FINAL REPORT

of the

Victorian Retinopathy Screening Development Project

as part of the
National Visual Impairment Prevention Program

Centre for Eye Research Australia
July 2001

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GLOSSARY OF ACRONYMS

CERA	Centre for Eye Research Australia
CWG	Central West Gippsland
DEHP	Diabetes Eye Health Promotion Project
DR	Diabetic Retinopathy
GP	General Practitioner
GPDV	General Practice Divisions Victoria
LEHP	Lions Eye Health Project
LOTE	Languages other than English
NDSS	National Diabetes Supply Scheme
NH&MRC	National Health and Medical Research Council of Australia
NMRC	Non-mydriatic retinal camera
n.s.	not significant
PCP	Primary Care Partnerships
VACCHO	Victorian Aboriginal Community Controlled Health Organisation
VCO	Victorian College of Optometry
VIP	Visual Impairment Project
VRSDP	Victorian Retinopathy Screening Development Program
WMRSP	Western Melbourne Retinopathy Screening Project

EXECUTIVE SUMMARY

Why do we need a Victorian Retinopathy Screening Development Project?

All people with diabetes are at risk of vision loss or blindness due to diabetic retinopathy. To prevent vision loss and blindness, early detection and timely treatment of diabetic retinopathy is required. Therefore, the National Health and Medical Research Council (NH&MRC) guidelines on the management of diabetic retinopathy recommend an eye examination at diagnosis and then at least every two years for all people with diabetes.[1]

Diabetic retinopathy is asymptomatic in its early stages and vision may not be affected until the disease becomes severe and much less amenable to treatment. Laser treatment is very effective for prevention of vision loss due to diabetic retinopathy, however, laser treatment cannot restore vision that has already been lost. Therefore it is essential to detect and treat diabetic retinopathy before any loss of vision occurs.

Despite the potential for the prevention of vision loss and blindness in people with diabetes, many people with diabetes do not have their eyes examined regularly. In Victoria, 48% of people with diabetes had not had visited an ophthalmologist in the past two years or ever and 51% had not visited an optometrist in the past two years or ever.[2] Overall, approximately 45% of people with diabetes in Victoria reported that they had not had an eye examination ever or in the past two years.

What is the Victorian Retinopathy Screening Development Project?

The National Diabetes Strategy and Implementation Plan set a goal that at least 80% of people with diabetes are appropriately screened for diabetic retinopathy[3]. As part of the National Diabetes Strategy, the Commonwealth Government allocated funds

for a National Visual Impairment Prevention Program to be implemented in each of its jurisdictions. The Victorian Retinopathy Screening Development Project (VRSDP) was developed to identify and seed sustainable strategies to increase the number of people being regularly screened for diabetic retinopathy.

There have been a number of Victorian based research and development projects for diabetic retinopathy in recent years. The VRSDP provided an opportunity for further application of the findings of these projects and to evaluate the implementation process. The VRSDP encouraged approaches to retinal screening that built on existing infrastructure, utilised existing expertise, and enhanced local uptake of nationally developed resources by the Diabetes Eye Health Program (see page 38).

Three diabetic retinopathy screening projects were developed locally in Victoria over twelve months. Each project was tailored to meet the needs of a defined population and each project focussed on different components of the screening pathway from recruitment to education through to assessment and referral for treatment and more broadly, the management of diabetes. The focus of each project is project development, as well as screening uptake in the local community.

Each screening project differed according to the target population that was identified (e.g. people from culturally diverse backgrounds versus rural populations), enabling the provision of locally appropriate services in Victoria. This evaluation of the development of the three local screening projects provided recommendations on the establishment of a retinal screening program for Victoria.

Key Outcomes

The three local screening projects were coordinated by the *Latrobe Community Health Service*, the *Victorian College of Optometry*, and *South West Healthcare*.

- Results from the project coordinated by the Latrobe Community Health Service indicated that improvements in diabetic retinopathy screening rates could be achieved through intense social marketing strategies coupled with diabetic retinopathy screening by optometrists. The project was embraced by 100% of optometrists in the region.

- The Project coordinated by the Victorian College of Optometry found that at the beginning of the project, many GPs admitted to not being aware of the role that optometrists can play in diabetic retinopathy screening. And although GP awareness increased as a result of this project, continuing education regarding the roles of different health professionals with respect to diabetes care is needed.

- Key outcomes from the project coordinated by South West Healthcare included the development of a suitable approach to mobile screening for rural areas using the non-mydriatic retinal camera and an accredited training program for diabetic retinopathy screening with non-mydriatic photography.

Recommendations

Based on results from the VRSDP, results from previous screening projects and research in Victoria and a review of the scientific literature, eight general recommendations and 13 implementation recommendations have been formulated. The eight general recommendations are designed to outline programmatic considerations for a sustainable model of diabetic retinopathy screening in Victoria. The recommendations are listed below and repeated in the relevant Sections throughout the document.

The following 13 recommendations provide guidelines for the implementation of a diabetic retinopathy screening program in Victoria. They relate more specifically to issues concerned with the development of the components of diabetic retinopathy screening for the Victorian context. The implementation recommendations have been

identified on the basis of findings arising from the three local screening projects and a review of the scientific literature.

General Recommendations

1. The integral components of a screening model for Victoria include screening by ophthalmologists, optometrists, GPs and those trained in the use of a non-mydriatic camera. (Screening Process)

2. Diabetic retinopathy screening should be a part of comprehensive care for people with diabetes and embedded in the health service system. Opportunities to incorporate diabetic retinopathy screening with other relevant health initiatives (such as Division of General Practice diabetes initiatives) and events (such as National Diabetes week) should be actively sought. Results of eye examinations by ophthalmologits, optometrists and non-mydriatic photography screening programs should be communicated to the patient's GP. (Health Service System)

3. Optometrists are currently under utilised in providing diabetic retinopathy screening. Further support and promotion of optometrists as screeners for diabetic retinopathy is needed. (Screening Process, Health Professional Training)

4. As the non-mydriatic retinal camera (NMRC) offers people with diabetes who do not attend optometrists or ophthalmologists an alternative, it is an integral component to diabetic retinopathy screening for Victoria. (Screening Process)

5. The central role of the general practitioner in diabetes care should be maintained and linkages with other health services enhanced. GPs should be kept informed about diabetic retinopathy issues, awareness raising campaigns, and, where possible, their input on program design and implementation should be sought. (Health Service System)

6. Many resources, such as brochures, posters and public service announcements relating to diabetes eye health, have been produced nationally. Wherever possible, nationally produced materials should be used to ensure that people with diabetes receive a consistent message regarding the importance and timing of regular eye examinations. (Promotion and Community Awareness)

7. Materials developed for people of culturally and linguistically diverse backgrounds should be evaluated for cultural appropriateness and effectiveness (i.e. reach and impact), and be consistent with national messages. (Promotion and Community Awareness)

8. "Block bookings" could be made for people who speak languages other than English to enable interpreter services to be utilised.

9. Recall methods are integral to the continued success of regular screening. A much higher number of people with diabetes continue to have their eyes examined when reminded to do so. (Recruitment and Recall)

Implementation Recommendations

Optometrists

1. To increase the utilisation of optometrists for retinal screening, emphasis should be placed on
    - Continuing education for health practitioners on their roles and abilities for diabetic retinopathy screening through accredited seminars and incentives such as CME points.
    - Support for enhanced communication between diabetes related health professionals
    - The creation and maintenance of linkages between optometry services and other health related professionals or organisations (e.g., diabetes educators, community health centres, Divisions of General Practice)
    - Promoting the use of optometry through PCPs

Non-mydriatic retinal cameras (NMRC)

2. Promoting the use of non-mydriatic cameras can be done through Primary Care Partnerships (PCPs) and implemented by health workers using accredited training programs, as established in this project.

3. The viability of non-mydriatic photography for diabetic retinopathy screening depends on sustainable funding such as the creation of a Medicare item number for fundus photography.

4. Appropriate areas for screening programs using non-mydriatic retinal photography include
    - Rural areas where accessibility and availability of optometric and ophthalmologic services may be limited and large distances to travel are a barrier.
    - Areas where it will assist allied health professionals to incorporate diabetic retinopathy screening into routine care for their patients with diabetes.
    - Urban areas where ophthalmologic and optometric services are available, but the proportion of people with diabetes having their eyes examined remains low.

5. Where GPs and allied health professionals wish to conduct diabetic retinopathy screening, non-mydriatic retinal cameras can be used.

Recruitment

6. Statewide saturated marketing strategies should be implemented at yearly intervals in conjunction with a recognised diabetes related event, such as World Diabetes Day, National Diabetes Week, or World Sight Day.

7. For smaller townships and rural areas, a localised approach to recruit for screening is appropriate and effective.

Health Service System

8. Links and partnerships with regional health networks, community groups and health related organisations help to embed diabetic retinopathy screening in the health service system. In this project, partnerships and links established with other organisations facilitated communication between GPs, diabetes educators, optometrists and NMRC screeners, provided assistance with patient recruitment, and presented opportunities for education of consumers with diabetes and health professionals. PCPs have proved to be a good environment to promote retinal screening.

Promotion and Community Awareness

9. Diabetes eye health resources are essential components to a well-planned screening program, yet constitute only one of several strategies to support program delivery. Resources developed in Victoria should be consistent with national messages.

10. Where existing materials need to be adapted, locally developed materials should be pilot tested and
    a) specifically state that people with diabetes who are not currently being screened at least every two years for diabetic retinopathy are targeted;
    b) include a health education message regarding the need for eye examinations for all people with diabetes AT DIAGNOSIS and then at least every two years; and
    c) list where more information can be obtained or which health professionals can conduct screening or a date and venue for screening with the NMRC.

The Lions Eye Health Program Community Eye Health Kit (see page 55) provides resources for diabetic retinopathy screening and guidelines for promotion of screening sessions.

11. If translated materials are needed in the community being screened,
    - Consultation with city councils, migrant resource centres and community leaders should be held to determine the most appropriate languages for translation.
    - To facilitate the checking of the accuracy of content of translated materials, a person proficient in English as well as the translated language should translate (in writing) the material back into English.
    - As discovered in this project, some languages may have different dialects or formal and informal ways of speaking. In this case, it is important to discern which dialect or style is most appropriate for the target population.

Sustainability

12. An assessment of a program's effectiveness in reaching the target population should be conducted periodically to evaluate a screening program. Other issues that warrant the collection of data from screening participants include the identification of barriers to screening and information to monitor screening outcomes.

13. A 'kit', which provides practical advice and guidelines for relevant stakeholders (e.g. health services, Divisions of General Practice, etc) to set up diabetic retinopathy screening, should be developed and disseminated.

GOALS AND OBJECTIVES

The VRSDP aimed to increase the number of people with diabetes having regular eye examinations through:

1. increased knowledge and awareness of the importance of retinal screening amongst people with diabetes; and
2. increased access of the community to retinal screening, particularly among people who face particular barriers to screening.

It was through the following objectives that the aims were to be achieved:

1. Increase access to retinal screening in Victoria through the establishment or enhancement of organised programs of retinal screening involving the most appropriate and accessible local professionals.

2. Undertake community awareness, recruitment and education activities for the target populations.

3. Develop and disseminate education and support resources for targeted practitioners demonstrating linkages with the nationally focused Diabetes Eye Health Promotion Project (summarised on p. 55).

4. Develop mechanisms and establish community networks to ensure the retinopathy screening program is embedded in the health service system and is part of comprehensive management of diabetes and its complications (including appropriate referrals for the treatment and ongoing management of people with diabetes).

PROJECT OVERVIEWS

The VRSDP consisted of two components. The first component was three local retinopathy screening development projects (12 months duration) and the second component was the statewide evaluation and support (14 months duration).

The three local screening projects were coordinated by the *Latrobe Community Health Service*, the *Victorian College of Optometry,* and *South West Healthcare*. The projects that were coordinated by the Latrobe Community Health Service and South West Healthcare targeted people with diabetes who live in rural communities. The project coordinated by the Victorian College of Optometry covered the western suburbs of Melbourne, which has areas in which over 50% of the population speak a language other English at home.[4]

The Centre for Eye Research Australia (CERA) was responsible for the statewide evaluation and support component.

Centre for Eye Research Australia

A framework for evaluation was designed by CERA in conjunction with each of the local screening projects. The evaluation, which is presented in this report, assesses the methodologies utilised by the local screening projects and provides an assessment of efficacy of the skills and services required to implement a comprehensive, statewide approach to screening for diabetic retinopathy. A database (with data manual) and core minimum data set was established by CERA for the collection of uniform data from each of the local screening projects to facilitate the evaluation.

CERA also provided guidance and support to each of the local screening projects in a range of capacities. CERA conducted community-based screening for diabetic

retinopathy in both rural and urban Victoria with non-mydriatic photography from 1996-1999 and has been involved in the evaluation of the NH&MRC Guidelines for the Management of Diabetic Retinopathy.[5, 6] CERA also collaborates with Lions to manage the Lions Eye Health Program, which is a national level initiative for education and awareness of diabetic retinopathy and glaucoma. Therefore, CERA's experience in planning and implementation of programs designed to promote community awareness of diabetic retinopathy provided a basis from which expert advice could be offered. This support ranged from training in the use of the non-mydriatic camera to modification of program designs to data collection and analysis.

The Latrobe Community Health Service *(Central West Gippsland project)*

Central West Gippsland (CWG) is located in a rural area in eastern Victoria. The Central West Gippsland screening model was coordinated by one full time project officer who organised social marketing strategies and liaised with optometrists to increase the proportion of people being screened for diabetic retinopathy. Support was received from all 18 optometrists who practice in the region and the involvement of optometrists in the design and delivery of the screening project ensured a high level of commitment and collaboration with community health, GPs and other health professionals.

The project also operated in conjunction with *Better Practice in Diabetes Care*, which was a Division of General Practice program that aimed to improve the quality of diabetes care. Coordination with the *Better Practice in Diabetes Care* program reinforced protocols for the management of diabetes.

The area covered by this project has a resident population of 102,802, of which approximately 2,400 people are diagnosed with diabetes. An estimated 840 people with diabetes in this area do not have their eyes examined regularly. This project screened 573 people with diabetes from June- October 2000. Of the 573 screened,

154 (27%) people with diabetes reported no eye examination ever or in the past two years. Therefore, an estimated 18% (154/840) of the target population was screened.

Western Melbourne Retinopathy Screening Project

The Victorian College of Optometry managed the project on behalf of a consortium comprised of individuals from:

Department of Optometry and Vision Sciences, University of Melbourne
Diabetes Alliance Group
Optometrists Association Australia (Vic Div)
Royal Melbourne Hospital
Victorian College of Optometry

The Western Melbourne Retinopathy Screening project (WMRSP) catchment has an unusually high percentage of people who speak languages other than English (LOTE). The project design was based on the utilisation of optometrists for diabetic retinopathy screening. People with diabetes accessed the screening program via an optometrist, GP or self-referral. When a person with diabetes presented to a GP, the GP advised a visit to a local optometrist (if the patient was not already under regular review for eye care). Any patient that presented directly to an optometrist with a need for further non-urgent referral to an ophthalmologist was referred back to the GP, thus maintaining the central role of GPs in the care of people with diabetes.

The project was coordinated by one part time project manager and two part time project officers. A key outcome of this project was for GPs to be aware of and embrace optometry as a method for diabetic retinopathy screening. Key findings of the project include the need for further support for communications between health professionals that was established by this project and further education of health professionals on the role of optometrists for diabetic retinopathy screening.

This project covered the cities of Brimbank, Maribyrnong & Hobsons Bay, which have a total population of 282,000 and an estimated target population for screening of 7,755. From March- September 2000, the WMRSP collected data from 256 people with diabetes, of which 85 (33%) had not had their eyes examined ever or in the past two years. This resulted in 1.1% (85/7,755) of the target population being screened.

South West Healthcare *(the Warrnambool project)*

The Warrnambool project covered a large area in western Victoria, with half of their population scattered across rural landscape. One full time project officer conducted diabetic retinopathy screening with a non-mydriatic retinal camera. Screening with a non-mydriatic camera allowed for collaboration with general practitioners, reduction of travel time for patients with diabetes, and an opportunity to meet with a diabetes educator at the screening session.

A key outcome of this project is the development of an accredited diabetic retinopathy screening training program for diabetes educators and rural nurses using non-mydriatic retinal photography. Access to diabetic retinopathy screening in rural areas is expected to increase through use of the non-mydriatic camera by rural health professionals.

The region covered by this project has an estimated population of 55,518 and an estimated target population of 531 for diabetic retinopathy screening. Screening was conducted within GP surgeries and health care centres from April- September 2000. A total of 160 people with diabetes have been screened thus far and seven more screening sessions are organised for early 2001. Of the 160 people screened, 47 (29%) reported that they had not had their eyes examined ever or in the past two years. Therefore, the project has screened 8.9% (47/531) of its target population.

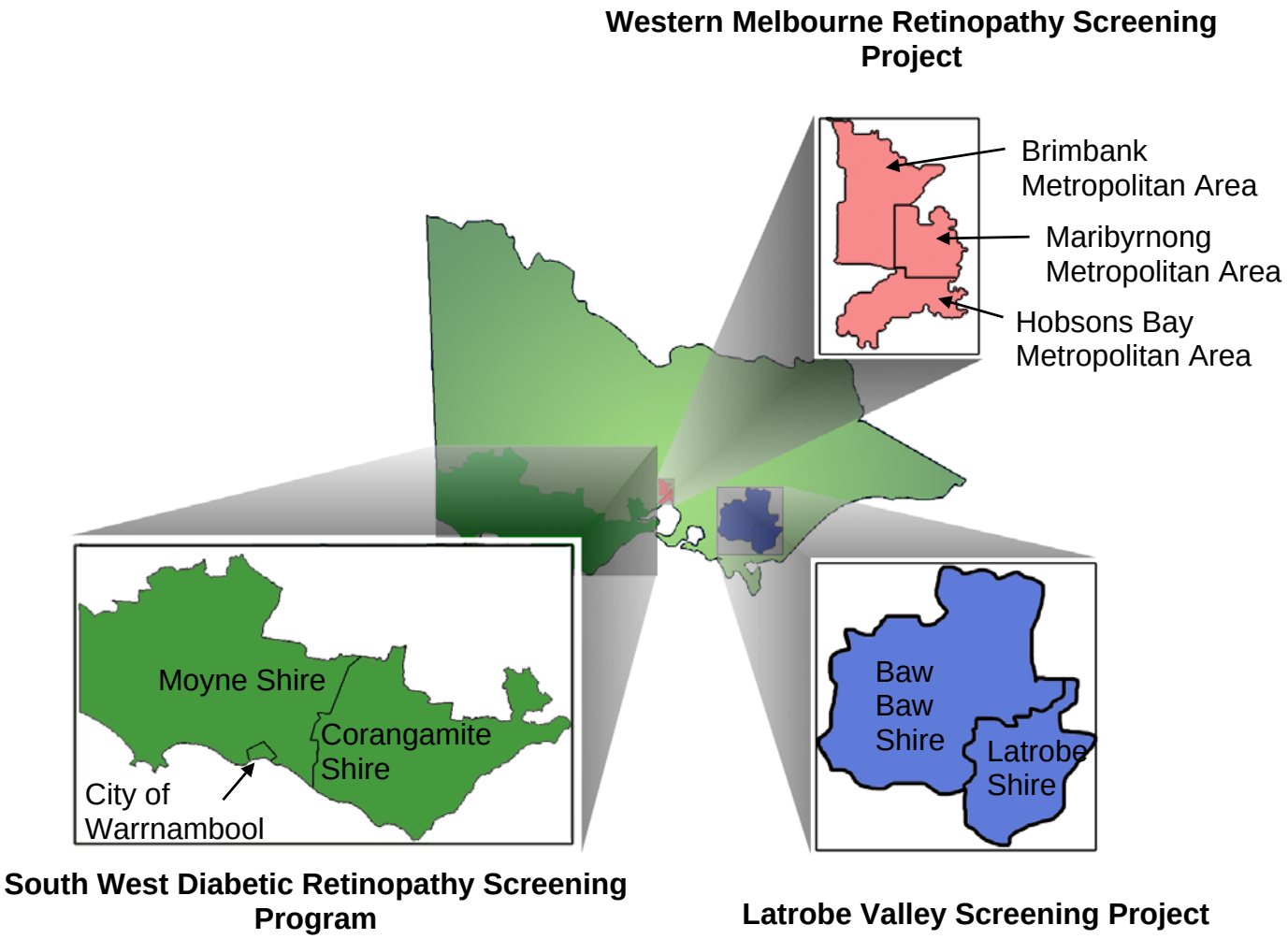
Table 1. Summary information for three local projects and their regions

	CWG	WMRSP	Warrnambool
Population	102,802	282,000	55,518
Diabetes prevalence	age specific*	5%	age specific*
Estimated n of people with diabetes	2,400	14,100	1,517
Estimated % not regularly screened for DR	35%	55%	35%
Estimated n not regularly screened for DR	840	7,755	531
Target population screened**	18%	1.1%	8.9%

* from reference number 7

** Participants who did not report the date of their last examination were not included in this dataset (2.8% for CWG, 7.8% for WMRSP, and 0.6% for Warrnambool).

Figure 1. Areas in Victoria covered by the three local screening projects.



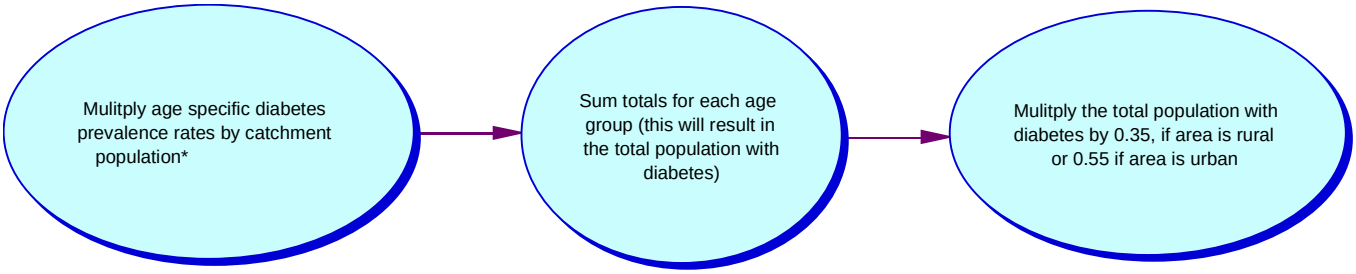
BASELINE DATA

The target population for the VRSDP was people with diabetes who had not had their eyes examined since diagnosis or had let more than two years elapse since their last eye examination. An estimation of the target group was sought in order to assess the uptake of the three local screening projects.

An evaluation based on the recommendation for at least two yearly eye examinations for a project with a twelve month time frame posed inherent difficulties. Initially, the Centre for Eye Research Australia (CERA) proposed to undertake a random survey in the areas covered by the three projects (and one control area) using the National Diabetes Supply Scheme (NDSS) database and to repeat this survey after twelve months. Although using specially selected populations, such as NDSS registrants, is not a population-based method and likely to be positively skewed, this method would provide baseline estimates of the target population specific to each of the local screening projects and allow for comparison of any differences after twelve months. This survey, however, was not conducted as approval for it was not received.

As a result of time lost and time constraints, the steering committee of the VRSDP agreed that in addition to the individual methods of each local screening project, baseline estimates of the target population from the Visual Impairment Project (VIP) would be used. The VIP was a population-based study of the causes and prevalence of eye disease in Victoria. Population-based studies are specifically designed such that the findings are representative of the general population. The VIP found that an estimated 55% of people with diabetes in urban areas reported no eye examination in the past two years. In rural areas, 35% people with diabetes reported that they did not have their eyes examined on a two-yearly basis. Other Australian population-based studies from which baseline data for diabetic retinopathy screening can be obtained are the Blue Mountains Eye Study and the AusDiab Study.

To calculate the respective target populations:



The WMRSP did not provide age specific breakdowns of the population in their area. In lieu of an age-specific estimate for the prevalence of diabetes, the total population was multiplied by a prevalence rate of 5% in order to obtain an estimated total population with diabetes. The total population with diabetes was multiplied by 0.55 to obtain an estimate for the target population for screening.

Two of the local screening projects collected baseline data specific to their catchment areas.

Table 2. Findings from baseline data collection.

Project Title	Collection method	Finding
CWG screening project	Information regarding the number of patients seen, how many had diabetes, and how many were screened for the first time was collected from optometrists from Dec 1999- Feb 2000.	In a period of three months, optometrists screened 357/6,598 patients for diabetic retinopathy. 77 (22%) were screened for the first time.
Warrnambool screening project	Questionnaires that requested the same information as the core minimum data set were distributed to people with diabetes via NDSS outlets, diabetes educators and health centres.	47/200 (24%) people with diabetes reported no eye examination in the past two years or ever

As part of the WMRSP, a clinical audit was conducted through the Melbourne Division of General Practice to identify current retinal screening practices of GPs in the Western suburbs. CME points were awarded as an incentive for GPs to participate

in the audit. Nine GPs have returned data and report that 37/135 (27%) of their patients with diabetes had not had an eye examination in the past two years or ever.

The VIP data show that people with diabetes who live in rural areas are more likely to have had their eyes examined within the recommended interval than people with diabetes who live in urban areas. This may be because people in rural areas are more likely to access eye care services through optometrists than people who live in urban areas and this is most likely due to the efficiency of optometrist recall systems in rural areas.

Several factors may explain the differences found in the baselines figures obtained from the VIP population-based study versus the data collected specifically by the projects. For example, The Northwest Melbourne Division of General Practice conducts a diabetic retinopathy screening program in an area that overlaps with the region covered by the WMRSP. Similarly, CERA conducted screening with non-mydriatic retinal photography in 1996 and 1998 in the Latrobe Valley, which overlaps with the CWG project area. In Warrnambool, the Lions Eye Health Program, which aims to increase awareness regarding diabetic retinopathy, was being piloted. These previously existing screening and awareness raising programs may have resulted in higher than expected screening compliance rates in these areas.

Another possibility is that the data collected by the WMRSP and Warrnambool project is positively skewed due to sampling within specially selected populations. It is possible that the GPs who participated in the WMRSP audit were ones who more actively refer their patients with diabetes for eye examinations. Similarly, in the Warrnambool project, people with diabetes who are more proactive regarding their diabetes may be the ones regularly visit health centres or diabetes educators.

While VIP data can be applied generally to the Victorian population, the data collected by the local projects should only be used for that specific area. However, the variation between the population-based data and the data collected by the local

screening projects remind us that the baseline data only provide estimates for comparison and that conclusions drawn from these estimates should be made with caution. Emphasis for the VRSDP was placed on the *development* of local screening initiatives (e.g. program establishment, development of local networks, marketing, etc) from which areas for action for sustainable statewide diabetic retinopathy screening for Victoria could be identified.

RECRUITMENT and RECALL

Recommendation

Recall methods are integral to the continued success of regular screening. A much higher number of people with diabetes continue to have their eyes examined when reminded to do so.

Recruitment

Past experience in Victoria has shown that targeted, versus general, recruitment strategies can result in more efficient screening for diabetic retinopathy. When recruitment strategies specified that a screening service was available for people with diabetes *who have NOT had their eyes examined in the past two years* nearly a three fold increase in screening efficiency was observed. This meant that a lower proportion of people with diabetes, who had already had their eyes examined in the past two years, were screened.[8] While people with diabetes may present for eye examinations for reasons other than diabetic retinopathy, screening a person with diabetes specifically for diabetic retinopathy more often than recommended results in additional cost with no additional benefit. A large percentage of the populations recruited for each of the local screening projects indicated that they had already been screened for diabetic retinopathy within the past two years.

As expected, the rural populations screened (CWG and Warrnambool projects) had very low percentages of people who were born in a country other than Australia or who spoke a language other than English at home. The WMRSP screened a very high percentage of people who were born in a country other than Australia and whose main language was not English.

Table 3. Demographic profile of people with diabetes screened for diabetic retinopathy

	CWG	WMRSP	Warrnambool
Number screened	573	256	160
Age (mean)	61 yrs	61 yrs	64 yrs
Age (range)	16-92 yrs	19-91 yrs	26- 93 yrs
Duration of diabetes (mean)	7.1 yrs	5.3 yrs	7.8 yrs
Duration (range)	< 1 – 59 yrs	< 1 – 42 yrs	<1- 45 yrs
Female	304 (53%)	138 (54%)	72 (45%)
Insulin treated	94 (16%)	7 (2.7%)	39 (24%)
Born in Australia	425 (74%)	83 (32%)	145 (91%)
English as main language at home	540 (94%)	141 (55%)	160 (100%)
Currently employed	154 (27%)	43 (17%)	42 (26%)
Privately insured	213 (37%)	-	24 (15%)
Eyes NOT examined in past two years or ever	156 (27%)	85 (33%)	47 (29%)

Data from this project were insufficient to draw conclusions regarding participation by groups from culturally diverse backgrounds. However, research has shown consistently lower rates of recruitment and participation in community-based and preventive services by groups from culturally diverse backgrounds.[9, 10, 11] This supports the notion that frameworks for promotion and recruitment for diabetic retinopathy screening programs must be tailored to the community by first, background research and a demographic assessment of the target population and second, cultural appropriateness of the strategies chosen.

For example, rural areas are characterised by vast distances between towns, smaller (sometimes sparsely distributed) populations, isolation, and a wide range of living settings and conditions. In lieu of a large general promotional campaign, the Warrnambool screening project used an intensive, localised approach supplemented

with advice from a local health worker for each town in which screening sessions were conducted. This was an appropriate and effective approach to recruitment for this region.

On the other hand, the CWG project, also in a rural area, used saturated social marketing strategies for diabetic retinopathy screening. This strategy was appropriate for this particular screening project as it worked to raise general awareness in the community and encouraged people with diabetes to take action to have their eyes examined (i.e. visit an optometrist in the area).

The development of working relationships with community members is essential for successful recruitment. Members of the community (e.g. local health workers, consumers with diabetes, community groups and organisations) can provide invaluable advice regarding appropriate and effective recruitment strategies for their area and also assist with the implementation of recruitment strategies. In particular, community members should be consulted when local resources are developed to ensure acceptability and to verify that a clear and correct message is being conveyed.

On-going evaluation of a screening project through assessment of the target population being reached, including demographics and distribution, is necessary to assess what, if any, modifications need to be made. Analysis of the target population reached by the three local screening projects indicated that approximately a third of the target populations reached by the CWG and Warrnambool projects were people with newly diagnosed diabetes. It has been shown that people with diabetes who present for an eye examination soon after diagnosis are more likely to continue to have their eyes examined than people with diabetes who present for their first eye examination four or more years after diagnosis.[12]

The WMRSP screened a higher percentage of people with diabetes who had previously had an eye examination, though not within the past two years. This may be due to the fact that the population that is reached by optometrists are more likely to

wear glasses and therefore more likely to have had their eyes examined. A similar trend was found in the CWG project which also utilised optometrists for diabetic retinopathy screening. When compared to baseline data estimates, the number of people with diabetes who presented for their first examination increased slightly. This may indicate that acceptance of optometry as an additional route for diabetic retinopathy screening is slow to occur or that networks between optometrists and the primary health care sector could be strengthened.

It is also important to bear in mind the effects that prior screening programs or awareness raising campaigns may have on recruitment efforts. When a higher proportion of people with diabetes already access eye care services regularly, the actual target population becomes smaller and more difficult to reach. As the size of the target population becomes smaller, barriers to access may be greater for the remaining portion of the population.

Table 4. Profile of target population (i.e., people with diabetes who have not had eyes examined ever or in the past two years)

	CWG	WMRSP	Warrnambool
Number screened*	154	85	47
Age (mean)	57 yrs	59 yrs	60
Age (range)	16- 85 yrs	25-82 yrs	31-90 yrs
Duration of diabetes (mean)	5.1 yrs	4.7 yrs	4.2 yrs
Duration (range)	< 1 – 59 yrs	<1 – 30 yrs	<1 – 20 yrs
Female	77 (50%)	37 (44%)	24 (51%)
Insulin treated	26 (17%)	1 (1.2%)	8 (17%)
Born in Australia	114 (74%)	23 (27%)	45 (96%)
English as main language at home	145 (94%)	45 (53%)	47 (100%)
Currently employed	51 (33%)	17 (20%)	15 (32%)
Privately insured	62 (40%)	-	4 (8.5%)
Eyes NOT examined ever	108 (70%)	19 (22%)	32 (68%)
Eyes not examined- Newly diagnosed	54/108 (50%)	9/19 (47%)	12/32 (38%)
Eyes not examined- duration > 1 yr	54/108 (50%)	10/19 (53%)	20/32 (63%)

* Participants who did not report the date of their last examination were not included in this dataset (2.8% for CWG, 7.8% for WMRSP, and 0.6% for Warrnambool).

Table 5. Distribution of screening services.

CWG Screening	WMRSP	Warrnambool Screening
Of 577 patients screened by 18/18 optometrists, • 238 were examined in Traralgon • 47 in Morwell • 162 in Moe • 100 in Warragul, and • 26 in Drouin.	29/36 optometrists returned screening forms for 213 people with diabetes and 15 GPs returned screening forms for 42 people with diabetes. The number of GPs encompassed by the project area is 293, 189 of which were contacted throughout the project. Participants with diabetes from all 21 postcodes encompassed in the project's catchment were screened. More than a third of the patients (39%) were examined at the Victorian College of Optometry.	In an area of 10,000 square kilometres (3 rural municipalities), screening sessions have been held in 11 major townships (7 more townships will be covered in 2001).

Recall

Models for diabetic retinopathy screening must not only increase the number of people with diabetes who have regular eye examinations, but also seek to maintain behaviour change. A system of recall is one way to remind people with diabetes that they are due for an eye examination.

In a recent study of barriers to screening among patients with diabetes who presented at the Royal Victorian Eye and Ear Hospital, it was found that patients who had an eye examination at the time of diabetes diagnosis were much more likely to continue having regular examinations.[12] Among patients who reported a previous eye examination, 36% reported their first dilated examination at the time of diagnosis and 34% reported continuing regular screening since diagnosis. Among patients who had their first eye examination four or more years after diagnosis, a third continued to

have regular eye examinations, but two thirds continued to have only sporadic eye examinations. This suggests that concentrated efforts on the recruitment of people with newly diagnosed diabetes may be worthwhile and that barriers other than knowledge of eye examinations are important. Among the local screening projects, 38-50% of the target populations screened were people with diabetes who were newly diagnosed (i.e., less than one year ago).

Reminder notices have the potential to increase regularity of examinations. A study by Legorreta et al. found a 27% increase in retinal examinations after the implementation of a 'reminder' intervention.[13] The provision of a recall system is integral to the sustainability of any diabetic retinopathy screening program to maintain regularity of eye examinations.

Table 6. Number of people with diabetes who reported no previous eye examination

Project	N	Newly diagnosed (% of the target pop. screened)†	Diagnosed 1 yr or more ago
CWG Screening project (n=573)	108*	54 (50%)	51
WMSRP (n=256)	17**	9 (47%)	6
Warrnambool Screening project (n=160)	32	12 (38%)	20

* data missing from 3 cases

** data missing from 2 cases

† one participant (0.6%) in the Warrnambool project could not remember the year of diagnosis for their diabetes; 23 participants (9%) did not report their year of diagnosis in the WMRSP; and 10 participants (1.7%) did not report their year of diagnosis for diabetes in the CWG project. These participants were not included in this analysis.

For two of the three VRSDP screening projects (CWG Screening project and WMRSP) optometrists managed recall for screening of their patients with diabetes. When the third screening project (Warrnambool) is completed in March 2001, they will be in a position to make recommendations for the establishment of a recall system. Previous screening with non-mydriatic photography in Victoria, however, has already shown that nearly 90% of participants continued to have their eyes examined two years after initial screening, when reminded to do so.[14]

Despite the small successes of individual recall systems, a reliable national diabetes reminder service is an essential component for complete elimination of blindness due to diabetic retinopathy. In Iceland, where 90% of the population with Type 1 diabetes is registered and recalled for regular examinations, dramatic results in the prevention

visual impairment have been achieved.[15] In Australia, a National Diabetes Eye Examination Reminder Service is currently being piloted. The pilot is due for completion in March 2001.

SCREENING PROCESS

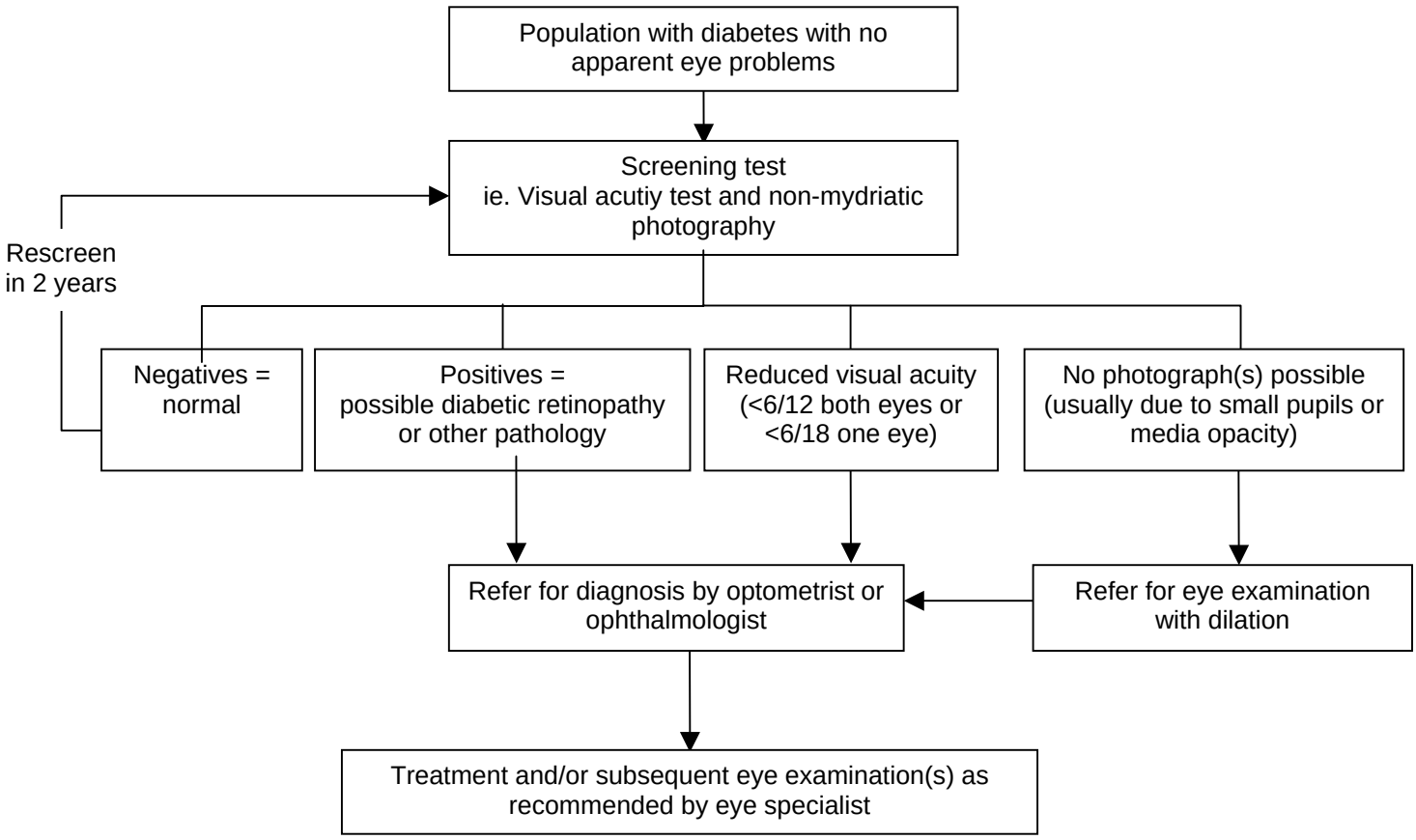
Recommendation

The integral components of a screening model for Victoria include screening by ophthalmologists, optometrists, GPs and non-mydriatic photography.

Definition

Screening programs are used to actively detect disease(s) or condition(s) in asymptomatic individuals. Commonly referred to as 'secondary prevention', screening tests are not diagnostic, but separate people who *may* have the condition from those who *probably* do not. People with a positive result from a screening test are referred to the appropriate health care practitioner for diagnosis and treatment. The difference between a screening test and a comprehensive eye examination should be made clear to both people with diabetes and health professionals. For example, in the VRSDP, the CWG and WMRS projects utilised optometrists for 'screening'. However, optometrists provide comprehensive eye examinations. The Warrnambool project, on the other hand, developed a screening program using a non-mydriatic retinal camera. A screening program with non-mydriatic photography requires participants who have abnormalities detected in their photographs to be referred to the appropriate health professional for further assessment.

Figure 2. An example of a screening program using non-mydriatic photography.



Screening intervals

Evidenced-based guidelines for the management of diabetic retinopathy have been developed by the National Health and Medical Research Council.[1] For early detection and timely treatment of diabetic retinopathy, eye examinations are recommended at least once every two years from the time of diagnosis, followed by more frequent examinations if diabetic retinopathy is detected. Due to higher prevalence of diabetic retinopathy, earlier onset of diabetes, and poor access and low utilisation of services among Aboriginal and Torres Strait Islander people, retinopathy screening is recommended at diagnosis and then at yearly intervals.

When no diabetic retinopathy is present, yearly examinations for all people with diabetes is not as cost-effective as two yearly screening as there are negligible differences in the prevention of vision loss due to regular repeat examinations.[16] It is interesting to note that while the screening forms used by the WMRSP did not provide an option for two yearly recall by optometrists (maximum recall time option was yearly), only one patient who had no abnormality detected was advised to return in two years. The WMRSP found that although optometrists generally prefer to recall patients annually, the mean time between screening for their patients was 23 months.

Screening sensitivity

According to guideline recommendations, sensitivity for screening for diabetic retinopathy at least every two years should be at least 60%.[1] Estimates of sensitivity reported in the literature provide a range of values above 60% for screening by ophthalmologists, optometrists and non-mydriatic retinal cameras.[17]

The role of ophthalmologists

Once any diabetic retinopathy beyond the classification of minimal non-proliferative diabetic retinopathy is present, routine referral to an ophthalmologist is recommended for management and treatment.[1]

The role of non-mydriatic retinal photography

Non-mydriatic retinal cameras offer people with diabetes who do not or cannot attend optometrists or ophthalmologists a practical alternative and can provide out-reach screening services to facilitate compliance with diabetic retinopathy screening recommendations. In the Warrnambool project, which used a non-mydriatic retinal camera (NMRC) for screening, gradable photographs were obtained from 93% of the participants with diabetes.

As a screening tool for the early detection of diabetic retinopathy, the non-mydriatic camera has many advantages. Its easy operation does not require medically trained personnel as the photographs may be assessed off site, screening services can be provided in the evenings and on weekends, it is a cost effective method of screening[18], and dilating drops are not required. In addition, its portability permits coverage of wide geographic ranges which may be particularly beneficial for screening in rural areas. The design of a screening program that uses non-mydriatic photography can be incorporated into coordinated care protocols for people with diabetes. The screening organised by the Warrnambool project arranged for a diabetes educator to be present at the screening sessions. With regards to people with diabetes from culturally and linguistically diverse backgrounds, screening programs can offer 'block' appointments to enable the provision of interpreters during the examination.

Screening with non-mydriatic photography, however, has significant establishment costs (including purchase of the camera and a station wagon), requires occupational health and safety instruction for transport of the camera, and necessitates training and maintenance of skills for camera operation. The local project that used non-mydriatic photography to screen for diabetic retinopathy were unable to take gradable photographs in 7% of the participants that presented for screening, most likely due to small pupils or media opacity. The successful uptake of this method of screening is also dependent on sustainable funding such as the creation of a Medicare item number for fundus photography.

Recommendation

As the non-mydriatic retinal camera offers people with diabetes who do not attend optometrists or ophthalmologists an alternative, it is an integral component to diabetic retinopathy screening for Victoria.

The role of optometrists

Optometrists are accessible primary eye care providers and therefore a good resource for the provision of screening for people with diabetes. In particular, optometrists are more readily available in rural areas than ophthalmologists. Screening by optometrists should occur as part of their regular eye examination and include dilated retinal examination. As some eye diseases occur with higher frequency in people with diabetes, optometrists have the advantage over non-mydriatic cameras of being able to conduct comprehensive eye examinations for people with diabetes. Other advantages of using optometrists for diabetic retinopathy screening include the ability to provide direct referral to ophthalmologists, the ability to accommodate for the diversity of Melbourne's population (e.g. proficiency in languages other than English), excellent recall systems, the majority of optometrists bulk bill, and their accessibility in the community.

It appears that other health professionals have been slow to embrace optometrists as screeners for diabetic retinopathy. Findings from this project indicate that optometrists are currently under utilised in providing diabetic retinopathy screening. The role of optometrists for diabetic retinopathy screening needs to be supported and promoted through continuing education of health professionals and consumers and improved lines of communication between health professionals.

Recommendation

Optometrists are currently under utilised in providing diabetic retinopathy screening. Further support and promotion of optometrists as screeners for diabetic retinopathy is needed.

The role of GPs, diabetes educators, nurses and other allied health professionals

Although general practitioners may also conduct diabetic retinopathy screening, an Australia wide study showed that only 35% of GPs reported ever having performed a dilated fundus examination and 88% reported that they often or always referred their patients with diabetes to an ophthalmologist or eye hospital/clinic.[19] Though many GPs may prefer to refer people with diabetes to ophthalmologists or optometrists, GPs may also be trained in the use of an ophthalmascope to conduct dilated eye examinations or in the use of non-mydriatic cameras. Alternatively, GPs can coordinate eye care for their patients with diabetes through a non-mydriatic screening program.

Nurses and diabetes educators may also use non-mydriatic photography to incorporate diabetic retinopathy screening as part of routine care for people with diabetes. In rural area in particular, if accessibility and availability of ophthalmic or optometric services is limited, the portability of the NMRC will enable nurses and diabetes educators to conduct diabetic retinopathy screening during scheduled community or home visits.

Screening considerations

Because of Victoria's geography and population distribution, the optimum model to prevent vision loss due to diabetes will be a combination of screening methods. The appropriate screening methods to use will be dependent on resources available and circumstances of the particular area. Although two of the three local screening projects utilised optometrists to screen for diabetic retinopathy, the design of all three of the projects varied greatly.

The strengths and weaknesses of each project should be considered in context for what would be appropriate for screening in a particular region. For example,

particular challenges were faced by the WMRSP due to the high concentration of LOTE populations in their catchment. Education and awareness raising strategies must be correctly translated and culturally appropriate. Verification within the community to ensure accuracy of content and that the intended message is being conveyed is essential. Provision of services with interpreters or by a service provider who speaks languages other than English must be arranged. The WMRSP provided a listing of participating optometrists that spoke languages other than English for GPs who participated in the project. This is in contrast to rural communities, where vast distances and availability of services may be priority issues.

Table 7. Summary of strengths of local screening projects

Project	Strength	Comment
CWG	• Marketing strategies to educate entire community on the importance of regular eye examinations for people with diabetes, including friends and family of people with diabetes • All 18 optometrists in the area embraced the screening project.	• Increased awareness and education through marketing strategies should be commensurate with efforts to link eye care with routine care for all people with diabetes and to ensure services for further referral and treatment are also linked and available and accessible.
WMRSP	• Enhanced communication between health professionals optometrists and GPs, including role delineation and transfer of information regarding patient examinations • The profession of optometry was introduced to diabetes health workers in the area, not previously familiar with the role of optometrists • CME and CPE accredited educational courses addressing diabetic retinopathy screening were provided for GPs and optometrists	• The political climate among health professionals was very negative toward the involvement of optometrists in diabetes care at the commencement of the VRSDP. This created difficulties in the establishment of the role of optometry for diabetic retinopathy screening and also hindered obtaining GP support for the project. • Despite political challenges and negative press coverage, inroads were made by engaging existing networks and communication between health professionals was enhanced. This is important for the advancement of optometry as a method for diabetic retinopathy screening.
Warrnambool	• Non-mydriatic camera for screening was particularly useful in rural areas due to its mobility and ability to cover large geographic ranges. • An accredited course for non-mydriatic photography will assist in increased access to screening services.	• Operation of the non-mydriatic camera requires initial training and maintenance of skills.

	• Screening sessions at GP surgeries and health centres provided an opportunity for patient education via coordination with diabetes educators • Coordinated advertising with community groups (eg Lions) to recruit people for screening	

SCREENING UPTAKE

The National Diabetes Strategy and Implementation Plan has set a goal of 80% of people with diabetes being appropriately screened for diabetic retinopathy. Although the ultimate aim of the VRSDP was an increase in the number of people being screened for diabetic retinopathy, the three local projects were new development projects that required development and implementation over a 12 month period. Therefore the emphasis was also on design development, professional education and involvement, awareness raising and working interactively with health care providers at the local level. For this reason, the percentages of target populations reached as an indicator for 'success' should be read cautiously.

Also important to keep in mind is that the target populations are based on *estimates*. (refer to Baseline Data section to see how target populations were calculated). In addition, one must consider the *capacity* of each screening program to screen a specified number of people in the time available for the project.

Table 8. Percent of target populations reached

Project	Target	Screened (n/population with diabetes = % increase)	New estimate of population with diabetes being appropriately screened*
CWG	840	154 (6.4%)	71.4%
WMRSP	7,755	85 (0.6%)	45.6%
Warrnambool	531	47 (3.1%)	68.1%

* this estimate is a result of summing the estimated population with diabetes already assumed to be accessing eye care services on a regular basis (65% for rural, 45% for urban)[2] plus the percent increase achieved by each local screening project

Treatment (insulin versus non-insulin) was not significantly associated with the likelihood of having had a previous eye examination for any of the populations screened by each project (all $p > 0.3$). In the CWG and Warrnambool screening projects, having private health insurance also did not significantly affect the likelihood of having had an eye examination in the past two years. The WMRSP did not collect data on private health insurance.

In the population that was screened by the WMRSP, main language spoken at home and country of birth did not make it more or less likely for a person with diabetes to have had an eye examination in the past two years.

In the Warrnambool project, people who had a longer duration of diabetes were twice as likely to have had eye examination (in the past two years or ever) than those with a shorter duration of diabetes. This difference remained significant after adjustment for age. In the CWG screening project, both age and duration remained significant in the multivariate model. For the WMRSP, people with diabetes who were older were significantly more likely to have had their eyes examined in the past two years or ever, but not those with longer duration. (Table 9)

Table 9. Results from the multivariate analysis. This table shows factors associated with the likelihood of having had an eye examination in the past two years versus no examination in the past two years. Areas that are shaded were significant ($p < 0.05$).

	Longer duration OR (95%CI)	Older OR (95%CI)
CWG	1.41 (1.22, 1.63)	1.03 (1.01, 1.04)
WMRSP	n.s. in univariate model	1.04 (1.01, 1.06)
Warrnambool	2.01 (1.46, 2.90)	1.03 (1.0, 1.06)

Also in the WMRSP, males with diabetes were at significantly higher risk for not having had an eye examination in the past two years (OR = 1.8, 95%CI = 1.05, 3.21). Gender was not significantly associated with the likelihood of having had an eye examination in the past two years with either of the other two local screening projects.

Detection of diabetic retinopathy

Follow-up of the patients that are referred for further assessment after screening is of utmost importance in the design of any screening program as these are the people who are at high risk for losing vision.

Table 10. Number of people from target population with diabetic retinopathy

CWG Screening project	WMRSP	Warrnambool Screening Project
20/154 (13%)	13/85 (15%)	5/47 (11%)

An advantage of the design of the Warrnambool project is that each patient receives the results from the screening which contains recommendations for what they should do next (e.g. another examination in 2 years or see their GP for further assessment and possible referral). A copy of that letter, the retinal photographs and grading assessment with a covering letter, are sent to their nominated GP as well.

In the WMRSP, at the suggestion of GPs, referral pathways were amended so that a patient who presented with diabetic retinopathy (or another eye related condition) to an optometrist was referred back to their general practitioner to decide upon appropriate management for the patient (versus direct referral to an ophthalmologist). This practice is to aid in the maintenance of the central role of GPs for people with diabetes.

In the case of urgent referrals, optometrists in the WMRSP continued to refer directly to an ophthalmologist. Four patients received a direct referral to an ophthalmologist and none have been reported to have complied with the referral within the time frame of this project. Ideally, future screening programs should investigate strategies that will evaluate compliance.

HEALTH SERVICE SYSTEM

Recommendation

Diabetic retinopathy screening should be a part of comprehensive care for people with diabetes and embedded in the health service system. Opportunities to incorporate diabetic retinopathy screening with other relevant health initiatives (such as Division of General Practice diabetes initiatives) and events (such as National Diabetes week) should be actively sought. Results of eye examinations by ophthalmologists, optometrists and non-mydriatic photography screening programs should be communicated to the patient's GP.

The establishment of community networks to ensure retinopathy screening was embedded in the health service system and part of comprehensive management of diabetes was a critical aspect of the VRSDP.

The Community

The role of the community (i.e. consumers who the screening program is targeting, other health professionals who will be involved, community service clubs, etc) cannot be underestimated; without the support of the community, no diabetic retinopathy screening program will be successful. Members of the community can provide invaluable information and their involvement lends itself toward sustainability of screening.

The cultural context of communities should be understood before undertaking a screening project in any area. Key community contacts should be identified and working relationships developed. Community residents and community leaders should be included in the decision of what will be included as program content, how

to adapt the program so that it is culturally appropriate and what strategies will be most useful in program implementation. The WMRSP included a consumer representative from the community on its steering committee.

Kooris

Life expectancy for Aboriginal populations is 15-20 years below that of non-indigenous Australians and diabetes is a major cause of morbidity and mortality.[20] The high prevalence of diabetes is exacerbated by poorer access and lower utilisation of mainstream services, particular focus on indigenous communities for diabetic retinopathy screening has a place on a statewide screening project agenda.

According to the NHMRC Guidelines, links between Aboriginal communities and eye care practitioners should be fostered. In situations where this care is not available or utilised, the screening with the NMRC offers an appropriate alternative. Results from screening should be communicated to both the general practitioner and aboriginal health workers so they can assist with follow-up.

The project coordinators from the Warrnambool and WMRSP projects attended a seminar organised by the Victorian Aboriginal Community Controlled Health Organisation (VACCHO) and the General Practice Divisions of Victoria (GPDV). The seminar was about ways in which general practice and the Victorian Aboriginal Eye Health Program could work together to improve access to diabetic retinopathy screening for Aboriginal people in Victoria. One of the project officers from the WMRSP presented on the use of optometrists for diabetic retinopathy screening.

The CWG and Warrnambool screening projects established links with the Aboriginal communities in their area and this has resulted in collaborative efforts towards improved access to diabetic retinopathy screening for Koories. The CWG project coordinated media promotion for Victorian Aboriginal Eye Health Program in the Latrobe Valley and shared locally developed resources. In Warrnambool, the project

coordinator provided a screening session with the NMRC for the Koori community at the Gunditjmara Cooperative. The project coordinator also organised for a diabetes educator and dietitian to attend the screening session. Screening with the NMRC will be provided by the Warrnambool project coordinator at the next Koori Well Persons Health Check in Portland. As the VCO has existing links with the Aboriginal Health Service in Melbourne and provides diabetic retinopathy screening through optometrists, the establishment of new links through the WMRSP was not necessary.

General Practitioners

Recommendation
The central role of the general practitioner in diabetes care should be maintained. GPs should be kept informed about diabetic retinopathy issues, awareness raising campaigns, and, where possible, their input on program design and implementation should be sought

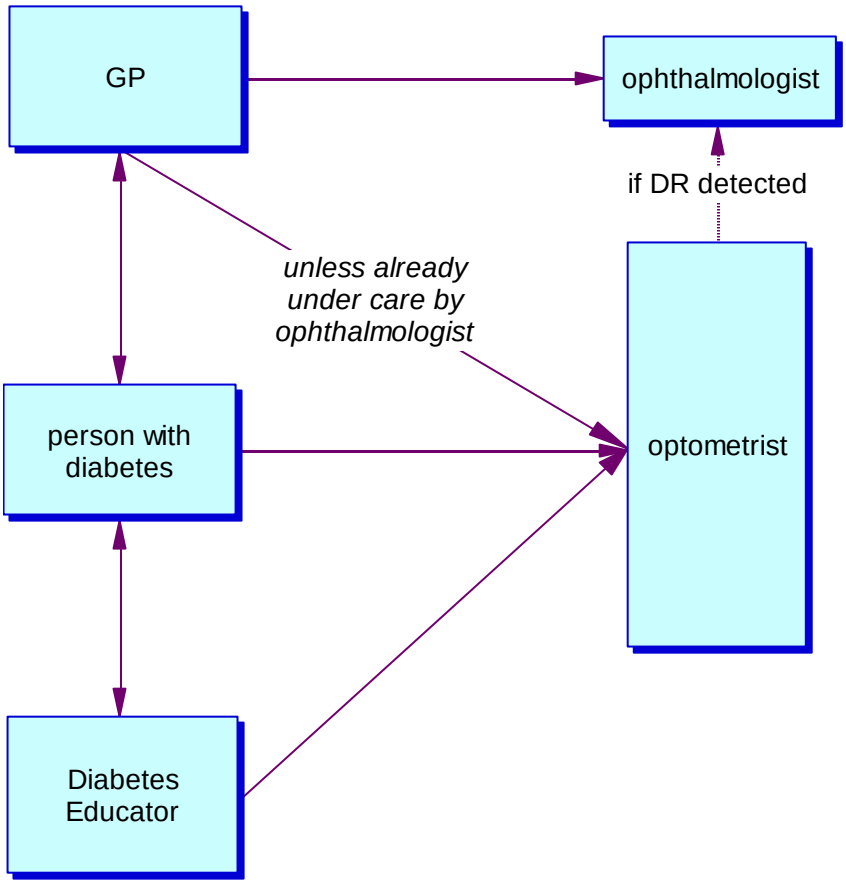
As general practitioners have a central role in the management of people with diabetes, effective diabetic retinopathy screening must first enrol the support of the GP. In fact, general practitioners are reported to be the sole carer for over 50% of the population with diabetes.[3]

In a study conducted by the CERA in 1997, 62% of people with diabetes reported that their general practitioner was the best source for keeping them up-to-date regarding diabetes complications and 61% reported that their GP was the main prompt that encouraged them to have their eyes examined.[21] Yet, although GPs are in a unique position to ensure that patients receive regular eye care, the demands of their practice often limit their involvement in screening for diabetic retinopathy.

Because general practitioners are very busy, direct contact with individual GPs regarding health promotion is often difficult. Communications to GPs regarding most

aspects of diabetic retinopathy screening (e.g. recruitment, promotion, etc) can be conducted through practice managers, peak bodies or through other existing relevant health programs or events (e.g. National Diabetes Week, World Diabetes Day). Issues related to patient management, however, should continue to be handled directly with the GP. The CWG Screening project established a link with the *Better Practice in Diabetes Care* program which was implemented by the Central West Gippsland Division of General Practice. This link enabled eye care to be incorporated as part of holistic diabetes care.

Figure 3. CWG Screening project pathway of care (through links with *Better Practice in Diabetes Care* program)



The WMRSP and Warrnambool project established links with the Divisions of General Practice. In this manner, GP input in the development and progress of the

screening projects was obtained and the partnership added credibility to the screening projects when local GPs saw that they were supported by the Division(s). In addition, the screening program design used by the WMRSP placed great emphasis on the facilitation of communication between optometrists and GPs. The expected results of improved communication between optometrists and GPs was the inclusion of optometrists in diabetic retinopathy screening. Improved communications between health professionals regarding results of referrals will also result in better quality comprehensive care for the person with diabetes.

Diabetes educators

Each of the local screening projects established opportunistic links with diabetes educators. The Warrnambool project coordinator engaged diabetes educators to be present at the NMRC screening sessions. The CWG project was indirectly linked to diabetes educators as the basis of the *Better Practice in Diabetes Care* project was for GPs to refer all newly diagnosed people with diabetes to a diabetes educator. The WMRSP found that diabetes nurse educators were a good source for recruitment as they provided courses for newly diagnosed people with diabetes in various languages.

HEALTH PROFESSIONAL TRAINING

Recommendation

The role of optometrists as screeners for diabetic retinopathy can be enhanced through the creation of links with primary health agencies, continuing education of other health professionals and consumers and improved communication between health professionals (e.g. results of eye examinations should be communicated to other relevant health professionals)

Health professional training offers an opportunity to facilitate links and communications with other health professionals.

The goal is for all diabetes related health providers to:

- Be familiar with the basic guidelines for diabetic retinopathy screening (i.e. encourage eye examinations at diagnosis and then at least every two years),
- Understand that the development and progression of diabetic retinopathy is related to the control of diabetes,
- Know that laser treatment is most effective when diabetic retinopathy is detected *before* any visual symptoms are present,
- Encourage good control of blood pressure and serum lipid levels to reduce the risk of diabetic retinopathy;
- Understand the relationship between onset of diabetic retinopathy and the duration of diabetes; and
- Understand the roles of different health professionals with respect to diabetic retinopathy screening.

According to the National Diabetes Strategy and Implementation Plan, health professional training is vital to a Diabetes Visual Impairment Prevention Program. The health professional training and education sessions arranged by the local screening projects were relatively well attended by general practitioners and optometrists. Sessions that provided incentives, such as dinner or CME credits were particularly well-attended. Educational sessions are an opportunity to remind GPs to refer their patients for retinal examinations, offer strategies for patient education, clarify the roles of different eye care professionals and advocate different methods of diabetic retinopathy screening. Educational sessions are especially pertinent in rural settings where maintenance of quality of care may be an issue and professional isolation is a challenge for health care practitioners.

Some of the training sessions for GPs were organised through the Divisions of General Practice. Every opportunity to include diabetic retinopathy issues within Division educational programs should be encouraged. Whenever possible, GP education sessions should be followed-up with an article in the Division's newsletter. Other health professionals who come in frequent contact with people with diabetes who should also be included in training are: ophthalmologists, optometrists, specialist physicians (including endocrinologists), pharmacists, nurse practitioners, diabetes educators, and aboriginal health workers.

Training programs offer a forum in which skills and confidence for diabetic retinopathy screening can be improved and maintained. The WMRSP developed a CME program that combined education for GPs and optometrists with respect to diabetic retinopathy screening which was accredited by the Royal Australian College of General Practitioners and the Optometrists Association of Australia.

The Warrnambool project is in the process of developing an accredited training program for allied health professionals. An application for accreditation has been completed, reviewed and approved by an assessment panel, and submitted to the Office of Post Compulsory Education, Training, and Employment (OPCETE).

Preliminary discussions with Diabetes Australia- Victoria to take administrative responsibility of the program has begun. A proposal to engage the Australian Diabetes Educators Association to undertake the training and promotion of the accredited course across Victoria has also been put forward.

PROMOTION AND COMMUNITY AWARENESS

Recommendation

Many resources, such as brochures, posters and public service announcements relating to diabetes eye health, have been produced nationally. Wherever possible, nationally produced materials should be used to ensure that people with diabetes receive a consistent message regarding the importance and timing of regular eye examinations

Recommendation

Materials developed for people of culturally and linguistically diverse backgrounds should be evaluated for cultural appropriateness and effectiveness (i.e. reach and impact), and be consistent with national messages.

Another aspect of CERA's role was to promote linkages between the National Diabetes Eye Health Promotion project and the work undertaken as part of this project in the VRSDP. The use of nationally developed resources ensures that the population with diabetes not only receive consistent messages on the importance of regular eye examinations but also that these messages are consistently reinforced. Health education related to diabetic retinopathy cannot afford to risk the creation of further barriers to eye care due to confusion from mixed messages. The two national level programs with which formal links were established were the Diabetes Eye Health Promotion Project and the Lions Eye Health Program-Australia.

The Diabetes Eye Health Promotion Project (DEHP), coordinated nationally by Diabetes Australia (via the Retinopathy Sub-committee of the Australian Diabetes Society), aimed to improve knowledge of, application of, and adherence to the

NH&MRC Clinical Practice Guidelines for the Management of Diabetic Retinopathy. Key activities of the project included: target group consultation, and the development of materials and resources including TV and radio community service announcements, posters and consumer brochures and print advertisements. Specific materials were developed for GPs, optometrists and ophthalmologists which have included retinopathy slides, a photo-card and a consumer video.

The Lions Eye Health Program- Australia (LEHP) is a community eye health campaign to prevent vision loss and blindness from diabetic retinopathy and glaucoma. It is a joint undertaking of CERA and the Victorian Lions Foundation with Diabetes Australia and Glaucoma Australia as partners. A Community Eye Health Kit has been produced that contains posters, brochures, videos, copy for print and broadcast media with guidelines for the implementation of a community based program. The Kit has been distributed to Lions Clubs in western Victoria, which coincides with the area covered by the Warrnambool project. The Kit is being progressively distributed to Lions Clubs across Victoria.

Local screening projects utilised national resources as listed in the following table. The second table lists resources developed by each local screening project.

Table 11. Use of national resources by each of the local screening projects

Project	Use of National Resources	Comments
CWG Screening Project	• Media campaign (radio, television and print) was developed through use of LEHP slogan 'Don't lose Sight of Diabetic Retinopathy' • DEHP posters and brochures were distributed to optometrists • DEHP brochures were distributed to community by Australia Post • LEHP posters and brochures were distributed to optometrists • DEHP and LEHP posters distributed to shopping centres, schools, churches, etc	• Television commercial did not specify two yearly time interval for eye examinations • DEHP diabetic retinopathy management cards had already been distributed to GPs and optometrists by *Better Practice in Diabetes Care* project
WMRSP	• DEHP brochures and a poster sent to optometrists who participated in the project • DEHP Retinopathy management chart distributed to participating optometrists • DEHP brochures in 9 languages distributed to participating optometrist during Diabetes Awareness Week, with another DEHP poster and fax back re-order form • DEHP brochure distributed to participating GPs and diabetes educators	
Warrnambool Screening Project	• *Diabetes and your Eyes* booklet and LEHP brochures distributed to participants with diabetes at screening sessions and at educational sessions (e.g. diabetes support group meetings) • LEHP video shown at screening sessions by Lions Club volunteers • Radio announcements for screening sessions coordinated with LEHP	• DEHP materials were not used by the Warrnambool project as focus group discussions revealed that people with diabetes found the gray colour of the brochure 'morbid' and small print difficult to read. The focus group discussions revealed that people with diabetes prefer positive messages with print large enough to be read without the aid of glasses. (personal communication, CERA) • Links forged with local Lions Clubs and LEHP facilitated cost-effectiveness and maintenance of consistent messages for people

		with diabetes. Now that LEHP has obtained national funding, links forged by the Warrnambool project can be replicated with other screening projects in Victoria.

Table 12. Materials developed by each of the local screening projects

Project	Developed materials	Comments
CWG Screening Project	• Write on magnets (10x7 cm) that used LEHP slogan distributed to patients with diabetes, optometrists, and pharmacies • CERA 'friendly reminder' was developed to invite past participants of CERA's screening to have their eyes examined • Optometrist contact list developed for consumers with diabetes and pharmacies	• Magnets were thought to support recall systems and have been adopted by the LEHP program • 57 (10%) participants reported presenting for an eye examination because they had received a CERA 'friendly reminder'. Once people have presented for a previous eye examination, they may be more likely to continue to access eye care. In a follow-up screening conducted by CERA, 90% of participants either returned to the screening or had already had a subsequent eye examination within the past two years.[1]
WMRSP	• *Diabetes- Looking after your eyes* brochure and poster with message in 10 languages developed • Listing of participating optometrists and whether or not any languages other than English were spoken was distributed to GPs	• The poster was used for World Diabetes Day in Victoria as it targeted a wide range of people with diabetes • Assessment by the WMRSP found a need for translated information that recognised the literacy levels of the population in the region. The translation of resources can be useful to culturally diverse communities, however, the importance of verifying translations in the community for whom they are intended must be stressed. Incorrectly translated materials contradict the original reasons for their creation and may also convey false information. Therefore materials should be translated back into written English by a person who is proficient in English and the translated language. Some languages may also have different dialects or formal and informal ways of speaking. In this case, it is important to discern which dialect or style is most appropriate for your specific target population.
Warrnambool Screening Project	• Locally developed pamphlets and posters to announce each screening session contained a short message on the importance of regular eye examinations and the date and location of each screening.	• To maintain consistency, national resources that have a space to record dates and locations of screening (e.g. as with the Aboriginal Eyecare Program) should be developed

SUSTAINABILITY

The three projects used their staff in very different ways. With the emphasis on marketing in the CWG project, one project coordinator was able to recruit 18 optometrists who screened 573 people with diabetes. Using the non-mydriatic retinal camera in Warrnambool, one project coordinator organised local promotion in nine separate townships (with screening in six other townships pending) and screened 160 people with diabetes with help for recruitment from GPs and health services. For the WMRSP, one part time project manager and two part time project officers (1EFT) recruited 19 GPs and 29 optometrists who screened 256 people with diabetes for diabetic retinopathy.

In the case of screening with the non-mydriatic camera, project coordinators should be appointed for existing health networks or defined geographic regions to liaise with local health professionals, provide diabetes education to screening participants through provision of diabetes educators at screening sessions, screening promotion in local communities, camera maintenance, links to a photo grader, and screening result follow-up to patient and GPs. Optometry screening could use the support of one full time project coordinator to promote the role of optometrists through organised educational sessions, create and maintain links with health networks, and to explore strategies that will lead to better communication among health professionals.

In addition to manpower required to sustain diabetic retinopathy screening, linkages that have been forged with health services will complement sustainability. Each of the local screening projects developed links with key community organisations. For example, the partnership between CWG project and the Division of General Practice ensured integration of diabetic retinopathy screening in the coordinated model of care for diabetes being endorsed by GPs. The partnership between the Warrnambool project and Vision Australia resulted in the establishment of an accredited training

course for screening with non-mydriatic photography. The WMRSP developed a link with the Western Region Health Centre which resulted in utilisation of optometry services and optometrist involvement in diabetes group education sessions. Partnerships will provide referral sources, ensure that diabetic retinopathy is embedded in the overall health system, and increase access to services for people with diabetes.

Table 13. For each project:

Project	No. screened	Target	Health professional involvement			
			GP	Optometrists	Allied health	Ophthalmologists
CWG	573	840	37/100 through CWG Division of GP	18/18	Diabetes educators through Better Practice in Diabetes Care project	1 ophthalmologist for education of optometrists
WMRSP	256	7,755	19/293 plus partnership with Western Melbourne Div of GP and the Westgate Division of GP	29/36 plus partnership with Optometrists Association of Australia	Links to diabetes educators who provided courses for people with newly diagnosed diabetes Collaboration with Diabetes Alliance Group	2 practices in area notified of project 1 ophthalmologist on steering committee who provided training at educational sessions
W'bool	160	531	4 screening sessions at GP surgeries, with 2 planned for 2001 plus support from Otway Division of GP	-	Diabetes educator services organised at screening sessions Partnership with Vision Australia Collaboration with South West PCP project	2 ophthalmologists in the area informed of screening- one on steering committee 2 ophthalmologists from the Royal Victorian Eye and Ear Hospital for photo grading and GP education

Non-mydriatic retinal cameras

The use of non-mydriatic retinal cameras for diabetic retinopathy screening is dependent on sustainable funding to cover running costs. One way would be the introduction of a Medicare item number for fundus photography. Screening with NMRCs also entails:

- high establishment costs (acquisition of NMRC and station wagon)
- training and maintenance of skills of camera operator
- enlisting support of GPs
- definition of geographic catchment areas (e.g. Division of General Practice boundaries, local government areas, or PCP catchments) and establishment of a 'home base' for each defined catchment
- provision of a project coordinator
- on going funding for costs of travel, accommodation, and photo grading
- occupational health and safety supports for transportation of camera

The Warrnambool screening project sent their retinal photographs to an ophthalmologist for grading. To expedite photograph assessment, screeners can be trained to separate normal photographs from photographs that indicate pathology or photographs for which diagnosis is uncertain. This subset of photographs can then be sent to an ophthalmologist for grading. The average time required to assess retinal photographs from 60 patients is one hour (personal communication, Dr Alex Harper, CERA).

For sustainability of the Warrnambool project, South West Healthcare has a submission pending for a Diabetes Disease Management Project. This project has a diabetic retinopathy screening component that would ensure that diabetic retinopathy screening is embedded in comprehensive care for people with diabetes and provide for the continuation of screening with the NMRC as an integral part of diabetic retinopathy screening.

Optometry

One of the advantages of using optometrists for screening is the capacity for recall. This aspect of optometry lends itself well to sustainability for diabetic retinopathy screening. Optometry also lends itself well to sustainability because of easy accessibility within the community, no requirements for continual recurrent funding other than Medicare, and the possibility for provision of services to culturally and linguistically diverse populations.

The uptake of optometrists for diabetic retinopathy relies upon acceptance of optometrists as screeners by other health professionals such as endocrinologists, ophthalmologists and GPs. Yet, other health professionals appear to be slow to embrace optometrists as a viable method for diabetic retinopathy screening. Support and promotion of the role of optometrists as screeners for diabetic retinopathy is essential if an increase in the number of people with diabetes having their eyes examined is to be achieved. The WMRSP demonstrated that acceptance of optometrists as diabetic retinopathy screeners is possible through promotion, education and communication between health professionals. Links with allied health professionals, community health centres and Divisions of General Practice will also benefit the inclusion of optometrists in diabetic retinopathy screening.

Two of the three local screening projects successfully engaged with the local Division(s) of General Practice to incorporate diabetic retinopathy screening within a pre-existing diabetes initiative. Therefore, encouraging GPs to use optometrists for diabetic retinopathy screening became another component in the system of holistic care that already existed for people with diabetes.

Reporting by optometrists back to other health professionals may also enhance acceptance of optometrists as screeners for diabetic retinopathy.

BARRIERS

Because diabetic retinopathy remains asymptomatic in its early stages, substantial barriers to achieving regular eye examinations for people with diabetes include the belief that 'nothing is wrong with my eyes', not being told of the need for eye examinations and being too busy.[22, 23] Studies on barriers to diabetic retinopathy screening in Victoria indicate that being asymptomatic and not being told of the importance of regular eye examinations are the two most commonly cited reasons for failure to comply with guideline recommendations.[12, 24] Many people with diabetes who participated in the three local screening projects reported similar reasons for not having had a previous eye examination ever or in the past two years. In the case of the WMRSP, the reasons were recorded by the practitioner who completed the survey on behalf of the patient.

Table 14. Barriers as reported by participants who had not had a previous eye examination.

	CWG (n = 573)	WMRSP (n = 256)	Warrnambool (n = 160)
Never had an eye examination	108	19	32
Newly diagnosed	23	-	13
Have not had any problems with eyes/vision	44	-	6
Not aware of the risk of diabetic eye disease	27	-	4
"Haven't got around to it"	0	-	4
Concerned with other health problems	6	-	5
"First exam"	0	5	0

"No reason"	6	-	0
Too expensive	2	-	0
Cannot get there myself/ Need assistance	1	-	0
Don't know where to go	1	-	
Patient says diabetes diagnosis is not 'definite'	0	-	3
Other	1	1	3
No Response	5	13	0

In response to possible barriers of distance to travel to an eye examination, the Warrnambool project set up the NMRC in GPs practices and community health centres in a number of small towns and villages throughout their region. The 'visit' of the camera was advertised extensively in the local areas prior to the screening.

For the WMRSP a poster was printed in the languages known to be used in the western metropolitan area. Optometrists speaking community languages were encouraged to participate in the project.

In both the CWG and WMRSP optometry practices were in most local towns/ suburbs. Both these projects aimed to initiate and strengthen the referral pathway between GPs and optometrists.

Table 15. Barriers as reported by participants who reported that they had not had an eye examination in the past two years.

	CWG (n = 573)	WMRSP (n = 256)	Warrnambool (n = 160)
No eye examination in the past 2 years	46	66	15[†]
Have not had any problems with eyes/vision	17	6	11
Not aware of the risk of diabetic eye disease	10	5	0
"Haven't got around to it"	2	5	3
Concerned with other health problems	4	1	1
Waiting for reminder	1	1	-
"No reason/ No excuse/ forgot"	2	-	-
Too expensive	1	-	2
Cannot get there myself/ Need assistance	-	-	-
Too far to travel	-	-	1
Language barrier	1	1	-
Inconvenient	-	1	-
Other	3	2	-
No Response	16	47	0

Increased knowledge and awareness raising of the importance of retinal screening, as addressed by the first goal of the VRSDP, may serve to prompt people with diabetes to have eyes examined. Addressing barriers, however, is a complex issue. While knowledge and awareness raising serves an important role, it has also been shown that simply knowing about the importance of regular screening is often not enough to

prompt a person with diabetes into action. In a study of barriers to screening among patients with diabetes who presented at the Royal Victorian Eye and Ear Hospital, 111 reported that they were aware of screening recommendations, but only half of those patients reported having regular eye examinations.[12]

One strategy that has been found to enhance compliance is the use of reminder notifications in conjunction with educational campaigns.[25, 26] In Victoria, the national recall system that is currently being piloted is expected to increase screening and enhance awareness raising.

The difference between rural and urban utilisation of eye care in the VIP study highlighted the fact that different regions probably face different barriers to screening. The identification of barriers for each project allows tailoring of specific recruitment strategies for each area. For example, the VIP found that rural residents with diabetes tend to access optometrists more than their urban counterparts. Thus, once again, underscoring the need to tailor specific strategies for rural environments and the need to have culturally appropriate messages for culturally diverse populations for the implementation of a successful screening project.

CONCLUSION

Although 88% of GPs in Australia report that they often or always refer their patients with diabetes for eye examinations, almost half of people with diabetes in Victoria report that they have not had an eye examination for diabetic retinopathy in the past two years. To prevent vision loss and blindness due to diabetes, early diagnosis and timely treatment of diabetic retinopathy is essential.

The provision of on-going diabetic retinopathy screening program in Victoria will require continued awareness raising and health promotion campaigns, utilisation of ophthalmologists, optometrists and other relevant health professionals for eye examinations and the maintenance of screening programs using the non-mydriatic retinal camera.

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