clinic for the screening to take place
- the need for specialised equipment such as fundus cameras, which are expensive, to be housed in appropriate surroundings and fully utilised
- the need for staffing of both services to be efficiently deployed, and
- the barriers to providing appropriate training to NCD nurses.

The DR programme has addressed this by training NCD nurses about DR, ensuring that they have the skills to test visual acuity and providing them with Snellen charts so that they can identify any visual impairment in diabetic patients and refer them on for further screening. In the Solomon Islands, two diabetic nurses were supported to complete the six-month PGCEC programme with a view to providing full screening services on their return. The full potential of providing this training to fully integrate the services, however, has not been realised. The Diabetic Clinics are not equipped to provide the services and the deployment of the two DR trained nurses does not allow them to

maximise the use of their skills. Unfortunately, the shortages of nursing staff restrict the ability of NRH nursing directors, who allocate staff, to place specialist trained staff in the areas in which they have specialised. For example, one of these nurses has had her time employed in the REC reduced from two days a week in 2017 to one day a week in 2018 and has been moved from the diabetic clinic to work in the general outpatient clinics the other four days.

As presented in Section 4.2, the Solomon Islands has established one to two month attachments in the REC for NCD nurses to increase their capability in DR and the staff have found this successful, although there has not been a full evaluation of the impact.

Fuller integration of services has worked well in relation to foot care. There is strong evidence of the success from the integration of foot care in the Suva Diabetic Hub. In this case, specialist foot care nurses are based at the Diabetic Hub and provide foot care treatment and advice to patients attending. While it has not reduced the total number of amputations significantly, it has greatly reduced the number of above knee amputations and replaced them with more toe or foot amputations.

In conclusion, delivering the comprehensive DR screening service within diabetic clinics could well improve efficiency of the service, increase the number of patients screened and provide better, more streamlined services for patients. This, however, is outside the control of the DR programme.

Improving the patient pathway

Offering DR services in conjunction with the management of diabetes in a single visit would be more convenient for the patient. There are also other ways of improving efficiency for the patient that have been adopted by some of the countries as they implement the programme. When it can be arranged, patients who are screened and found to need laser treatment may be treated at the same visit if the clinician and the equipment is available. At PEI, where ophthalmologists are usually in attendance, patients are offered this, especially patients from out of Suva who may have trouble returning for treatment. It is not an option in Vanuatu where most patients do not currently have access to laser treatment, and is not often utilised in Samoa as treatment clinic days are fully booked in advance.

In Samoa, however, where there is a close relationship between the medical, nutrition, foot care and DR services for diabetic patients, diabetic patients who are in-patients are sent to the eye clinic for screening from the medical ward while they are admitted. This practice also occurs in Suva.

Targeting awareness training and health promotion activities

In Fiji, scheduling of awareness workshops to primary care staff was deliberately focused on areas near the referral services and in the more populated areas (Central, Western and Northern Divisions) where patients live relatively close to services. This strategy has been effective in terms of maximising the achievements with the resources available with evidence of a substantial increase of referrals for screening following an awareness workshop. In contrast, in Vanuatu, the decision to target the awareness training in the outer islands where there is little access to full screening and grading services, rather than Port Vila where the screening services are significantly under-utilised, has not had the same impact.⁴⁸

Media campaigns on radio and television are expensive but stakeholders believe they are highly effective. For this reason, a further television campaign has been budgeted for Fiji later this year.

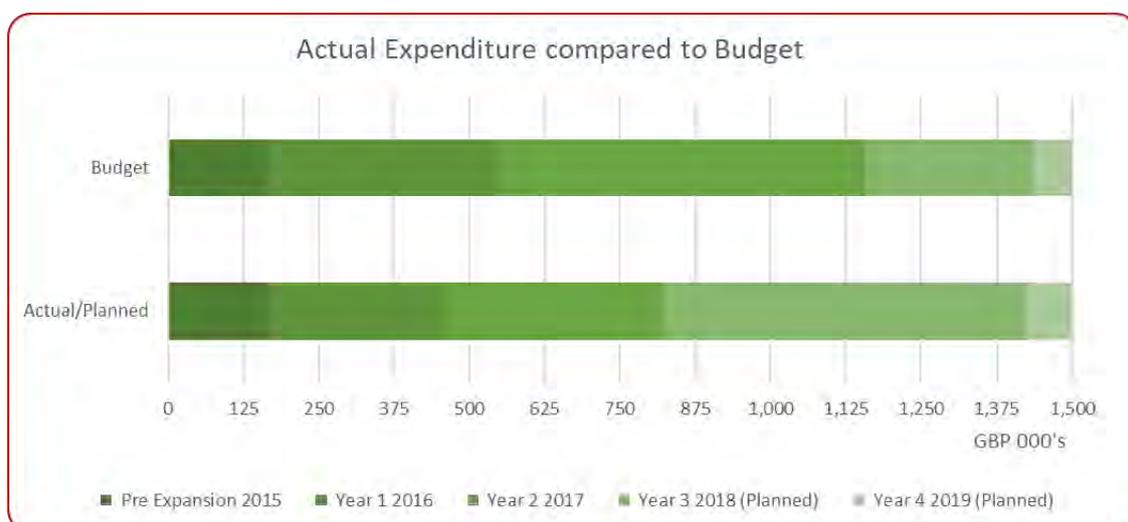
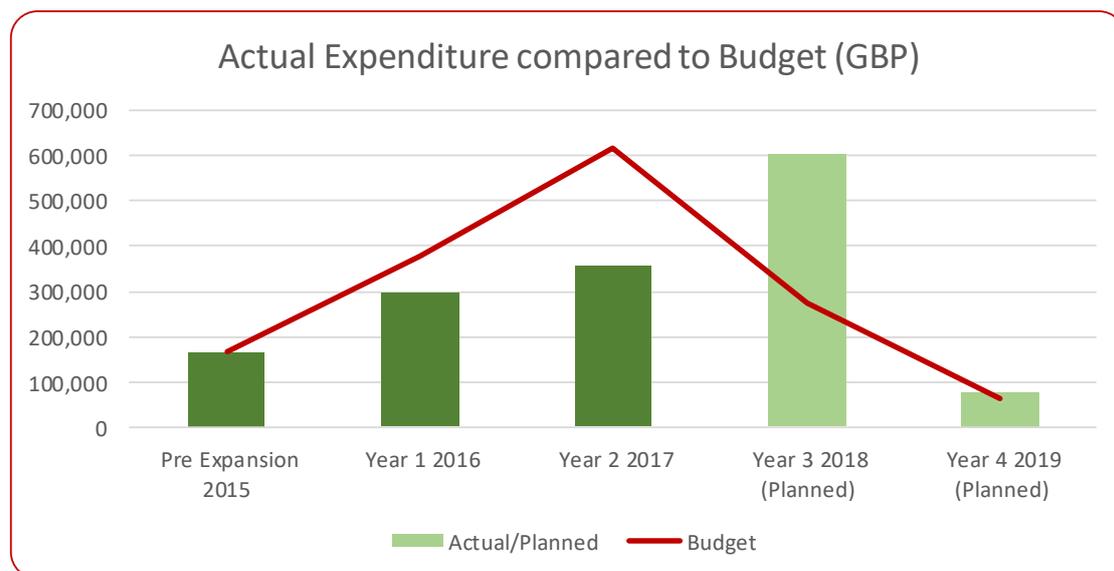
⁴⁸ Note that we refer here to screening and grading with the fundus camera. Eye health nurses in some outlying islands are equipped with ophthalmoscopes with which to do a level of screening. Outreach visits to Santo have also provided screening and treatment services.

Expenditure

A comprehensive financial audit will be conducted at the end of the Trust programme. This report has limited its review to the planned and actual expenditure of the programme, which are indicators of efficiency and also indicate the extent to which the planned deliverables have occurred on time.

The programme runs from July 2015 to June 2019 with a total budget of £2,289,460, of which £1,500,000 comes from the Trust. This analysis focuses on the Trust funding. The balance of the budget is funded by Fred Hollows Foundation and FHFNZ. The original budget of £1,040,855 was increased in June 2016 when the programme was varied to add Samoa and Tonga to the target countries. In the following table the planned expenditure is taken from the varied budget submitted in June 2016. The actuals are based on the 2017 final accounts.

Figure 2: Total spend of Trust funding as compared to budgeted spend



*Years from 2015 – 2019. Planned in 2018 and 2019 is the figure re-budgeted at the end of 2017.

These figures show that there has been considerable underspend over the first three years of the programme. There were two primary reasons for this. Firstly, the evaluation found frustrations in most countries due to delays in government finance departments releasing the funds which deferred

planned expenditure. This was particularly noticeable in Samoa where during the transition to the restructured health service which integrates the NHS back into the MoH, expenditure has required approval from the Acting Manager of Clinical Services (NHS); the General Manager (NHS); the NHS board; and the Finance Department of the MoH before it can be released. In addition, in Tonga, the delay in signing of the MOU delayed £88,256 planned expenditure with the majority of it being spent in 2018. Secondly, around 15% of the total initial budget was assigned to Open DR and PEEK. When these trials proved unsuccessful, the Trust agreed that the funding be redirected to other, more viable, projects in order to maximise the benefits, including providing essential DR equipment to the new eye clinic in Vanuatu, a project evaluation and a Health Promotion workshop. FHFNZ expects to acquit the full project budget of £1,500,000 by the project end in June 2019.

Return on investment

The term 'return on investment' in relation to public health care evaluates the benefits of an intervention against the total costs of its delivery. There is significant evidence from the international literature that investment in healthcare gives a good return on investment. Some recent examples include:

- A WHO extensive study of the evidence for social return on investment from public health policies concluded that the economic and societal burden of ill health and inequalities is significant for governments and clearly established that investment in public health drives social, economic and environmental sustainability.⁴⁹
- A systematic review of the return on investment from a range of public health interventions from 2957 titles, including 52 studies, found that public health interventions are highly cost saving and generally offered considerable return on investment.⁵⁰

Because of the importance and relevance of the DR programme, return on investment is estimated to be quite high in terms of preventing avoidable blindness and the costs associated with diabetes.

Rationale

Diabetes imposes large economic burdens on healthcare systems and the economy of the country, including the direct medical costs of preventing and treating diabetes and its complications and indirect costs of loss of productivity, disability and premature death. WHO estimates that people with diabetes require at least two to three times more in healthcare resources and may account for up to 15% of national health care budgets.⁵¹

For example, The World Bank found

- The estimated average cost of dialysis for patients with renal failure in Samoa was \$38,686 per patient per year in 2010/2011 (more than 12 times the GNI per capita of Samoa).
- Glucose testing strips for a diabetes patient in Vanuatu cost \$0.45 cents per day which equals \$164 per patient per year, more than the total government expenditure on health per capita.
- One patient requiring insulin absorbs the equivalent notional drug allocation of 76.4 other citizens in Vanuatu which means that only 1.31% of the population could be treated with

⁴⁹ WHO (2017) *Investment for health and well-being: a review of the social return on investment from public health policies to support implementing the Sustainable Development Goals by building on Health 2020*. Health Evidence Network synthesis report 51.

⁵⁰ Masters, R et al. (2017) Return on investment of public health interventions: a systematic review. *Journal of Epidemiology & Community Health*, Vol 71: Issue 8.

⁵¹ WHO (2010) Global status report on non-communicable diseases, cited in FHFNZ, Programme Design Document.

insulin before the total Government pharmaceutical and medical supplies budget is expended.

52

Every person with diabetes is at a risk of developing DR which is a cause of visual impairment and irreversible blindness worldwide but particularly in the Pacific. There is, therefore, a high economic cost of not addressing DR. In addition, patients whose diabetes is uncontrolled to the extent of having DR, are also vulnerable to other complications of diabetes, such as renal failure and circulatory problems requiring amputation.

Among people with diabetes the prevalence of DR ranges from 35%⁵³ - 75%⁵⁴. People with DR whose sight is at risk can be treated, usually by laser photocoagulation, to prevent visual impairment and blindness. There is no treatment, however, that can restore vision that has already been lost. Early intervention and vigilant treatment as well as effective management of the person's diabetes can reduce the incidence and progression of DR.

Vision impairment can impact on a person's ability to manage their underlying diabetes, such as monitoring glucose levels, operating an insulin pump, and taking medication. This means that people with limited or no access to diagnosis or treatment for DR often need to rely on family members or others for assistance, or have difficulty managing their diabetes which increases the risk of further complications or death.

Screening for DR has wider impacts in controlling the effects of diabetes. For example, early detection of DR can identify previously undiagnosed diabetes which provides an opportunity to manage and treat the diabetes to prevent other complications arising. For this reason, the management of eye health services for DR and medical services for diabetes go hand-in-hand.

The return on investment for the Pacific DR Programme has been increased by:

- the way the implementation of the programme has been tailored to the different countries enhancing this return, and
- the changes that FHFNZ have introduced into the programme as it has progressed in order to achieve the greatest gain.

5.7 Integration and collaboration

“Improved diabetes and diabetic retinopathy care require stronger strategic collaboration and partnerships across the different professional sectors, including diabetes care, education and eye health. In addition, ongoing service provision requires health management information systems that are secure and work across sectors to enable dissemination and retrieval of patient data at every level.”⁵⁵

We have already referred to the importance of collaboration and integration between eye health services and services for patients with diabetes in terms of sustainability and efficiency. Collaboration of DR and eye health services with diabetes, NCD, and other health services is crucial for the successful prevention, screening, and treatment of DR, where the goal is to ensure that all diabetic patients are regularly screened for DR.

⁵² World Bank (2014) *NCD Roadmap Report*, p.15.

⁵³ WHO (2016) *Global Report on Diabetes*.

⁵⁴ Yau, J et al (2012), cited in Vanuatu Non-communicable disease policy and strategic plan 2016-2020, p.11.

⁵⁵ Queen Elizabeth Diamond Jubilee Trust – Draft Theory of Change.

WHO defines integration as “*the management and delivery of health services so that clients receive a continuum of preventive and curative services, according to their needs over time and across different levels of the health system.*”⁵⁶ In the context of this evaluation we refer to it as the extent to which DR services are integrated into the health service of the country and also the extent to which DR services are integrated with NCD or diabetic services.

Overall, the DR Programme has increased collaboration and the DR coordinators have been instrumental in achieving this. Despite the improvements, there are opportunities to increase the integration of services.

Embedding DR within the health system contributes to the sustainability of DR activities by ensuring continued screening and awareness. The different models of programme delivery have provided the opportunity to examine different models of service delivery in the target countries to compare and contrast the approaches to assess the impact of each.

Referrals

The primary way collaboration has been occurring is through the establishment and use of referral systems for diabetes patients to eye clinics for DR screening from other health providers. Although, anecdotally, the referrals for screening have increased from specific diabetic services that indicate that these referral systems are working, there are no robust ways of monitoring the success of such referrals to provide information on the proportion of diabetic patients that are being regularly screened. This lack of monitoring is related in many cases to the absence of electronic patient records in the countries involved. It is concerning that in Vanuatu the referrals for screening from the NCD clinic have fallen off over the past year and the reasons for this are not perfectly clear.

An attempt to match the number of diabetic patients seen with the numbers screened failed as jurisdictions do not systematically record this information in a comparable form. For example, data on diabetic patients where it does exist, does not separately record new or repeat patients, does not necessarily cover the same geographical area as the DR statistics or simply is not collected at all. The development of tracking systems that can trace the referral pathways would be a valuable investment.

Referrals from primary care providers are generally very low. Targeting awareness training to primary care nurses is one way to address this. Fiji has addressed this issue by extending their awareness training to target general practitioners, with the first such workshop held in October 2018. This is an excellent initiative and it would be useful to monitor its success over the next six months and consider ways to increase the awareness and referrals from the primary care sector.

Equipment

The DR programme has provided HbA1c blood sugar testing equipment in Fiji, Solomon Islands, Tonga, Kiribati and Vanuatu to support the diabetic services. Eye health nurses also use testing strips to check the blood sugar of the patients screened for DR and indicate when referral to NCD/Diabetic services should occur. The evaluation has found consistent anecdotal evidence that previously undiagnosed diabetes has been identified as a result of a finding of DR in a patient presenting with visual impairment.

⁵⁶ WHO (2008) *Integrated health services – what and why?* Technical Brief No.1.
http://www.who.int/healthsystems/service_delivery_techbrief1.pdf

Integration of services

Integration of services has been discussed in relation to sustainability and also efficiency so will merely be summarised here. It is noted that the implementation of the DR programme is based on service configurations already existing in countries and determined by governments.

Table 6: The extent to which eye health services are integrated

Country	Discussion
Fiji	<p>Eye health services in Suva, including DR, are provided at PEI which, although on the grounds of the CWM hospital, is not fully integrated into other hospital services that are run by the MHMS. There are plans for the MHMS to take over responsibility for the eye health services provided at PEI and that this is being implemented incrementally over the next few years. Such a move will increase the potential for further integration of eye health services with mainstream health services provided by CWM Hospital in the future.</p> <p>Diabetes services are provided in diabetes hubs and other primary and secondary government funded health services, so integration of diabetic and eye health services is limited.</p> <p>The lack of integration between the services has been addressed by the development of robust referral processes from the diabetes hub to PEI with a goal of referring all diabetes patients for screening. Evidence suggests that a high proportion of diabetic patients presenting to the hub are likely captured for screening.</p> <p>The good relationship between the DR Coordinator and Diabetes Fiji has resulted in some integration of their services. Some examples include:</p> <ul style="list-style-type: none"> • provision by Diabetes Fiji of consumables for testing of blood sugar levels to the eye health outreach services, and • presentations by the DR Coordinator at meetings of women’s consumer groups to inform women about DR. <p>In Lautoka, referrals are received from the Diabetes Hub but the success of the referral process is unclear.</p>
Samoa	<p>Eye health services are funded and provided at TTM hospital so they are totally integrated with other publicly funded health services.</p> <p>Since the closure of the specialist diabetic clinic in Apia in 2014-15, due to lack of funding, diabetic services have been integrated within general medical services. A recent move to reactivate the Diabetic Association appears to be on hold. The main links with eye health services which provide the DR programme for diabetic patients are the Metuaileoo Environment Trust Inc (METI), an NGO which offers nutritional advice and programmes for NCD, including diabetes; the foot clinic; and the general medical outpatients and in-patient ward.</p> <p>There appears to be a very good relationship between the services outlined above that cater for diabetes patients and the eye health nurses in Apia. Stakeholders interviewed from the other relevant departments were all familiar with DR and the services offered. The foot clinic and the medical outpatients refer diabetic patients for DR screening frequently. Diabetic patients who are inpatients are all sent to the eye clinic for screening from the medical ward while they are admitted and also, as much as possible, are provided necessary treatment during their admission. The eye clinic regularly refers patients found to have high blood sugar to these departments as well. The referral systems appear to work well in Apia, although there is no data to support that. Stakeholders expressed the view that the system would work better if there was a separate diabetic clinic.</p>
Solomon Islands	<p>Eye health services, including DR, are all provided at the REC which is a separate building beside the NRH and almost completely resourced by staff funded by the MHMS. The eye health services, including DR, are integrated with general health services funded by the MHMS and</p>

provided at the NRH. Diabetic services are provided through regional NCD clinics and the National Diabetes Centre which is within the NRH but at the far end of the facility from the REC. A strength of this programme is that there has been the focus on training NCD nurses in DR screening which should improve integration of services. Stakeholders in diabetic services expressed a strong preference for DR services to be based within the NCD services and this objective may have led to their support of training.

The level of collaboration of the services in the past with eye health nurses included in NCD outreach programmes and included in NCD workshops and meetings has stopped. The reasons why this has happened are unclear.

Vanuatu In Vanuatu, DR leadership and policy development is well integrated within the MOH. Its location in the NCD Unit is a considerable strength in ensuring that DR is given a high-level focus and integrated at the policy and management level with other health services, including services for diabetes.

This integration does not necessarily carry on down to service level. The DR programme funding of an HbA1C machine and consumables for the NCD clinic was intended to increase the number of diabetic patients identified and referred for screening but there is no evidence of an increase in referrals. An initial plan to locate the service in a 'one-stop shop' with NCD services was not followed through and, despite the temporary location of the eye clinic next door to the NCD clinic, there is little evidence of a sustained collaboration. For example, although the NCD clinic does refer patients to the eye clinic for screening, there is little follow up and no information on the proportion of those referred who attend.

As Kiribati and Tonga were subject to desk review only, we were unable to assess the extent to which their services are integrated in as much detail. In Kiribati, the DR programme is coordinated by eye health nurses who are employed by the government and, therefore, fully integrated within government eye health systems.

6. Equity and Access

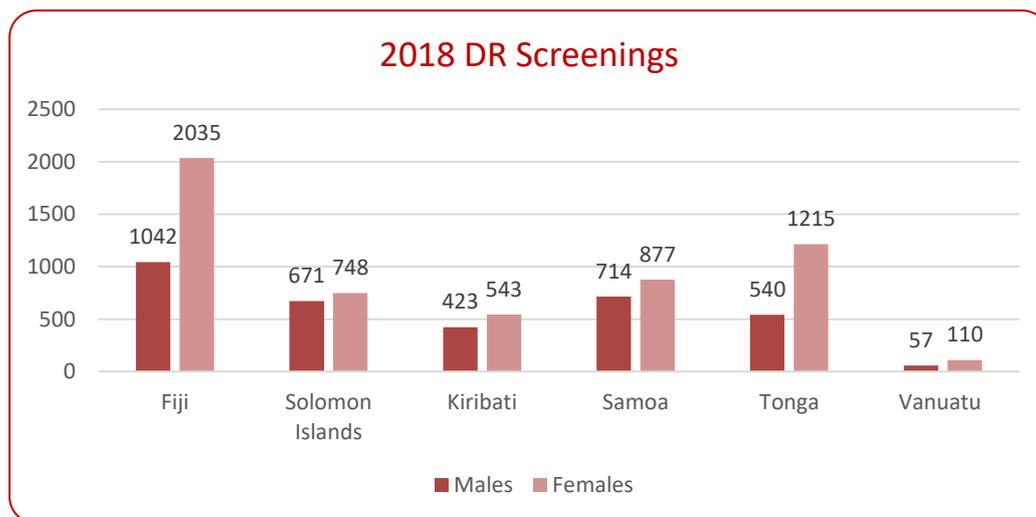
“Equity is the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically. Health inequities therefore involve more than inequality with respect to health determinants, access to the resources needed to improve and maintain health or outcomes. They also entail a failure to avoid or overcome inequalities that infringe on fairness and human rights norms.” (WHO)

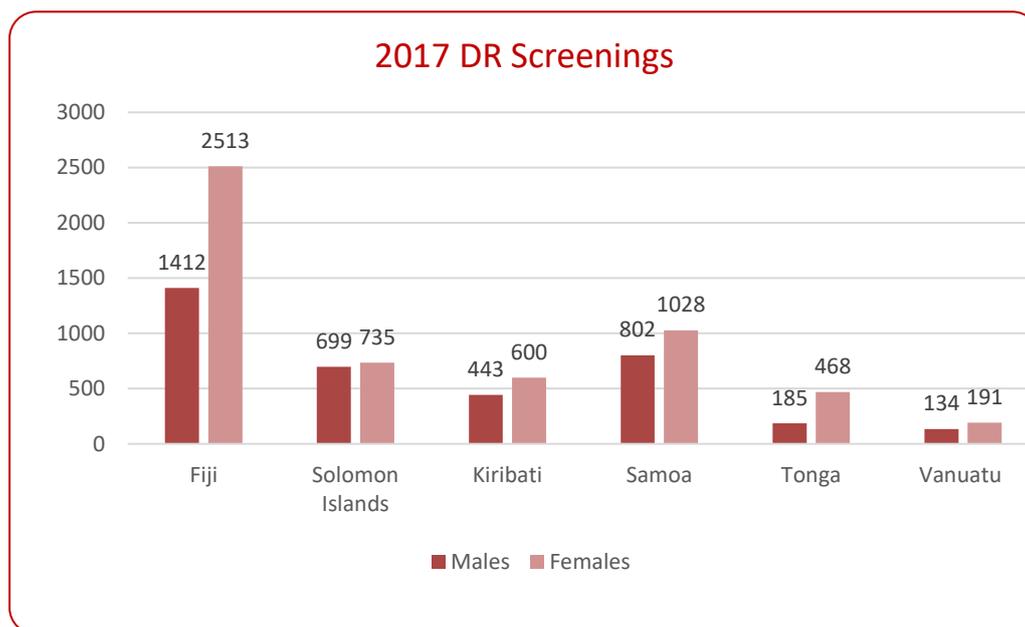
Equity was measured by the extent to which the programme has been successful in achieving health equity and reaching those most at need. The evaluation of equity was limited to gender, and geographical access due to the lack of information on other parameters such as socio-economic status and ethnicity.

6.1 Gender

In all programme countries in both 2017 and the first half of 2018, more women were screened for DR than men. This was most pronounced in Fiji, Tonga, and Vanuatu, as illustrated below (figure supplied by FHFNZ, 2018).

Figure 3: DR Screenings by gender





This underrepresentation of males in screening numbers does not align with evidence that internationally there is higher prevalence of diabetes in men than in women⁵⁷ and suggests that men are not accessing DR services in the numbers that they should be. Stakeholders in Fiji provided anecdotal evidence that younger men avoided being diagnosed with diabetes, even if they experienced symptoms, as this would not make them as eligible or desirable for marriage. While there does not appear to be a concerted push to screen more men for DR, initiatives to screen for DR in Suva workplaces may engage more men in the screening programme. Gender was not a significant consideration in efforts to increase screening and treatment in the other fieldwork countries. There is a high need for more screening and treatment across the entire eligible population. It is possible that targeting men more strongly may not be seen as a priority at this stage.

6.2 Geographically isolated populations

All four fieldwork countries identified issues with delivering DR screening and treatment to people who lived in remote areas and islands – which generally included people who did not live on the main island within close proximity to a well equipped and adequately staffed eye clinic.

There were three recurring barriers to services that were identified for these populations:

- **Transport** – the cost of travelling to an eye clinic for DR screening and treatment is prohibitive and out of reach for many, if not most, people. Costs include ferries, long distance buses, and the cost of staying overnight near the eye clinic if necessary. Further, for diabetics who are hyperglycemic, low vision, or have other complications such as amputations; long and uncomfortable trips are difficult.
- **Lack of trained DR clinicians** - remote populations have limited access to health care and very limited access to nurses and doctors with the skills, equipment, and facilities to screen for and treat DR.

⁵⁷ Kautzky-Willer, A., Harreiter, J., & Pacini, G. (2016). Sex and Gender Differences in Risk, Pathophysiology and Complications of Type 2 Diabetes Mellitus. *Endocrine reviews*, 37(3), 278-316.

- **Low literacy rates** – literacy rates are low in many remote populations, and this limits peoples' ability to engage with health promotion resources. Further, health literacy is also very low and this translates to poor awareness of diabetes and DR and also the use of traditional medicine as an alternative to prescribed treatments for diabetes.

The primary way countries reach these groups is through outreach visits. These are staffed by national DR nurses and ophthalmologists where possible, for example in Solomon Islands and Fiji, or are operated out of the PEI, such as in Vanuatu. Outreach visits are an important component of eye health provision in the Pacific, and a significant resource is put into them. The DR programme has supported DR outreaches by training staff so that more clinicians are available to be part of outreach teams, and by providing portable equipment necessary to screen for, and in some cases treat, DR in outlying islands.

Awareness training for nurses and other health workers in remote areas and islands is another way in which DR Coordinators have increased access to DR health care. This training provides participants with the skills to identify patients who may need to be screened for DR, provide basic information to patients, and refer to the appropriate DR service. Some training has also included visual acuity tests and longer training, such as the NCD attachments in Solomon Islands, provides nurses with the skills to undertake an initial screen.

In Samoa, patients from outlying areas experience barriers travelling to Apia for treatment. We heard that patients from Savai'i (another island in Samoa) have particular difficulty due, in part, to the cost and time required for travel but also obtaining appointments in Apia due to full clinics and, apparently, lower priority given to them. While there are no exact figures, anecdotally around 40% of patients screened in Savai'i and found to be needing treatment do not follow up.

Samoa DR screening in the outlying districts has been more challenging due to staff shortages and lack of equipment. Apart from TTM, there are cameras situated only at Leulumoega and Savai'i. The camera provided to Savai'i in 2018 under the DR programme funding has had a considerable impact in screening there. The provision of a portable binocular indirect -ophthalmoscope under the DR Programme has also increased the ability to undertake screening in other districts. Eye health outreaches are done in collaboration with general multi-disciplinary teams and there have been problems with cancellations or lack of space for eye health staff and the equipment. Providing transport for specific eye health outreach visits would increase the number of people able to be screened.

Solomon Islands DR screening in provincial areas is challenging as provincial hospitals are not equipped for screening with cameras and access is an issue. Nurses have screening equipment that is suitable for low resource settings and refer patients on for further screening and treatment when required. Screening occurs through outreaches. Some of these, however, have been cancelled due to resourcing restraints. These cancellations have impacted on awareness training, which had been delivered in conjunction with the outreach visits. They have also resulted in patients, whose arranged appointments were cancelled at short notice, developing negative feelings towards the service. The Smartscope provided under the DR programme in 2018 and also the planned funding of outreaches from the end of 2018 will increase access to screening in the provinces and also awareness training which is often conducted in conjunction with the outreach visits.

7. Conclusions

The Pacific DR Programme has provided an excellent response to the health crisis currently faced by PICs.

The increasing prevalence of NCD, including diabetes, places tremendous pressure on health services, populations and PIC economies. Not only does the treatment of the complications of diabetes, such as renal failure, DR and loss of limbs, impose significant health costs; but the disability of patients affected also imposes financial burdens on families and Island economies. Good primary and secondary prevention and management of diabetes, therefore, has the potential to greatly improve population health and reduce health expenditure. Identifying DR early and treating it prevents blindness and the costs that blindness or significant visual impairment incurs on families and communities. Importantly, the programme also contributes to the identification and management of diabetes which potentially increases the impact considerably. Reducing the threat of DR is a high priority for the countries selected for this programme.

The DR programme, which has enabled FHFNZ to escalate its previous DR activities, has provided more momentum towards achieving sustainable approaches to addressing diabetic retinopathy in the target countries: Fiji, Kiribati, Samoa, Solomon Islands and Vanuatu.

7.1 How successful has the programme been in integrating DR into existing Government health strategies and improving the sustainability of services?

Implementation of the programme, as has been presented previously, has been contextualised to suit the specific characteristics and needs of each country. While the programme has increased the collaboration between NCD, particularly diabetic services, and eye health services, it has not yet succeeded in achieving full integration into governments' health strategies in all countries. It has, however, established a strong base for further developments in this area.

The points below summarise the current situation in relation to the target countries.

- Only Kiribati, Solomon Islands and Vanuatu specifically include DR in their health plans although NCD and diabetes do feature quite strongly.
- In Kiribati, Samoa, Solomon Islands and Tonga, eye health services are funded and provided by government within public health services.
- In Vanuatu, the confirmation of ongoing government support for the appointment of a DR coordinator and his positioning within the NCD Unit of the Ministry of Health ensures that DR is considered in health policy development, health plans and strategies and service budgets, which supports its sustainability.
- In Samoa, Kiribati and Vanuatu the DR coordinators are integral permanent members of the eye health clinical team and eye health services are fully integrated into the Ministry of Health's delivery of health services.
- In Solomon Islands, government employs all the staff of the REC except the DR coordinator so arrangements need to be in place to continue the functions that the current coordinator provides.
- In the Central Division in Fiji, eye health services, including DR, are funded and provided by FHFNZ outside of the mainstream public health services. This reduces their visibility within the Ministry of Health based in Suva; ensures that they are excluded from Ministry service planning and funding and reduces considerably the potential sustainability.

- Successful health promotion activities have been funded under the programme and government or further donor support will be required to continue these.

Services targeting DR need to be delivered as an integral component of a chronic care management approach to NCD. This is not yet occurring in the countries studied. The relationships with diabetic services are collaborative rather than integrated. Services for NCD and diabetes have high government priority and increased alignment with these services would improve the efficiency and effectiveness, provide a stronger platform and strengthen advocacy for DR services. The high-level integration of eye health with NCD in Vanuatu provides a model for what can be achieved, although the advantages of this high-level alliance has yet to influence integration at service level.

Overall, in the short and medium term most activities will likely be sustained to some extent, with the services being supported by FHFNZ and PIC governments. Longer-term sustainability, however, without further donor investment is unclear.

7.2 To what extent has the programme met its planned results and targets?

While the programme has met the outcomes identified, which are not quantified, it is difficult to assess the extent to which the outcomes are being achieved. The targeted results have been exceeded overall. The extent to which the targets have been met varies between individual countries.

There are some general issues that complicate interpretation of the results that are acknowledged by FHFNZ.

Data issues

It is difficult to accurately assess the extent to which the programme has met its targets due to gaps in the data reported. The RMT as presented was difficult to follow and did not capture all the necessary information to get a comprehensive snapshot of progress. For example:

- Not all the baseline data has been provided or is complete.
- Targets are not clear in the RMT for all countries and have been set conservatively.
- In Fiji the target is lower than the baseline for 2015 and the agreed target for 2017 was not reflected in the RMT.
- The targets and results for Fiji reflect only the services provided from PEI and no information is available from the rest of the country, therefore the results are not a true reflection of the actual service delivery.
- The results, largely collected from main centres only, do not fully capture the wider gains from programmes such as health promotion and awareness training in outlying provinces or islands. The absence of data from across the country meant that the full impact of the programme could not be measured. For example, in Fiji, the programme was delivered in three regions but the RMT only captures information from services delivered at PEI or by PEI staff.

How individual countries are meeting the targets

FHFNZ has met its targets for staff training and exceeded the targets for awareness training.

While the total targets were met, there was variation in the extent to which individual countries met them. The targets were also set very conservatively. In terms of screening and treatment targets:

- **Fiji** met neither its screening target for 2016 (which was lower than the numbers screened in 2015) nor its treatment target for 2017.
- **Kiribati** met all its targets and significantly exceeded its 2017 targets. No treatment target was recorded for 2016.

- **Samoa** significantly exceeded its screening target and exceeded its treatment targets.
- **Solomon Islands** exceeded its targets in both 2016 and 2017.
- There was not enough information from **Tonga** to assess this.
- **Vanuatu** did not meet any of its targets, although the numbers of treatments have increased from the baseline.

Finally, the evaluation has raised issues about the efficiency of screening when there is no way of providing treatment services when DR is identified. It is generally acknowledged internationally that the introduction of screening programmes needs to be accompanied by sufficient support for follow up investigations and treatment.⁵⁸ In Vanuatu, where there is no ophthalmologist and service delivery is reliant on outreaches from PEI, 52 patients who were screened in 2017 and 26 who have been screened in 2018 were identified as having DR needing urgent follow up. This is considerably more than the total number of treatments delivered. While it is understood that screening provides wider benefits, such as opportunities for patient education on management of their diabetes and the need for regular monitoring, there are legitimate concerns about screening when there is no opportunity to treat the disease. One strategy used by FHFNZ to address this is to combine awareness training, screening and treatment into the planned outreach programmes where possible.

7.3 What changes to the programme would improve its effectiveness?

FHFNZ is to be congratulated for the flexibility by which they have amended the activities over the lifespan of the programme to accommodate new information and emerging issues. This has helped to keep the programme relevant and effective.

Strengthening the integration between NCD and eye health services in relation to DR

Closer alignment between the services would improve the efficiency and effectiveness of the DR programme by providing a more streamlined process for patients. We recommend that FHFNZ works with governments in further exploration of the possibilities of providing the services within diabetic clinics to increase the ownership of the programme in diabetic services, improve the patient pathway and therefore increase the proportion of diabetic patients presenting for screening. Such exploration should identify ways to address the barriers and improve the effectiveness of the service.

Services for NCD and diabetes have high government priority and stronger alignment with these services would provide a stronger platform and strengthen advocacy for DR services. The high-level integration of eye health with NCD in Vanuatu provides a model for what can be achieved, although the advantages of this high-level alliance have yet to influence integration at service level.

Developing clear patient referral pathways

Developing a clear protocol for referrals from the NCD services with monitoring of uptake could identify ways to increase the numbers of patients being screened.

While countries vary as to the data they collect and their patient record systems, no country in the programme has the means to systematically track and record the number of diabetic patients and the proportion of referrals from NCD services that are followed up with screening and/or treatment where indicated. This information is critical to determining the extent to which the DR services are reaching diabetic patients. The development of a robust system for monitoring the service would provide evidence necessary to ensure its continued support.

⁵⁸ National Health Committee (2003) *Criteria to assess screening programmes*. P.3.

Increasing involvement and communication in programme planning and monitoring

Increased communication to staff involved in the delivery of the services on the targets and progress towards meeting them would increase the common understanding and the relevance of the targets set. It would also strengthen the collaboration between the services and their involvement in working together to achieve the objectives.

The evaluation found that many stakeholders across eye health, diabetic services and Ministries had not been involved in setting targets and were unaware of the targets or the extent to which they were being met. Wider involvement would increase 'buy-in' and the potential sustainability of the programme. It would also ensure that the targets reflect the government's objectives and, while FHFNZ do refer to health plans and strategies and meet with government officials to discuss the programme, there was no evidence that governments were consulted about the targets. In addition, the budget-setting process and determination of priorities for the activities were not transparent to key staff or wider stakeholders.

Increased involvement of wider stakeholders in each PIC, such as the Ministry staff and staff providing diabetic services would increase the understanding of the programme and could increase the commitment from the Ministry to sustain the services.

Improving information

Improving the data collected and reported on the services, particularly those outside the main centres, would strengthen the ability to evaluate the services and ensure that they were targeted to the most effective activities.

Increasing awareness training, particularly in larger population centres

The workshops aimed at primary health care and NCD practitioners have been very effective at raising awareness of the need to regularly monitor patients with diabetes for the development and progression of DR and increasing referrals to the service. The way that Fiji has targeted their awareness training to focus on larger population areas closer to the services before moving them out to the peripheral areas has proved very effective. Adopting this approach in other countries may have improved the efficiency of the activity and increased their effectiveness in increasing the demand and uptake of DR screening.

7.4 What lessons can be learnt from this programme that could guide future integrated programmes?

Overall, reflecting on the experiences of FHFNZ in implementing the programme *Tackling DR in the Pacific*, the following lessons have been identified. Many of these are applicable to other programmes in the Pacific and also wider afield.

The Pacific is not a case of 'one size fits all'

The Pacific is diverse. Activities designed for one context may not work the same in another. This presents challenges for regional programmes where more nuanced approaches are required at a country level to contextualise the programme to the individual circumstances of the country in which it is being delivered. Tailoring the DR programme to the specific needs and contexts of each country has been a significant success factor in maximizing impact and effectiveness. Equally, employing different models of programme delivery with emphasis on different activities also provides good opportunities to assess what is working well in one country and whether it may also be effective in another jurisdiction.

Building leadership and country ownership takes time, but is critical for sustainability

Activities are less likely to succeed and be sustained if there is no local leadership and ownership of activities. Effective leadership can take a long time to develop but once it is there it is easier to sustain by growing successive leaders. Strong leadership greatly enhances the likelihood of activity benefits continuing beyond development partner support. FHFNZ has recognised this by investing heavily in leadership support in Vanuatu which is expected to pay dividends in the medium term and long term future.

Finding the right person for the role of DR Coordinator has been instrumental to the success of DR activities in some countries. These individuals were well connected, well respected, understood the health system, and were motivated to make a positive difference. This has particularly been the case in terms of increasing collaboration, generating buy-in, and gaining the support of government officials and Ministers. For future initiatives, time should be invested in ensuring in-country positions are filled by those best positioned to drive change.

Long term success is more likely when activities leverage off established systems and processes

Leveraging off country systems is not always feasible especially in a specialised area where country systems may not exist. Establishing parallel systems inhibits full integration and sustainability. Separate systems should be as closely coordinated and aligned as possible.

The leveraging of the DR programme off existing FHFNZ eye health programmes has been able to utilise the infrastructure and workforce capability already in place and the solid relationships between eye health service providers, PEI and FHFNZ.

Activities need to be well-supported by robust monitoring and reporting

Investment in establishing good information systems could potentially reap significant benefits in informing programme evaluation and future development and, also, providing the evidence required to attract ongoing support from governments and development partners. A key measurement of effectiveness is the comparison of results against quantified baseline data and targets. In health programmes, monitoring patient pathways through different services also provides good insight into the outcomes for individual patients which, when amalgamated, build up a clear picture of the overall health outcome of the programme.

8. Recommendations

Overall, the programme has had a significant impact on strengthening and expanding DR services through increasing the capability and capacity of the workforce and equipping health workers to provide effective DR services. A key achievement has been the significant increase in awareness and knowledge about DR and its relationship to diabetes. This training has been delivered to a wide range of health workers through workshops and presentations and to the general population through health promotion activities and also, significantly, through interactions with nurses and other health practitioners who have been informed through the professional development provided through the programme. These activities have combined to increase the demand for DR services and expand the services to meet the demand.

The evaluation includes two sets of recommendations: one for short-term adjustments to the current programme which finishes in June 2019 and one to guide the development of future programmes.

8.1 Recommendations for the DR Programme

This evaluation was an outcome evaluation occurring near the end of a four-year programme. There is just over six months remaining under the Trust funding to institute any changes to the current programme. In addition, one of the strengths of the programme has been FHFNZ's responsiveness to the issues arising during the programme and its flexibility in reviewing the workplans annually to target the activities to meet the changing requirements. These recommendations are based on the current state of the programme in the target countries and focus on ways that the evaluation team considers would position DR services better for the future.

In working with FHFNZ during this evaluation, we are aware that FHFNZ is already aware of many of these issues and addressed some of the challenges. FHFNZ's proposals for further activity also reflect the areas identified by the evaluation as potential weaknesses.

The evaluation recommends that FHFNZ:

1. Focuses on planning for the DR programme that follows the Trust funded programme

It is important to set up a solid platform for the design of future activities. Specific activities may include

- Identifying funding sources, including support from governments and donors, and
- Workforce planning to identify ongoing and future workforce development needs and specific proposals to meet them.

2. Works with governments to strengthen the inclusion of DR in national plans and strategies

The evaluators consider that it is a priority for the last part year of the programme to work with governments to increase the visibility of eye health and DR screening so that it is specifically included in Governments' Health Strategic Plans and Operational Plans. This will ensure that it is included in health budgets and help to promote ongoing sustainability of the gains achieved through the programme.

3. Strengthens partnerships with NCD and diabetic services

It is recommended that there is a strong focus on involving the partners in these related services in order to ensure that the gains achieved are sustained. This would involve sharing the results of the evaluation and working together on plans and projects for the future development of the programme, including ways to improve and monitor referrals.

4. Focuses awareness training programmes in areas that have not been covered

This will vary from country to country and requires an assessment of the area of greatest need. In Fiji, such an examination has led to the expansion of programmes to community health workers and general practitioners. The extent to which other countries have done this is not clear. In Vanuatu, for example, targeting workshops to areas close to Port Vila may bring the greatest benefit, particularly with the imminent arrival of an ophthalmologist to deliver the laser treatment.

5. Considers developing training programmes in screening for DR that are more accessible to nurses who are not specialist eye health nurses

The previous 6 month PGDEC that has now been discontinued was widely considered by stakeholders to provide excellent training and was more accessible for NCD or diabetic specialist nurses than its replacement 1-year PGDEC due its focus and length. Development of a shorter programme focused specifically on DR competencies would provide additional capacity and capability in DR and also assist with the integration of DR into diabetic services. The attachment in the REC that Solomon Islands has provided NCD nurses in the Solomon Islands is a useful exercise which could be explored further as a replacement.

6. Gives priority to treating patients who have been screened and identified to need treatment

It is recommended that these patients are identified and particular attention is paid to organising treatment services that are accessible to the patients that have been screened and not treated with a goal to ensure that patients already screened are treated. This may require increasing the capacity and equipment for treatment in some areas, or supporting patients to travel to eye centres for laser treatment.

7. Works with governments to ensure that funding is released to purchase all planned equipment

There is a considerable under-expenditure in the programme to date due, in part, to delays in getting the funds released. FHFNZ has identified equipment required and it is important to ensure that this can be purchased and installed by the end of the programme.

8. Increases health promotion activities with particular investment in resources and initiatives that are likely to have the most benefit

The programme has identified the benefits of media campaigns and it is recommended that funding is allocated, where available, to another round of these before the programme ends. Developing printed resources that can continue to be used after the programme finishes would also be beneficial.

Country specific recommendations

Recommendations specific to countries that have been identified during the fieldwork are listed in Table 7 below. This list excludes issues that have more general application.

Table 7: Country specific recommendations

Country	Recommendations
Fiji	<ul style="list-style-type: none"> • Continue to work with the Government on integrating eye health services better into public health services and increasing the government resourcing of services • Monitor the health administrative re-structuring as it progresses to assess the potential impacts on DR services and address issues that are identified to ensure ongoing service provision
Samoa	<ul style="list-style-type: none"> • Consider purchasing a laser machine for Savai'i and possibly training the eye health nurse based in Savai'i to deliver laser treatment or developing other ways to increase the access to treatment services for patients from Savai'i. • Consider ways to increase the outreach services to outlying areas. • Consider widening the provision of screening cameras to more district hospitals and health centres⁵⁹
Solomon Islands	<ul style="list-style-type: none"> • Continue to work with Government to strengthen the links between NCD clinics, the Diabetes Centre and the REC at a strategic and workforce level • Consider purchasing a screening camera for location at the Diabetes Centre and work with the Nursing Division to maintain deployment of trained staff there to operate it • Continue to plan ways to maintain the coordination of the DR service following the termination of the programme in June 2019.
Vanuatu	<ul style="list-style-type: none"> • Focus awareness training on areas closer to Port Vila • Working with the incoming ophthalmologist, develop a service plan for DR services which includes increasing outreach services to outlying islands for both screening and laser treatment and provide portable equipment to support the plan.

8.2 Recommendations for integrated programmes in the future

These recommendations build on the previous discussions, particularly Section 7.4.

1. Contextualising the programme to the individual country

As discussed earlier, what has worked particularly well in the DR programme under study is the way that the FHFNZ has varied the programme to account for the particular characteristics or conditions of the country concerned. While all the components of the programme have been implemented in each country, the emphasis is different based on what is needed to make the most impact. This is an important element of regional programmes and should be considered in the design of future programmes.

⁵⁹ Note that Samoa has four qualified eye health nurses who provide services to outlying areas and supplying them with cameras would make services more accessible to the public and reduce the pressure on services in Apia.

2. Ensuring that the eye health and diabetes services work together in the most effective way possible

Diabetic retinopathy is a condition of the eye. It is also a complication of diabetes. This means that, to be successful, the programme to prevent, diagnose, monitor and treat it needs to involve both NCD and eye health services. Services that are targeting DR should be delivered as an integral component of a chronic care management approach to NCD. Full integration of the services such as a one-stop shop for diabetes patients that provides DR services with the diabetic case management of the patient, while the optimum solution, is not always possible in the context of how health services are organised, managed and resourced. If the services cannot be integrated, then there should be strong collaboration in a way that suits the services, to ensure maximum effectiveness and efficiency.

The rationale for this includes the following points:

- a. Health services should be primarily focused around the needs of the consumers. There is a wealth of international literature on the benefits of patient-centred care which is supported by research, national policies and consumer rights charters.⁶⁰ As all patients with DR have diabetes, services work more effectively if diabetic and eye health are combined or co-located. Services need to be organised around ensuring a patient pathway that is convenient for the patient.
- b. Closer alignment between the services would improve the efficiency and effectiveness of the DR programme by providing a more streamlined process for patients. The DR service needs to capture as many diabetic patients as possible for screening. Screening for DR while the patient is attending the diabetic/NCD clinic or while an in-patient reduces the number of visits required and is likely to increase the numbers screened.
- c. NCD and eye health staff need to work together to facilitate the provision of a seamless service. The effectiveness of the reach to patients can be maximized if the health workers involved have common goals and a common understanding of the condition, the causative factors and clinical response. The best way to achieve this is for staff and management from both services to work together in the service planning, target setting, and success factors of the programme.

⁶⁰ Patient-centred care is defined as ‘providing care that is respectful of and responsive to individual patient preferences, needs and values and ensuring that patient values guide all clinical decisions’. (Institute of Medicine, quoted in *Health Navigator NZ*. In www.healthnavigator.org.nz/cliniciand/p/patient-centred-care/)

9. Case Studies

Two case studies are presented for comparison, analysis and illustration of the coordination. The countries selected: Samoa and Vanuatu, demonstrate two styles of coordination that are quite different but both effective for the maximum impact in their countries.

9.1 Samoa

In Samoa, the DR Programme is coordinated by four eye health nurses who are qualified in DR and already employed in the NHS delivering eye health services. They have incorporated the requirements of the DR Programme into their eye health positions in the districts in which they are employed. While each nurse takes responsibility for coordinating the DR Programme in the district in which he/she is employed, they work together and consult on their delivery of the DR Programme to ensure that there is no overlap and maximum efficiency.

The funding and establishment of the DR Programme has enabled eye health nursing services to be reconfigured. Previously services were fragmented with the trained eye health nurses being assigned to districts under the management of district health managers. Without access to screening equipment, they were unable to use their DR training and were often re-deployed by district managers into general health areas to meet staffing shortfalls. Under the DR Programme, management support was obtained for restructuring the deployment of the eye health nurses to coordinate DR services under the auspices of the lead ophthalmologist based in Tupua Tamasese Meaole (TTM) hospital in Apia. This has enabled all districts to work together to maximum effect.

Of the four DR Coordinators:

- one is permanently employed in the TTM hospital in Apia
- one is in Savai'i (another island), based at Malietoa Tanumafili II (MTII) Hospital
- one covers the western part of Upolu, including Leulumoega, Faleolo and Sa'anapu, and
- one covers the eastern part of Upolu, including Lufilufi, Lalomanu and Poutasi.

Because of the current staff shortages in TTM, all of these nurses are spending a proportion of their time in TTM which reduces the time available in their districts while also maximizing the DR service delivery.

Advantages of the DR Coordination model

This model has been very effective in Samoa.

- Using eye health nurses who are employed in public services for the DR coordination enables them to integrate the DR programme seamlessly into their regular workloads.
- Training and using staff who are already employed in public services increases the sustainability of the service.
- The DR Coordinators can be re-deployed to suit the service needs, for example varying the amount of time that they spend in their districts or at TTM to address staff absences or shortages.
- Their familiarity with smaller districts, facilitates their responsiveness and enables them to target the programme to the assessed needs more easily.

9.2 Vanuatu

In Vanuatu, the DR Programme is coordinated by a full-time DR Coordinator employed by the Ministry of Health placed within the NCD Unit rather than in Vila Central Hospital (VCH). In 2015 when the DR Programme was introduced, the level of eye health services was insufficient to support the DR Programme. This meant that the programme required the development of a new design that was fit for purpose. FHFNZ, therefore, focused on setting up a management system for the DR Programme that would ensure its successful implementation and sustainability. Initial investment included the contracting of a part-time consultant in 2015 to scope what would be needed and set the relevant platforms in place. It was crucial for the DR Programme to work with the government to establish a position for a DR Coordinator.

The agreement with the Ministry of Health to establish a position for a National Eye Health Coordinator within the Ministry itself and base it in the NCD Unit was a key achievement for the DR Programme. This Unit focuses on planning and policy rather than direct service delivery which is provided in the VCH. The Unit is very strategically placed with the manager of the Unit reporting to the Director of Public Health.

In June 2017, the Ministry seconded an eye health nurse from Malekula (one of the outlying islands) to coordinate eye health services, including DR. This position has recently been re-allocated permanently.

The DR Coordinator is trained in DR and, when other priorities permit, delivers services in the eye health unit at VCH, as well as providing strategic direction to all eye health services and coordinating the DR programme.

Advantages of the coordination model

The positioning of the DR Coordinator in the NCD Unit of the MOH has been effective in Vanuatu.

- It has enabled support for the DR Programme from the highest levels of the Ministry
- Its integration into the national level priority setting, service planning and reporting raises the profile of eye health and DR.
- It also integrates the planning and policy for eye health with NCD which works well for DR.
- The DR Coordinator has good access to other Ministry resources, such as health promotion, finance, planning and IT services.
- The wider role of the DR Coordinator in the coordination of all eye health services has provided leadership and representation of eye health in wider strategic forums at national level.

One disadvantage is that the selection of the eye health nurse from Malekula has left a gap in the services in this district although it has provided the additional service of an experienced DR nurse in Port Vila.

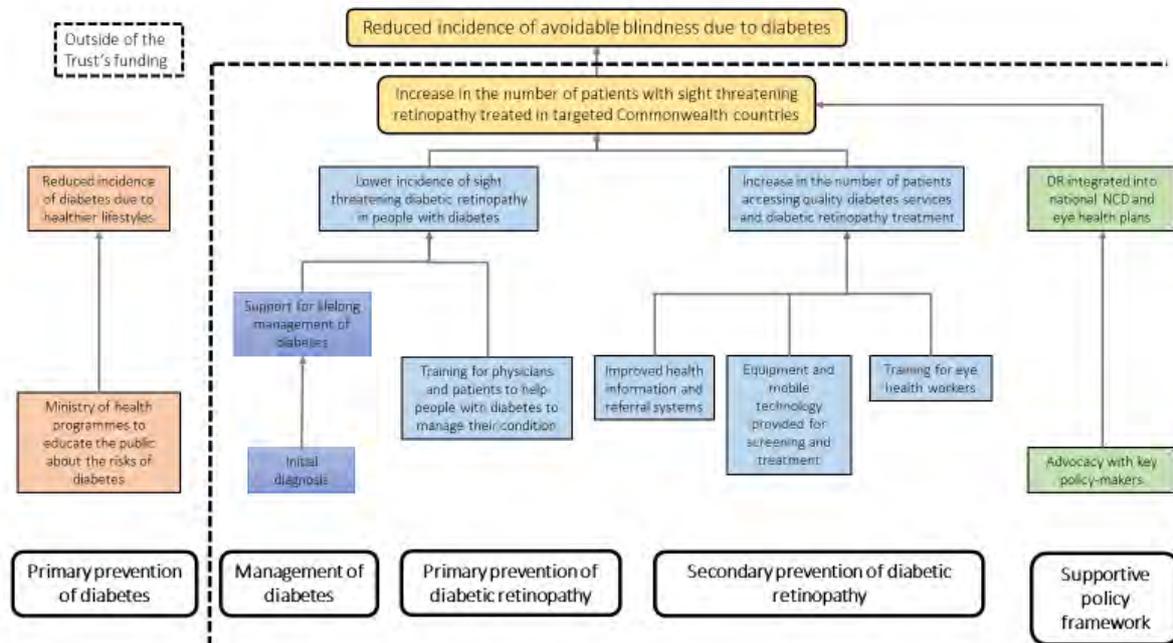
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Annexe 1: Glossary

Term	Definition
DAC Criteria	Development Assistance Committee (OECD) criteria for evaluation of development programmes
Diabetes	Fasting plasma glucose ≥ 7.0 mmol/L (126 mg/dl) or on medication for raised blood glucose
Integration	The management and delivery of health services so that clients receive a continuum of preventive and curative services according to their needs over time and across different levels of the health system.
Primary prevention	Primary prevention, in this context, focuses on reducing the incidence of diabetes and the incidence of retinopathy among people who know that they have diabetes. Trust funded DR programmes focus on the incidence of retinopathy among people who know they have diabetes. Reducing the incidence of diabetes is implemented by governments and is outside the scope of DR programmes.
Raised fasting blood glucose	Capillary whole blood value ≥ 6.1 mmol/L or currently on medication for raised blood glucose
Secondary prevention	Secondary prevention entails early detection of sight threatening retinopathy followed by effective treatment.
The Trust	The Queen Elizabeth Diamond Jubilee Trust
The DR Programme	For the purposes of this evaluation, the DR Programme refers to the Pacific Diabetic Retinopathy Programme which is funded by the Trust.

Annexe 2: Queen Elizabeth Diamond Jubilee Trust – Summary Theory of change

Figure 4: Queen Elizabeth Diamond Jubilee Trust – Summary Theory of change



Annexe 3: Evaluation Framework

The evaluation framework guides the interpretation and judgement processes undertaken by this evaluation. The four key evaluation questions (KEQs) and sub-questions, which were developed in the initial phase of the project, are presented in the two tables below linked to relevant Development Assistance Committee (DAC) Criteria. Information sources used are listed in the far right column.

Table 8: Evaluation Framework

Questions	Relevant DAC Criteria	Information sources
KEQ 1: How successful has the programme been in integrating DR services into existing national and regional health policies, strategies, and programmes and improving the sustainability of services?		
1.1 How well aligned are the activities, planned results, and targets with PIC health department work programmes (both in terms of diabetes and eye health)?	Relevance and Sustainability	Documents provided by FHFNZ (including design documents) Documents provided by PICs (including health policies and strategies and programme information) Stakeholders (especially DR Coordinators and PIC Government staff)
1.2 How has the Programme enhanced existing DR programmes (including diabetes and eye health)?	Effectiveness	Documents provided by PICs (including health policies and strategies, programme information, and information on service provisions) Stakeholders (especially DR Coordinators and PIC Government staff) Documents from FHFNZ.
1.3 What impact has the Programme had on improving the PICs' capacity and capability to address diabetes associated blindness in their populations?	Impact, Sustainability	Documents provided by FHFNZ (especially results measurement tables (outcomes 1,2,4,5,6,7)) Documents provided by PICs (e.g. annual reports, job descriptions) Stakeholders (especially DR Coordinators and PIC Government staff)
1.4 Has service, national and regional collaboration relating to DR increased as a result of the Programme?	Effectiveness and Sustainability	Documents provided by FHFNZ (including DR snapshots, narrative reports, design documents, and results measurement tables) Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)
1.5 To what extent would activities and gains as a result of the Programme be able to continue without the current level of funding?	Sustainability	Documents provided by FHFNZ (including budgets and design documents) Documents provided by PICs (including health policies and strategies and programme information) Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)
KEQ 2: To what extent has the Programme met its planned results and targets?		
2.1 What new programmes, initiatives, and services to prevent and treat DR have been introduced under the DR programme?	Impact	Documents provided by FHFNZ (including budgets and design documents) Documents provided by PICs (including health policies and strategies and programme information) Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)

Questions	Relevant DAC Criteria	Information sources
2.2 What positive and negative changes have occurred from the Programme, both intended and unintended?	Impact, Effectiveness	Documents provided by FHFNZ (especially evaluative and feedback documents) Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)
2.3 How successfully is each PIC tracking against the targets in the results measurement table and how likely is that the PICs will achieve their targets by the end of the programme?	Effectiveness, Impact	Documents provided by FHFNZ (including DR snapshots, narrative reports, design documents, and results measurement tables) Stakeholders (including FHFNZ staff, PIC Government staff, DR Coordinators, and clinic staff)
2.4 To what extent has the Programme been successful in achieving health equity across the region – reaching those most at need (within and between PICs)?	Impact, Effectiveness	Documents provided by PICs (including demographic data on activities and targets) Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)
2.5 Were all relevant stakeholders adequately involved in the development and implementation of the Programme?		Documents provided by FHFNZ and PICs (including consultation documents, agendas, and meeting notes) Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)
KEQ 3: What changes to the Programme would improve its effectiveness?		
3.1 What changes could be made to the Programme before June 2019 that could improve its effectiveness?	Effectiveness Impact	Findings from KEQs 1-3. Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)
3.2 What factors have influenced success?	Efficiency Effectiveness	Documents (including narrative reports) Stakeholders (including FHFNZ staff, PIC Government staff, DR Coordinators, and clinic staff)
3.3 What factors have impeded success?	Effectiveness Efficiency	Documents provided by FHFNZ (including narrative reports) Stakeholders (including FHFNZ staff, PIC Government staff, DR Coordinators, and clinic staff)
KEQ 4: What lessons can be learnt from this programme that could guide future integrated programmes?		
4.1 Are the current programme activities most appropriate to make the intended impact of reducing the incidence of blindness from diabetes in the Pacific?	Relevance	Documents provided by FHFNZ (including DR snapshots, narrative reports, design documents, and results measurement tables) Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)
4.2 What are the main lessons for future programmes?	All DAC criteria	Findings from KEQ 1-3. Stakeholders (including FHFNZ staff, PIC Government staff, staff of other NGOs, DR Coordinators, and clinic staff)

Annexe 4: Evaluation Participants

Table 9: Evaluation Participants

Organisation	Role/Position
Regional Group Interview in Auckland (20 August)	
Fiji	Four participants, including DR Coordinator and Senior Eye Technician
Kiribati	Three participants, including DR Coordinator
Samoa	Three DR Coordinators
Solomon Islands	Eye Health Coordinator - MOH, Diabetic Retinopathy Coordinator, and Manager
Tonga	Eye health nurse and Medical Assistant
Vanuatu	DR Coordinator
Fiji	
Colonial War Memorial Hospital	Medical Superintendent Physician, Diabetes Hub
Department of Foreign Affairs and Trade, Australia	Counsellor, Development Cooperation Fiji and Tuvalu Senior Program Manager Health – Bilateral Team Leader, Australia’s support to Fiji Health Sector
Diabetes Fiji	Manager
Fiji Government	Assistant Minister of Health
Ministry of Health	Chief Medical Officer, Epidemiologist, Health Programme Chief Ophthalmologist, Lautoka Hospital Divisional Director Nursing, Central Division Eye Health Nurse, Nadi Hospital Head, Wellness Unit & National NCD Advisor Specialist Eye Health Nurse, Lautoka Hospital
New Zealand High Commission	Counsellor (Development), Fiji Bilateral and Pacific Regional,
Pacific Eye Institute	Consultant Ophthalmologist DR Coordinator Director and Consultant Ophthalmologist General Manager Senior Eye Technician Team Leader, Diabetic Eye Clinic, Two final year students in MMed programme
World Health Organization	Consultant NCD-PEN Team Coordinator Pacific NCD
Samoa	
Matuaileoo Environment Trust Inc	Director, METI Clinic
Ministry of Health	Acting Chief Executive Officer NCD Coordinator
New Zealand High Commission	First Secretary (Development)
World Health Organization	WHO Representative, Samoa

Organisation	Role/Position
Samoa	
National Health Service	General Manager Acting Clinical Services Manager, NHS Diabetic Foot Clinic DR Coordinator, Eastern Samoa (Apia) DR Coordinator, Western Samoa DR Coordinator, Savai'i Lead Ophthalmologist (by teleconference) Principal Nurse, NHS Senior Nurse Specialist, Medical Ward & Clinic, NHS
Solomon Islands	
Department of Foreign Affairs and Trade, Australia	First Secretary – Health
Honiara City Council	Director of Nursing NCD Coordinator NCD Nurse, Kukum
New Zealand High Commission	Development Counsellor Development Coordinator (Health)
Ministry of Health and Medical Services	Undersecretary Associate Director of Nursing, NRH Director of Human Resources Health Promotion Human Resources Consultant National Diabetes Centre/CNC National Eye care Coordinator National NCD Coordinator Nurse Educator, NRH
Regional Eye Centre	Consultant Ophthalmologist DR Coordinator General Manager Two eye health nurses
World Health Organization	Non-Communicable Diseases Professional Officer
Vanuatu	
Diabetic Association	Chairman
New Zealand High Commission	Programme Coordinator
World Health Organization	Medical Officer, Noncommunicable Diseases,
Ministry of Health	Acting in charge Eye Clinic (until 11/09/18), Vila Central Hospital Acting in Charge, Eye Clinic (from 11/09/18), Vila Central Hospital Assistant NCD Officer, Public Health Clinical Nurse Supervisors, Vila Central Hospital Diabetic Retinopathy Coordinator, NCD Unit Director of Curative Services Director of Public Health National Mental Health Coordinator & NCD Lead National Planning Officer Nurse in Charge, NCD Clinic, VCH Senior Eye Nurse, Eye Clinic, VCH

Annexe 5: What has been provided under the Trust funding

Table 10: What has been provided under Trust Funding

Country	
Fiji	<p>Coordination of the programme</p> <ul style="list-style-type: none"> • funding the employment of a full-time DR coordinator to organise the programme, lead the health promotion and stakeholder engagement with regional, national and local stakeholders, and conduct the DR awareness training <p>Workforce development</p> <ul style="list-style-type: none"> • training for eight eye health nurses (Post-graduate Certificate in Diabetic Eye Care (PGCDEC) – of whom seven remain in the Fijian workforce • training of four medical practitioners in Master of Medicine (Ophthalmology) of whom two have completed their training and two are still in programme • training of 386 primary health care and diabetes nurses (<i>around 80% of all relevant nurses</i>)⁶¹ in DR awareness (two-day course) • training of 271 community health workers for primary healthcare staff (<i>around 25% of all community health workers</i>)¹ in DR awareness • training of 9 doctors in DR awareness • development and printing of a community health worker training manual and a DR manual which is forming the basis for the region <p>Equipment</p> <ul style="list-style-type: none"> • provision of DR equipment at PEI Diabetes Eye Clinic, Lautoka Hospital, and Labasa Hospital, a smartscope (portable screening tool) used at the Mobile Eye Clinic and DR outreach visits • maintenance of equipment for the mobile eye clinic <p>Health Promotion</p> <ul style="list-style-type: none"> • development and printing of health promotion resources, including posters, and flipchart and manuals • development and presentation of a television advertisement that played across Fiji and a radio talkback show • health promotion, community engagement events and campaigns across Fiji <p>Global participation</p> <ul style="list-style-type: none"> • supporting the participation of the DR Coordinator and other eye care professionals at the PACEYES conference in 2016; a DR Health Promotion Regional Workshop in Auckland in 2018; and a DR workshop in Nadi, and <p>Research</p> <ul style="list-style-type: none"> • supporting a qualitative evaluation of the primary health care training in Fiji • retrospective analysis of the PEI diabetes clinic data to assess factors affecting patient attendance and compliance with follow-up.
Kiribati	<p>Coordination of the programme</p> <ul style="list-style-type: none"> • engagement of a consultant to support the DR Coordinator in country planning for the programme once the DR Coordinator was appointed

⁶¹ Anecdotal evidence – No workforce information available on the total numbers of these workers.

- Kiribati**
- funding for a DR Coordinator to organise the programme, lead the health promotion and stakeholder engagement with regional, national and local stakeholders, and conduct the DR awareness training
- Workforce development**
- the DR Coordinator has led one day DR awareness workshops during outreaches, and raised awareness about DR amongst primary level clinicians and community members through clinic visits
 - funding for two nurses to complete the PGCDEC
- Health promotion**
- development of health promotion resources such as posters and leaflets
 - installation of billboards and public health messaging to spread community awareness
 - coordination of a two-week DR media awareness programme
- Equipment**
- purchase of a Binocular Indirect Ophthalmoscope
 - provision of DR equipment, including HbA1c and associated consumables, and
- Global participation**
- attendance of the lead ophthalmologists and eye nurses at a DR Health Promotion Regional Workshop in Auckland in 2018.
- Samoa**
- Coordination of the programme**
- supplementing the salaries of the four DR Coordinators to organise the programme, lead the health promotion and stakeholder engagement with regional, national and local stakeholders, and conduct the DR awareness training
- Workforce development**
- training of one eye health nurse to complete the PGCDEC
 - training in DR awareness through workshops and presentations for general practitioners, new graduate nurses and 129 primary care workers
- Equipment**
- provision of DR diagnostic, screening and treatment equipment for Samoa, including portable equipment that can be used for outreaches, and a screening camera for Savai'i, and
- Global participation**
- attendance of DR Coordinators at a DR Health Promotion regional workshop in Auckland in 2018.
- Solomon Islands**
- Coordination of the programme**
- funding the employment of a full-time DR Coordinator since June 2016 and all the DR coordination activities, including attendance at stakeholder engagement meetings, events, and collaborations with local, national and regional organisations/stakeholders
- Workforce Development**
- awareness training for healthcare workers (seven of the nine provinces have been covered and more than ten Trust funded training programmes have been conducted)
 - training of three nurses in the PGCDEC, and
 - training of one medical practitioner towards a Masters in Medicine (Ophthalmology)

- Solomon Islands**
- Equipment**
- provision of a Smartscope and other DR screening and treatment equipment for REC, including a laser and cameras.
- Health Promotion**
- development of health promotion resources
 - campaigns to increase community awareness, including health promotion events and campaigns (e.g. World Sight Day campaign 2016 and 2017, 2018)
 - supporting the participation and attendance of DR workforce from SI at the DR Health Promotion Regional Workshop in Auckland 2018
 - funding an initiative to strengthen health management information systems in country, and
- Global Participation**
- funding the participation and attendance of the National NCD Coordinator and eye centre ophthalmologist at the Durban Symposium 2016 in South Africa, and
 - Attendance of the DR Coordinator at Pacific DR Programme workshops.
- Tonga**
- Coordination of the programme**
- funding for a DR Coordination group to organise the programme and lead the health promotion and stakeholder engagement with regional, national and local stakeholders
- Workforce development**
- two-day DR awareness workshop in Ha’api, with 13 nurses
 - funding for fuel costs for outreaches and workshops
- Equipment**
- provision of DR screening and treatment equipment, including cameras, a Binocular Indirect Ophthalmoscope, and HbA1c and associated consumables have been ordered
- Health promotion**
- development of a pamphlet and radio program
- Global participation**
- attendance of a senior DR nurse at the IDF Congress in Abu Dhabi in 2017
 - participation of the senior DR nurse at the National Eye Coordinator Workshop in Auckland in January 2018, and
 - attendance of the DR workforce at the DR Health Promotion Regional Workshop in Auckland in 2018.
- Vanuatu**
- Coordination of the programme**
- funding a part-time DR Coordinator from until mid 2017 to establish the programme and subsidising the salary of the current full-time DR Coordinator since June 2017
- Workforce development**
- training of one eye health nurse (Post-graduate Certificate in Diabetic Eye Care (PGDEC)
 - training of one medical practitioner in Master of Medicine (Ophthalmology)
 - Primary healthcare worker training (DR awareness training workshops) five two-day workshops, training 60 practitioners in DR awareness

Vanuatu**Equipment**

- provision of DR equipment, including an HbA1C machine and associated consumables⁶²
- DR screening and treatment equipment for the new eye clinic at Vila Central Hospital

Health Promotion

- broadcasting a talkback radio show on diabetic eye care across Vanuatu
- development of a DR brochure in Bislama (local language of Vanuatu)
- inclusion of a page on DR for addition into the NCD booklet in Bislama, and

Global participation

- supporting the attendance of the DR Coordinator to the DR Health Promotion Regional Workshop in Auckland in 2018.
-

⁶² New equipment is planned for the new eye health centre currently under construction.

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