Pan American Health Organization
World Health Organization
REGIONAL OFFICE FOR THE Americas

58th DIRECTING COUNCIL

72nd SESSION OF THE REGIONAL COMMITTEE OF WHO FOR THE AMERICAS

Virtual Session, 28-29 September 2020

CD58/INF/2
7 August 2020
Original: English

PLAN OF ACTION FOR THE PREVENTION OF BLINDNESS AND VISUAL IMPAIRMENT: FINAL REPORT

Background

1. The 53rd Directing Council of the Pan American Health Organization (PAHO) adopted the Strategic Plan of the Pan American Health Organization 2014-2019 (Official Document 345) *(1)* and the Plan of Action for the Prevention of Blindness and Visual Impairment (Document CD53/11) *(2),* which offered concrete actions to address priorities for the prevention of blindness and eye care in the Region of the Americas. In 2015, 117.86 million people were visually impaired in Latin America and the Caribbean: 2.34 million were blind, 12.46 million had moderate to severe visual impairment (MSVI), 11.34 million were mildly impaired, and 91.72 million had near-vision impairment (NVI). Cataract is the most common cause of blindness and under-corrected refractive error is the most common cause of visual impairment. Estimates suggest that the prevalence of blindness will continue to decrease but absolute numbers will increase to 132 million people with visual impairment due to population aging *(3)*. This final report reviews progress achieved towards meeting the objectives set in the strategic lines of action. It also provides a general overview of the progress achieved in eye health in the Region of the Americas.

Analysis of the Progress Achieved

2. Eye care in Latin America and the Caribbean has substantially improved, due to five main developments: *a)* generation and use of evidence in policy development; *b)* decreased prevalence of blindness; *c)* reduction of inequities in eye care services provision; *d)* increased access to eye care services for adults; and *e)* increased access to eye care services for children. Governance has been improved due to the production of evidence through population-based surveys *(4-13)* and reviews *(14-18)* that provided a sound platform for measuring progress; regional and country estimates of age-standardized prevalence of blindness and visual impairment continue to decrease *(1, 14)* and projections suggest the trend will continue. Solutions-based research has provided a sense of direction *(19-23)* to guide future eye health policies.

3. In order to reduce inequalities in eye care service delivery, the Pan American Sanitary Bureau (the Bureau) established a program to improve efficiency and quality in targeted public hospitals. This program delivered considerably greater outputs, without requiring additional resources, by improving the service delivery mechanism, strengthening managerial and administrative processes, and adopting standards for better performance and quality. The quality of cataract surgery was improved by building competencies among ophthalmologists working in the public sector, through wet labs and tutorials by international experts. Evidence was produced and published on inequities in the distribution of human resources *(24)* in order to support advocacy for policies and programs to train new ophthalmologists in underserved populations, especially in public residency programs.

4. During the period of the plan of action, the access and quality of eye care services to adults was increased. The Bureau provided technical cooperation, with the support of international partners, to establish a model of high-quality, high-volume cataract surgery within the existing ophthalmology services in the public sector, reducing long waiting lists for surgery to tackle the backlog of cataract blindness. Some countries decentralized cataract surgery services to regional hospitals in order to increase geographical access to the services. The Bureau provided cooperation and, jointly with partners and ministries of health, prepared and tested standardized models for the detection, referral, and treatment of diabetic patients with diabetic retinopathy *(25)*. These models will be the basis for future evidence-based policies.

5. Important progress has been made in the number of eligible premature babies screened and treated for retinopathy of prematurity (ROP) in at least half of the countries, reducing the incidence of blindness caused by this disorder *(23)*. The Bureau's ROP Control Program is a joint initiative between the eye care program and the Latin American Center for Perinatology, Women and Reproductive Health (CLAP/WR) of PAHO, which promotes national policies, develops clinical guidelines, supports the strengthening of services in intensive care neonatal units, and builds competency in the health workforce. During the period, an updated version of the clinical practice guidelines was launched to improve the quality of neonatal care and detection, and the treatment of ROP *(26)*. The Bureau supported the generation of evidence on clear policy alternatives to address primary eye care in refractive error programs for school children *(19)*. This will be the basis for future clinical practice guidelines in this area.

6. The Bureau carried out an epidemiological assessment of functional low vision (FLV) in the Region. A person with FLV is one who has visual impairment even after treatment and/or standard refractive correction, but who uses, or is potentially able to use vision to plan or carry out a task. The prevalence of FLV increases with age and varies between 0.9 and 2.2% in people over 50 years of age in 15 Latin American countries *(16)*. This evidence was used for advocacy purposes at the national level in order to promote the development of new FLV services and the utilization of existing ones.

7. At the regional level, the Bureau created a learning community with the national eye care program coordinators at the ministries of health, to boost learning from problems and successes. Information is shared in biennial face-to-face workshops and clear goals and priorities are set.

Strategic Line of Action 1: Health authority governance of visual health

8. A significant number of population-based surveys among people over 50 years of age were published in the Region during this period. These were used to determine a baseline, follow up on progress, and promote national policies in some countries. At the regional level, the data were used to estimate inequities in eye health *(15).* The prevalence of blindness and moderate visual impairment was concentrated in the most socially disadvantaged groups. In cataract surgery, coverage and optimal outcomes were concentrated among the wealthiest population *(15).* Another important achievement was the increased number of countries that used the World Health Organization's (WHO) Eye Care Services Assessment Tool (ECSAT) to assess the capacity of health systems and services to respond to eye care needs. ECSAT also provided guidance on evidence-based interventions to improve performance. Currently, most ministries of health have national eye care coordinators that liaise with other health programs, local health authorities, and the Bureau. Most national coordinators submit an annual situation analysis to the Bureau, using the regional program indicators.

Objective 1.1: Increase the epidemiological and service-related data used to strengthen and support the Member States' political and financial commitment to eye health	
Indicator, baseline, and target	**Status**
1.1.1 Number of population studies conducted by the Member States on the prevalence of visual impairments Baseline (2014): 18 Target (2019): 24	This target has been achieved. A total of 25 countries have met the indicator. During the period, seven additional countries published population-based surveys *(4-10)* to provide figures on the prevalence of blindness and visual impairment, its main causes, cataract surgical coverage and visual acuity outputs after cataract surgery, and barriers to accessing eye surgical services in a specific geographical area.
1.1.2 Number of countries that have completed and published an evaluation of eye health services Baseline (2014): 3 Target (2019): 10	This target has been achieved. Currently, a total of 15 countries have published an evaluation of eye health services (ECSAT) to provide guidance for assessing the status and functionality of a country's eye care services and systems.

Objective 1.2: Develop, update, implement, and monitor national and subnational policies and plans to achieve universal eye health during the life course by strengthening health systems	
Indicator, baseline, and target	**Status**
1.2.1 Number of Member States that submit annual reports on the implementation of eye health policies, plans, and programs Baseline (2014): 17 Target (2019): 25	This target has been achieved. A total of 25 Member States reported implementing eye care policies and plans through the annual national performance indicators and information tool.
1.2.2 Number of Member States that have a national coordinator or have formed a blindness prevention committee that actively monitors the implementation of eye health policies and plans Baseline (2014):14 Target (2019): 20	This target has been achieved. 24 ministries of health appointed a staff member as a focal point for the prevention of blindness and eye care program. Biennial meetings (2015, 2017, 2019) were organized with national coordinators for training and sharing experiences.
1.2.3 Number of Member States that report on the integration of eye health into national health plans and budgets Baseline (2014): 0 Target (2019):15	This target has not been achieved. Only 13 Member States reported integration of eye health into national health plans and budgets. The future approach needs to focus on the integration of eye care into health care plans, programs and budgets (e.g. maternal and childcare, school health programs, diabetes, aging).
1.2.4 Number of Member States that report that their national lists of essential drugs, diagnostic tests, and health technologies include sections on eye health Baseline (2014): 0 Target (2019):10	This target has been achieved. 13 Member States reported integration of eye care drugs and technologies into their national lists of essential drugs.

Strategic Line of Action 2: Available, accessible, attainable, quality eye health services for the entire population

9. In most countries, evidence was published on the inequality in the distribution of ophthalmologists between and within countries *(24),* with a disproportionate number concentrated in more developed, socially advantaged areas. These data were used to carry out advocacy and to encourage professional societies and most public residency programs to prioritize the training of new ophthalmologists for underserved populations. Eight countries reported having a plan on human resources for eye care. One crucial aspect was improving the efficiency, accountability, quality, and institutional culture of public eye care services. This is perhaps the most effective way to improve access to vulnerable population, since it reduces waiting lists, among other problems in the public sector. The Bureau provided technical know-how and support to improve the performance of public

ophthalmology services in six Member States. The key determinant of success was the commitment of hospital authorities to implement and report changes and progress achieved.

Objective 2.1: Create and maintain a trained, productive workforce that is equitably distributed at the national and subnational level	
Indicator, baseline, and target	**Status**
2.1.1 Number of countries that have conducted periodic evaluations of the availability of eye health care personnel at the subnational level Baseline (2014): 1 Target (2019):15	This target has been achieved. 23 countries conducted evaluations of the availability of ophthalmologists at the subnational level (14 Latin American countries and nine Caribbean countries) *(24).* There is high inequity in the distribution of ophthalmologists between and within countries, with a disproportionate number concentrated in more developed, socially advantaged areas.
2.1.2 Number of countries that report having a national plan for training human resources specializing in eye health and assigning them to areas and populations neglected by health systems Baseline (2014): 0 Target (2019):10	This target has not been achieved. Only eight Member States reported having a plan on human resources development for eye care. There is a need for more countries to develop plans, incentivizing human resources redistribution, and to convert these plans into concrete actions.
Objective 2.2: Strengthen the organizational capacity of public eye health services to provide efficient, affordable, high-quality eye care services	
Indicator, baseline, and target	**Status**
2.2.1 Number of Member States that have established a program to strengthen public eye health care services that is consistent with the protocol established by PAHO Baseline (2014): 3 Target (2019):12	This target has not been achieved. Only six Member States are working on strengthening public eye care service programs. Each service requires the collection of baseline information, an initial assessment visit, participation in a planning workshop, and two annual follow-up visits. The methodology to improve management and process was standardized.
Objective 2.3: Include eye health indicators in national information systems in order to monitor the delivery and quality of eye health care services	
Indicator, baseline, and target	**Status**
2.3.1 Number of Member States that include cataract surgery in their national information systems Baseline (2014): 1 Target (2019): 7	This target has been achieved. Seven Member States reported having included the number of cataract surgeries in their national health information systems; however, data are collected mostly from the public sector, which is a limiting factor for the production of annual rates.

Strategic Line of Action 3: Reduce blindness and visual impairment in adults

10. The recent administrative and clinical improvements in public eye care services are expected to have a positive impact on clinical and surgical services for cataract, diabetic and glaucoma. During this period, effective cataract surgical coverage (eCSC) was proposed as a replacement for the cataract surgery rate to measure access to cataract services, as it combines coverage with quality of cataract surgery, reveals inequities in service access and outcomes, and provides an objective, easy-to-measure Universal Health Coverage (UHC) indicator of services for the elderly *(28).* This new indicator was adopted by WHO in its World Report on Vision in 2019 *(29).* Some countries carried out a situation analysis using the WHO Tool for Assessment of Diabetes and Diabetic Retinopathy to evaluate service provision levels and identify the gaps to be addressed in ensuring universal access to diabetes care, and prevention and treatment of diabetic retinopathy. Some services developed delivery models of early detection and referrals for diabetic retinopathy *(27)*. In order to improve eye care access to services, eye care needs to be integrated into specific health programs (e.g. noncommunicable diseases, adult health, primary care, and rehabilitation).

Objective 3.1: Reduce blindness and visual impairment caused by cataract through greater cataract surgery coverage for all segments of the population and adherence to quality standards	
Indicator, baseline, and target	**Status**
3.1.1 Number of countries that have a cataract surgery rate above 2,000 per million population per year Baseline (2014): 19 Target (2019): 27	Indicator measured until 2018 (2017 data): National eye care programs had serious difficulties in collecting the number of cataract operations carried out by the private sector, which affected the validity of the indicator. Countries continue to collect data from the public sector only, which limits the validity of this indicator. Collection of data for cataract surgery rate before 2014 was carried out by the Vision 2020 national committees *(27)*. In the future, countries will be invited to use the eCSC indicator *(28)* adopted by WHO in the World Report of Vision *(29).* The new indicator measures access to and quality of cataract services in the context of UHC.
Objective 3.2: Reduce the prevalence of blindness from diabetic retinopathy through metabolic control, early detection in asymptomatic at-risk individuals, and timely, appropriate treatment	
Indicator, baseline, and target	**Status**
3.2.1 Number of countries that have prepared a situation analysis of their diabetic retinopathy services Baseline (2014): 5 Target (2019):11	This target has been achieved. A total of 13 countries have published and submitted an evaluation of their diabetic retinopathy services using the WHO tool for advocacy and planning of services.

Objective 3.2: Reduce the prevalence of blindness from diabetic retinopathy through metabolic control, early detection in asymptomatic at-risk individuals, and timely, appropriate treatment	
Indicator, baseline, and target	**Status**
3.2.2 Number of countries that report having health care models that include programs for the early detection and timely treatment of diabetic retinopathy as part of comprehensive diabetes care Baseline (2014): 0 Target (2019): 7	This target has been achieved. Nine countries are implementing screening programs integrated into primary health care and using telemedicine to refer diabetic patients with diabetic retinopathy. The models are standardized across non-governmental organizations and public hospitals *(25).* An economic analysis to promote evidence-based policies is still pending.
Objective 3.3: Reduce the incidence of blindness from open-angle glaucoma through detection and treatment, especially in high-risk groups such as Afro-descendants, the Caribbean population, adults over 40, and people with a family history of glaucoma	
Indicator, baseline, and target	**Status**
3.3.1 Number of countries with programs to raise community awareness about glaucoma Baseline (2014): 9 Target (2019): 15	This target has been achieved. 15 eye care programs at the ministries of health reported implementing community awareness programs on glaucoma in populations at high risk (e.g. people over 40 years of age, Afro-descendants, and those with a family history of glaucoma).
3.3.2 Number of countries that report an increase in the glaucoma surgery rate Baseline (2014): 0 Target (2019): 7	This target has not been achieved. No countries measured the glaucoma surgery rate; the national health information systems do not include glaucoma surgery; collection of this indicator might not be feasible in the future.
Objective 3.4: Reduce visual impairment through the detection and treatment of uncorrected refractive error and presbyopia in adults	
Indicator, baseline, and target	**Status**
3.4.1 Number of countries that include detection and treatment of presbyopia in adults in their national plans for both eye health and older adults Baseline (2014):0 Target: (2019): 10	This target has been achieved. 13 Member States are including presbyopia in their national eye care programs. For future population-based eye care surveys, it is recommended that coverage of presbyopia services be assessed.

Strategic Line of Action 4: Reduce blindness and visual impairment in children

11. An increasing number of countries have reported national policies on Retinopathy of Prematurity (ROP) *(20, 23).* This includes: *a)* costs covered by the national government; *b)* national guidelines for ROP; *c)* legislation mandating eye examination of preterm infants; and *d)* data-collection or monitoring systems to track the number of screened/treated newborns. A total of 228 neonatal intensive care units in the Region are reporting ROP quality indicators data *(23),* and in most countries, coverage of screening and treatment at the subnational level varies between 50% and 100% *(23).* Several countries have national programs for refractive error in school children and are measuring the use of eyeglasses to assess their effectiveness, with an increasing trend in some places *(12).* The health programs for school children show the advantages of the intersectoral approach in securing sustainability, high coverage and school community participation.

Objective 4.1: Reduce blindness from retinopathy of prematurity through the prevention of premature births, optimal neonatal care, and timely detection and treatment, which can prevent over half the cases of blindness in children from this cause	
Indicator, baseline, and target	**Status**
4.1.1 Number of Member States implementing a national policy on the prevention of retinopathy of prematurity Baseline (2014): 9 Target (2019): 14	This target has been achieved. 15 countries reported implementing national policies in ROP *(20,23).* This includes: *a)* costs covered by the national government; *b)* national guidelines for ROP; *c)* legislation mandating eye examination of preterm infants; and *d)* data-collection or monitoring systems to track the number of screened/ treated newborns.
Objective 4.2: Reduce visual impairment through the detection and treatment of uncorrected refractive error in schoolchildren and adolescents through effective screening and management programs	
Indicator, baseline, and target	**Status**
4.2.1 Number of Member States with effective models of intersectoral visual health programs for schoolchildren, in keeping with the standards promoted by PAHO Baseline (2014): 1 Target (2019): 7	This target has been achieved. Seven countries are implementing programs. The key determinants for success are: *a)* policies and programs led by ministries of education with the support of ministries of health; *b)* eye care included in a package of school health; *c)* programs with strong participation of the school community, including teachers, parents, and children; and *d)* strategies to increase the use of eyeglasses.

Strategic Line of Action 5: Reduce the burden of blindness and low visual function in all age groups

12. The Bureau published epidemiologic evidence *(16)* in support of advocacy efforts to increase the number of services that treat functional low vision and prescribe low vision aids, since most countries now have low-vision services. During this period, a higher number of residency programs in ophthalmology incorporated FLV care into their curriculum, in order to train future ophthalmologists to provide basic care for simple cases and refer more complex ones to the low-vision subspecialty. These efforts aim to increase awareness, access, affordability, and use of low-vision services in order to maintain people's functionality despite visual impairment.

Objective 5.1: Provide comprehensive care and services to people with low visual function through comprehensive clinical eye care, specialized low vision care with optical aids, rehabilitation, and educational services	
Indicator, baseline, and target	**Status**
5.1.1 Number of countries that have services to treat low visual function by 2019 Baseline (2014): 21 Target (2019): 25	This target has not been achieved. 23 countries reported having low-vision services in public or non-governmental sectors. Some countries are too small to have a FLV service; therefore, ophthalmologists or optometrists need to be trained to provide basic low-vision care.
5.1.2 Number of countries that include the subject of low visual function in the ophthalmology residency curriculum and certification examinations for ophthalmologists and optometrists Baseline (2014):1 Target (2019): 7	This target has been achieved. Seven countries reported having FLV training in their residency programs. Awareness and knowledge among eye care professionals increase detection and referrals to rehabilitation.
Objective 5.2: Ensure that people with blindness and visual impairments have access to rehabilitation programs and opportunities for education, in keeping with universal and regional human rights instruments such as the Convention on the Rights of Persons with Disabilities	
Indicator, baseline, and target	**Status**
5.2.1 Number of Member States that have drafted and/or amended legislation and national plans to promote inclusive education for children with visual impairments, in keeping with the Convention on the Rights of Persons with Disabilities and the Convention on the Rights of the Child, by 2019. Baseline (2014):10 Target (2019):15	This target has not been achieved. There were no new countries reporting progress on this indicator. The links with the rehabilitation programs need to be strengthened in order to achieve progress on this objective.

Lessons Learned

13. During the period of the plan of action, remarkable progress was made on prevention, detection, and treatment of ROP. The key determinant of success was neonatologists and pediatricians becoming the main stakeholders in the program in some countries. A similar situation with healthcare practitioners managing diabetes, elderly patients, and school children will increase the sustainability and effectiveness of these programs.

14. Improved efficiency is widely accepted as one of the four overarching goals of health systems with a view to increasing access to services with quality. Improving the efficiency and quality of public services requires a strong commitment by national and local health authorities, with permanent and constant guidance and advice from national health authorities and the Bureau, to improve service performance and staff practices *(30, 31).*

15. The education sector's approach to informing and encouraging the school community about health-related programs was effective. An intersectoral approach between health and education would enhance the effectiveness and sustainability of health programs for school children.

16. Policy development and implementation require a process that includes generating evidence to promote national guidelines and policies. Persistence and advocacy by national groups are pivotal to achieving this, while the Bureau plays a catalytic role in policy change.

17. Inequity in service delivery to rural and poor populations is the main cause of blindness and visual impairment. Improving public services and distribution of resources at the subnational level would increase access to all people, reducing visual impairment and blindness.

Action Necessary to Improve the Situation

18. To achieve universal eye health care, the following steps are necessary:

a) *Integrate eye care into health care:* Making eye care integral to UHC will contribute to achieving the Sustainable Development Goals by integrating them into the relevant health programs (e.g. maternal and childcare, programs for school children, diabetes care, and the healthy aging program and sectors (e.g. social, education, and labor). Integrating eye care into primary health care will improve access for vulnerable populations and would contribute to reducing inequities in access to services.

b) *Promote high-quality implementation of public eye care services:* Improving efficiency, accountability, quality, and an institutional culture of public eye care services is one of the most effective strategies to improve access among low income

people, since it reduces some problems in the public sector, such as long waiting lists.

c) *Raise awareness, engage and empower people and communities:* In order to increase healthy lifestyles and the demand for eye care services, it is necessary to raise community awareness about the availability of effective interventions that address eye care needs throughout the life course, and to engage and empower the public, especially underserved populations.

d) *Promote high-quality research to support evidence-based national policies:* Epidemiologic data, systems and services assessments, and solutions-based research can be used to set realistic policies and strategies that can be translated into effective actions.

e) *Develop and maintain human resources for eye care*: Periodic assessments of the distribution of human resources at the subnational level can identify inequities with a view to implementing programs to address gaps. This includes creating surgery-oriented residency programs in underserved provinces and increasing positions for candidates from rural areas and training them to work in low-tech hospitals. National policies should include hiring and retention strategies for poor and rural areas, including financial incentives, good working conditions, and continuous medical education. The medical vocation and mission need to be strengthened in medical schools.

Action by the Directing Council

19. Considering the extraordinary and unprecedented circumstances presented by the COVID-19 pandemic, and in accordance with Resolution CE166.R7, this report will be published for information purposes only, and will not be discussed by the Directing Council.

References

1. Pan American Health Organization. Strategic Plan of the Pan American Health Organization 2014–2019. [Internet]. 52nd Directing Council of PAHO, 65th Session of the Regional Committee of WHO for the Americas; 30 September–4 October 2013, Washington, DC. Washington: PAHO, 2013 (Official Document OD345). Available from: https://www.paho.org/hq/dmdocuments/2014/OD345-e.pdf

2. Pan American Health Organization. Plan of Action for the Prevention of Blindness and Visual Impairment. [Internet]. 53rd Directing Council of PAHO, 66th Session of the Regional Committee of WHO for the Americas; 29 September–3 October 2014, Washington, DC. Washington: PAHO, 2014. (Document CD53/11). Available from: https://www.paho.org/hq/index.php?option=com_docman&view=download&category_slug=paho-who-mandates-strategies-6479&alias=42684-cd53-11-plan-action-for-prevention-blindness-visual-impairment-684&Itemid=270&lang=en

3. Leasher J, Braithwaite T, Furtado J, Flaxman S, Lansingh V, Silva JC, et al. Prevalence and causes of vision loss in Latin America and the Caribbean in 2015: magnitude, temporal trends and projections. Br J Ophthalmol 2019;103(7):1–9.

4. López M, Brea I, Yee R, Yi R, Carles V, Broce A, et al. Encuesta de ceguera y deficiencia visual evitable en Panamá. Rev Panam Salud Publica 2014;36(6):355–60.

5. Silva, J. National surveys of avoidable blindness and visual impairment in Argentina, El Salvador, Honduras, Panama, Peru, and Uruguay. Rev Panam Salud Publica 2014; 36(4):2009–13.

6. Alvarado D, Rivera B, Lagos L, Ochoa M, Starkman I, Castillo M, et al.**.** Encuesta nacional de ceguera y deficiencia visual evitables en Honduras. Rev Panam Salud Publica 2014;36(5):300–5.

7. Rius A, Guisasola L, Sabidó M, Leasher JL, Moriña D, Villalobos A, et al. Prevalence of visual impairment in El Salvador: inequalities in educational level and occupational status. Rev Panam Salud Publica 2014;36(5):290–9.

8. Campos B, Cerrate A, Montjoy E, Dulanto Gomero V, Gonzalez C, Tecse A, et al.. Prevalencia y causas de ceguera en Perú: encuesta nacional. Rev Panam Salud Publica 2014;36(5):283–9.

9. Gallarreta M, Furtado JM, Lansingh VC, Silva JC, Limburg H. Rapid assessment of avoidable blindness in Uruguay: results of a nationwide survey. Rev Panam Salud Publica 2014;36(4):219–24.

10. Barrenechea R, de la Fuente I, Plaza RG, Flores N, Segovia L, Villagómez Z, et al. Encuesta nacional de ceguera y deficiencia visual evitable en Argentina, 2013. Rev Panam Salud Publica 2015;37(1):7–12.

11. Silva JC, Diaz MA, Maul E, Muñoz BE, West SK. Population-based study of Trachoma in Guatemala. Ophthalmic Epidemiol 2015;22(3): 231-6.

12. Barria F, Conte F, Muñoz S, Leasher JL, Silva JC. Prevalence of refractive error and spectacle coverage in schoolchildren in two urban areas of Chile. Rev Panam Salud Publica 2018;42:e61.

13. Serrano GM, Salazar AR, Figueroa OL, Monzón A, Yee M, Yee JF, et al. National survey of blindness and visual impairment in Guatemala, 2015. Arq Bras Oftalmol 2019;82(2):91-7.

14. Leasher J, Lansingh V, Flaxman S, Jonas J, Keeffe J, Naidoo K, at al. Prevalence and causes of vision loss in Latin America and the Caribbean: 1990–2010. Br J Ophthalmol 2014;98(5):619-28.

15. Silva JC, Mújica OJ, Vega E, Barcelo A, Lansingh VC, McLeod J, et al. A comparative assessment of avoidable blindness and visual impairment in seven Latin American countries: prevalence, coverage, and inequality. Rev Panam Salud Publica 2015;37(1):13–20.

16. Limburg H, Espinoza R, Lansingh VC, Silva JC. Functional low vision in adults from Latin America: findings from population-based surveys in 15 countries. Rev Panam Salud Publica 2015;37(6):371–8.

17. Bourne RRA, Flaxman SR, Braithwaite T, Cicinelli MV, Das A, Jonas JB, et al. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis; Lancet Glob Health 2017;5(9):e888-e897.

18. Flaxman SR, Bourne RRA, Resnikoff S, Ackland P, Braithwaite T, Cicinelli MV, et al. Global causes of blindness and distance vision impairment 1990-2020: a systematic review and meta-analysis. Lancet Glob Health 2017;5(12):e1221-e1234.

19. von-Bischhoffshausen FB, Munoz B, Riquelme A, Ormeno MJ, Silva JC. Spectacle-Wear Compliance in School Children in Concepcion Chile. Ophthalmic Epidemiol, 2014;21(6) :362-9.

20. Arnesen L, Durán P, Silva J, Brumana L. A multi-country, cross-sectional observational study of retinopathy of prematurity in Latin America and the Caribbean. Rev Panam Salud Publica 2016;39(6):322–29.

21. Hariharan L, Gilbert CE, Quinn GE, Barg FK, Lomuto C, Quiroga A, et al. Reducing Blindness from Retinopathy of Prematurity (ROP) in Argentina Through Collaboration, Advocacy and Policy. Implementation. Health Policy Plan 2018;33(5):654-65.

22. Ramke J, Zwi A, Silva JC, Mwangi N, Rono H, Gichangi M. et al. Evidence for national universal eye health plans. Bull World Health Organ. [online] 2018;96(10):695–704. Available from: http://dx.doi.org/10.2471/BLT.18.213686

23. Silva JC, Zin A, Gilbert C. Retinopathy of prematurity prevention, screening and treatment programmes. Seminars in Perinatology [online] 2019;43(6):348-351. Available from: https://doi.org/10.1053/j.semperi.2019.05.007

24. Hong H, Mújica OJ, Anaya J, Lansingh V, Lopez E, Silva JC. The Challenge of Universal Eye Health in Latin America: distributive inequality of ophthalmologists in 14 countries. BMJ Open [online] 2016;6(11). Available from: https://bmjopen.bmj.com/content/6/11/e012819

25. Salamanca O, Geary A; Suárez N, Benavent S, Gonzalez M. Implementation of a diabetic retinopathy referral network, Peru. Bull World Health Organ. [online] 2018;96(10):674–81 Available from: http://dx.doi.org/10.2471/BLT.18.212613

26. Pan American Health Organization. Clinical Practice Guidelines for the Management of Retinopathy of Prematurity. Washington: PAHO; 2018. Available in Spanish from: https://iris.paho.org/bitstream/handle/10665.2/34948/9789275320020_spa.pdf?sequence=6

27. Batlle JF, Lansingh VC, Silva JC, Eckert KA, Resnikoff S. The cataract situation in Latin America: barriers to cataract surgery. Am J Ophthalmol [online] 2014;158(2):242-50. Available from: https://www.researchgate.net/publication/262050933_The_Cataract_Situation_in_Latin_America_Barriers_to_Cataract_Surgery

28. Ramke J, Gilbert CE, Lee AC, Ackland P, Limburg H, Foster A. Effective cataract surgical coverage: An indicator for measuring quality-of-care in the context of Universal Health Coverage. PloS One. 2017;12(3):e0172342.

29. World Health Organization. World Report on Vision. Geneva: WHO; 2019.

30. World Health Organization. The world health report 2000 - Health systems: improvement performance. Geneva: WHO; 2000.

31. World Health Organization. Everybody's business: strengthening health systems to improve health outcomes: WHO Framework for action. Geneva: WHO; 2000.

- - -