INTRODUCTION

Retinopathy of prematurity (ROP) is a treatable vasoproliferative retinal disorder seen in premature and low birth weight infants. Appropriate screening is important for identifying infants who require treatment to prevent retinal detachment and blindness. The ETROP and CRYO-ROP studies established treatment criteria that have been widely adopted.1,2

Ophthalmologists who screen for ROP using the gold standard of binocular indirect ophthalmoscopy (BIO) travel to hospital wards to perform examinations on at-risk neonates. Examination findings are recorded using clinical drawings, which can be time-consuming. Those who perform screening at more than one hospital may spend a significant amount of time traveling, taking time away from providing clinical or surgical services elsewhere. Wide-field digital retinal imaging (WFDRI) makes it possible for ophthalmologists to provide remote services using a telemedicine model for ROP screening.3 Images of examinations are stored, making clinical drawings unnecessary. Trained personnel can obtain retinal images and the ophthalmologist reviews them remotely. Neonates may tolerate WFDRI better than BIO and have been shown to

Sixteen respondents used BIO exclusively, 2 used WFDRI exclusively, and 12 used both. Of these, 3 respondents used WFDRI for remote screening.

Conclusions: A significant proportion of ROP screeners have access to and are using WFDRI, but few currently use a telemedicine model for ROP screening.

have less stress response (determined by changes in heart rate, respiration rate, and blood pressure) during the former method of evaluation. Studies have shown that WFDRI has comparable sensitivity and specificity to BIO.5–8

Although WFDRI may provide the opportunity to change the traditional paradigm of ROP screening, obstacles remain. Initially, learning to obtain clear images adequate for screening can be difficult. The added expense of purchasing the imaging unit may be a limitation at some centers and training additional personnel, if required, may not be possible in all locations.

In Auckland, WFDRI (Retcam; Clarity Medical Systems, Inc., Pleasanton, CA) is used to screen at three hospital neonatal units. The ophthalmologist is often present at the main hospital center and remote screening is employed at the other two centers. An ophthalmic nurse and medical photographer comprise the team that obtains the retinal images at all three centers. A neonatal unit nurse facilitates examination by assisting with positioning, medical monitoring, and employing soothing techniques such as oral sucrose and pacifier use. Each ophthalmic nurse spent several months in training to perform imaging and became skilled at identifying the stages of ROP.8 Three views (posterior pole and nasal and temporal retinas) are obtained for each eye (Figure 1).

A survey of ophthalmologists who perform ROP screening in Australasia was undertaken to compare experiences at other centers using WFDRI with those in Auckland.

MATERIALS AND METHODS

An anonymous web-based questionnaire was developed and distributed via the Royal Australia and New Zealand College of Ophthalmologists. Two follow-up messages were sent to remind participants about the survey and request participation. Participants were not required to answer every question to submit their responses.

RESULTS

Thirty-five ophthalmologists completed the questionnaire. Of these, 30 participated in ROP screening. Self-identified subspecialties included Pediatric Ophthalmology (18 of 30 respondents, 60%), General Ophthalmology (11 of 30 respondents, 37%), and Retina (7 of 30 respondents, 23%). Most participated in weekly or bi-weekly screening (27 of 30 respondents); one participant screened monthly and 2 participants screened less frequently than once per month. Most screened at one hospital (23 of 30 respondents), 4 screened at two hospitals, and 3 screened at three hospitals. Twenty-six of 30 respondents used an eyelid speculum when screening. 3 used an eyelid speculum only if necessary, and 1 did not use an eyelid specu-
lum when screening. Methods of pain control during screening included topical anesthetic (90%), oral sucrose (87%), and pacifier use (50%).

Of the 30 ophthalmologists who participated in ROP screening, 16 used BIO, 2 used WFDRI, and 12 used both. This is illustrated in Figure 2. Of those who did not use WFDRI for ROP screening, reasons cited included no imaging unit available (14), uncertain if images would be adequate (2), and time-consuming with increased discomfort for patients (1). One respondent stated that WFDRI was used when patients had ROP, but not as a primary screening tool. Respondents who did not use WFDRI as a primary screening tool were asked if they had an interest in using WFDRI for ROP screening: 12 said yes and 1 said no. A lack of financial resources (11), personnel (5), or both was endorsed as a barrier for implementing screening with WFDRI. Two respondents had concerns that the examination would be longer and more uncomfortable for patients, whereas 3 had concerns that it would not be as reliable.

Participants who had access to WFDRI were asked about their use of the imaging unit: 6 used it as a primary screening tool for ROP, 10 used it for documentation purposes, 6 used it as an educational tool, and 1 used it when a second opinion was needed or to aid as a sign off if the screener was changing. One respondent additionally stated that there were plans to implement WFDRI as a primary screening tool. In this survey, duration of WFDRI use as a screening tool ranged from 4 months to 8 years.

Participants were asked about the protocol for ROP screening with WFDRI. Most obtained views of the posterior pole and nasal and temporal retinas (7 of 10 respondents). Three of the respondents included views of the superior retina, 2 included views of the inferior retina, and 1 included views of the anterior segment for plus disease. Three of the respondents did not have a standardized protocol. Personnel who obtained WFDRI images included the ophthalmologist (8), an ophthalmic nurse (6), a neonatal unit nurse (3), a medical photographer (2), and the ophthalmology registrar (1). Training of personnel varied and included no training (2), 1 to 2 sessions of training (4), several weeks of training (1), several months of training (3), and not applicable/unknown (3). When asked if screening with WFDRI would be recommended by those who currently used screening, 8 of 9 respondents selected “yes” and 1 of 9 selected “not applicable.”

When asked if using a telemedicine model for remote ROP screening, 3 of 12 respondents said yes, 7 of 12 said no, and 2 said that they used one for remote screening when cover was required at an additional institution. When asked if use of WFDRI had affected trainees (eg, fellows and registrars), 7 of 10 respondents cited benefits of allowing trainees to view physical findings without needing to repeat the examination, 2 cited concerns about trainees not gaining skills of examination with BIO, and 4 did not endorse an impact on trainees.

When asked if WFDRI facilitated parent education and acceptance of ROP screening examination, 8 of 10 respondents selected “yes” and 2 of 10 respondents selected “no.” The results were the same when asked if WFDRI facilitated informed consent discussions with parents.

A final survey question allowed for additional comments. One respondent acknowledged that implementation of WFDRI for ROP screening was more difficult than expected and was being used for documentation of disease and adequacy of laser treatment and for hand offs when the screener was changing. Four respondents expressed interest in obtaining WFDRI at their institution. One respondent (in his opinion) indicated that BIO was the best method of assessment and was concerned that WFDRI could induce the appearance of plus disease.

DISCUSSION

WFDRI has the potential to facilitate documentation and timely remote screening of premature infants for ROP. A significant proportion of respondents had access to WFDRI (14 of 30) and of the 16 who did not have access, 12 expressed interest in using WFDRI for ROP screening. Of those who had access, 6 used WFDRI as a primary screening tool for ROP. In most cases, ophthalmologists or ophthalmic nurses performed the procedure when digital images were obtained. Most screeners have
a standardized protocol, including imaging of the posterior pole and nasal and temporal retinas. Most of those using WFDRI subjectively agreed that digital imaging facilitated parent education, acceptance, and informed consent discussions.

This descriptive study confirms that WFDRI is widely used in Australasia and that those who do not currently use it have an interest in its use. Remote screening is not widely used, but it is made possible by this technology and is arguably more advantageous than BIO. Indeed, a recent study by Quinn et al. established that trained non-physician imagers and readers were able to detect referral-warranted ROP in 1,284 at-risk infants, with a sensitivity of 90% and specificity of 87% when both eyes together were considered. In this study, referral-warranted ROP was defined as plus disease, ROP in zone 1, and stage 3 or greater ROP. Other advantages identified by this survey were documentation of disease activity, documentation of retinal findings when transitioning from one screener to another, and documentation of adequate treatment of ROP and parent and trainee education.

REFERENCES