Red reflex screening in New Zealand: a large survey of practices and attitudes in the Auckland region

Naz Raoof, Shuan Dai

**ABSTRACT**

**AIMS:** Red reflex testing forms an essential part of newborn (within the first week of life) and infant (6 weeks of age) screening in New Zealand, as outlined in the *Well Child/Tamariki Ora* handbook. This survey of practitioners undertaking red reflex screening aimed to determine current practices and attitudes of screeners, as well as any barriers to screening.

**METHODS:** A short, multiple-choice, on-line questionnaire was sent to approximately 1,500 health care professionals undertaking red reflex screening, over a 4-week period.

**RESULTS:** Four hundred and eighty-three survey responses were received from 267 GPs (55.4%), 153 midwives (31.7%), and 50 paediatricians (10.4%). Thirty-six respondents (7.8%) performed red reflex screening only when they had time to do so, 13 (2.8%) only undertook this when there were concerns raised by the parents. Most respondents (97.3%) used an ophthalmoscope to perform screening. Seventy-nine respondents (16.6%) felt they were “not sure/underconfident” at performing this test. Only 83 of 479 respondents (17.3%) had received any formal training.

**CONCLUSIONS:** The development of an online resource or practical ‘refresher’ sessions would be well received and likely to improve current practices.

Red reflex testing forms an essential part of the examination of every neonate in New Zealand, outlined in the *Well Child/Tamariki Ora Practitioners* handbook circulated by the New Zealand Government. It is crucial to identify potentially treatable sight-threatening conditions in the neonate, most commonly the presence of congenital cataract, where the optimal period for surgery is thought to be in the first 4–6 weeks of life. An abnormal red reflex can also alert the clinician to other important conditions, both ocular (retinoblastoma, paediatric glaucoma) and systemic (metabolic conditions, congenital infections).

Although many countries formalise the requirement for red reflex screening within their national neonatal screening programme, the resources and training offered vary. The American Academy of Pediatrics, in conjunction with the American Association of Pediatric Ophthalmology and Strabismus (AAPOS), detail how to undertake red reflex screening in their 2008 Policy Statement. New Zealand outlines its national red reflex screening schedule in the *Well Child/Tamariki Ora Practitioners* handbook. This states that the first eye check should be done with an ophthalmoscope, either at the neonatal check (at birth, or within the first 48 hours) or the postnatal check (between 2–7 days of age). The screening is performed by a Lead Maternity Carer (LMC), who may be a midwife, obstetrician, or general practitioner (GP). At 6 weeks of age, the infant has another eye examination, by a “practitioner trained to use a direct ophthalmoscope”. At this time point, a brief assessment of visual behaviour and ocular alignment is also indicated.

Despite the presence of clear guidelines regarding eye screening in the *Well Child/Tamariki Ora* handbook, concerns have previously been raised regarding the quality of this screening. In 2005, Fry and Wilson undertook a survey of health care practitioners undertaking red reflex screening in the Nelson-Tasman region of New Zealand. Alarmingly, they reported
that 16% of GPs and 29% of midwives were not undertaking red reflex screening when it was indicated, and that 18% of doctors and 47% of midwives were unclear about testing or its relevance. Indeed, in our regional referral unit, we continue to see babies with poor vision from congenital cataract due to delayed diagnosis.

The aim of this paper was to undertake a survey of the current state of red reflex screening in the Auckland region of New Zealand, and to determine whether, 10 years on, practices have improved. Specifically, we aimed to determine: 1) if screening was taking place; 2) who was undertaking the screening; 3) the equipment used to undertake screening; 4) whether there were any barriers to undertaking screening; 5) the level of training received by screeners.

Methods

A short, on-line questionnaire (SurveyMonkey) was sent to approximately 1,500 health practitioners undertaking Well Child/Tamakiri Ora checks in the Auckland region. We identified obstetricians, paediatricians and their specialist nursing staff working at Auckland District Health Board (ADHB) from listings of medical staff. Midwives were identified via ADHB and local community midwifery representatives. General practitioners in the Auckland region were identified by accessing the database of The Royal New Zealand College of General Practitioners. Responses were collected over a 4-week period from 14 September 2015 to 11 October 2015.

Respondents were asked to select their role (general practitioner, paediatrician, obstetrician, junior doctor, hospital nurse, community nurse or midwife). They were then asked:

- How often they undertook eye screening for each child, according to guidelines
- At what age from birth up to 6-weeks the respondent felt red reflex testing was best done
- The equipment used to undertake red reflex screening
- The presence of any barriers to undertaking red reflex screening
- Whether there had been any formal training in red reflex testing
- Whether any additional training in red reflex screening would be considered beneficial.

Responses were analysed using the SurveyMonkey programme.

Results

The respondents

There were 483 respondents. The majority were GPs (267, 55.4%), followed by midwives (153, 31.7%). Paediatricians accounted for 10.4% (50 respondents). The results are shown in Figure 1.

Adherence to red reflex screening guidelines

Respondents were asked how frequently they undertook red reflex screening, when indicated as part of the Well Child/Tamariki Ora check. This question was answered by 464 respondents. Only 90% of respondents (415, 89.4%) performed the red reflex test for every newborn they saw. A further 36 respondents (7.8%) performed this test only when they had time to do so; within this category were 23 midwives, 10 GPs, 2 paediatricians and 1 junior doctor. A further 13 (2.8%) only undertook this when there were concerns raised by the parents; there were eight midwives in this category and five GPs.

Timing of red reflex screening

In response to the question, “In your experience, when is red reflex testing best done?”, many respondents answered according to what they actually do, rather than what they thought best practice was. The majority of respondents answered that the best time to screen was at 6 weeks of age (234/467 respondents, 50.1%). Within this
category, there were 210 GPs, 18 midwives and 4 paediatricians. Testing at 1–3 days of age, and at 1 week of age, were equally popular (101/467 respondents each, 21.6%), with the majority of midwives and paediatricians selecting one of these responses.

Equipment used
Respondents were able to select one or more items used to undertake red reflex testing. Almost all the respondents used an ophthalmoscope to perform red reflex testing (464/477 respondents, 97.3%). A pen torch was used by 12 respondents (2.5%). An otoscope was used by four respondents (0.8%). A digital camera was used by three individuals, while one used a laryngoscope. Only one respondent used dilating drops.

Barriers to screening
Of 477 respondents, 177 (37.1%) felt that there was a barrier present that interfered with them undertaking red reflex screening. Ninety-six (20.1%) respondents felt clinically unconfident about interpreting the red reflex screening test. A further 66 patients (13.8%) reported difficulty in finding equipment necessary for testing. Fifteen respondents (3.1%) felt it was not clinically important enough to justify the time required to perform the test.

Competence and training
While the majority of respondents judged themselves either “competent” or “very competent” at performing red reflex testing (398/477, 83.4%), 79 respondents (16.6%) felt they were “not sure/underconfident” at performing this test. Only 83 of 479 respondents (17.3%) had received any formal training in how to undertake this screening test. A further 178 respondents (37.2%) had received informal training. Most health professionals undertaking screening in this survey, however, reported that they had never received any formal training (218/479, 45.5%).

Further training in undertaking red reflex testing proved popular among our survey respondents, with 325 of 482 respondents (67.4%) judging that an online resource would help improve their skills in this area, while 252 (52.3%) supported a refresher course, or formal in-person training. A written resource was deemed useful by 169 individuals (35.1%). Only 39 individuals (8.1%) felt that no further support than that currently offered would prove useful; there were 23 GPs in this group, 12 paediatricians and 4 midwives. Additionally, 118 respondents (24.5%) stated that a free ophthalmoscope would help improve their skills in this area.

Discussion
Our study gives an overview of current practices in red reflex testing in the Auckland region of New Zealand. While 90% of respondents report that they check the red reflex for every baby they see as part of the Well Child/Tamakiri Ora checks, 10% of respondents do not follow the guidelines in every case. The major reason for not adhering to the guidelines is insufficient time to undertake this test. There were 31 midwives who reported that they did not follow guidelines in terms of undertaking screening in all cases, corresponding to 20.3% of midwives. Subsequent discussions with midwife groups have identified reasons for this omission, including time constraints, lack of an ophthalmoscope, and the difficulty of performing the red reflex test on an infant within the first 24–48 hours after birth. This is a concerning finding, especially as midwives tend to screen babies within the first week of life. This could suggest that we are potentially missing opportunities to detect sight-threatening visual problems, such as congenital cataract, at a very early stage. Additionally, 15 GPs (5.6%) did not follow the guidelines in all cases at the “6-week well baby check”, which, although a small number, remains concerning as the next visual screening opportunity is at the “B4 school check”.

Most respondents used an ophthalmoscope to undertake red reflex testing. Comments describing the difficulty in locating a functioning ophthalmoscope were common, even on hospital wards, which is surprising given that one would expect eye examinations to be a daily occurrence. Indeed, approximately a quarter of respondents welcomed the provision of an ophthalmoscope specifically for the purposes of red reflex testing. Most midwives use a pocket ophthalmoscope for red reflex test because of its lower cost; this type of ophthalmoscope, however, has very poor illumination which makes the red reflex difficult to be assessed, even by
experienced paediatric ophthalmologists (personal communication, S Dai, 2015). Only one respondent (a community nurse) used dilating drops when undertaking this test. The side effects of instilling dilating drops in small infants are well known, and described in the AAP recommendations for red reflex testing.\(^5\) In that publication, the authors state that the use of such mydriatics is thought to be safe in infants over the age of 2 weeks, once informed consent is gained. We would advise against the unmonitored use of mydriatics in babies aged less than 2 weeks in the community.

Less than one-fifth of those undertaking red-reflex testing had been provided with any formal training, while almost half the respondents had never received any training. It is not surprising that almost a fifth of respondents felt “not sure/underconfident” when performing the test. Our survey results also show that the majority of those undertaking red reflex screening would like further training or support, most popularly via an on-line resource or ‘refresher’ course. This perhaps reflects that while in theory the red reflex test is straightforward, undertaking this on an infant, with small eyes and who is resisting examination can be very challenging. Additionally, a number of comments on survey replies acknowledged the difficulty in eliciting the red reflex in a dark-skinned child.

It is difficult to make comparisons between our work and that of Fry and Wilson.\(^6\) Our paper refers to results from a more populous urban population, and we also asked different questions, given that the red reflex screening programme is now better established. Fry and Wilson report that 18% of doctors and 47% of midwives “did not understand why red reflex screening was important or what was being looked for”. Our survey, however, shows only 3.1% of or survey respondents agreed with the statement that red reflex testing was not “clinically important enough to justify the time required”.

We acknowledge that there are limitations to our study. We surveyed respondents using a multiple choice questionnaire, and therefore limited the responses available. This study also relies on self-assessments, and we have no objective outcomes upon which to evaluate the current state of red reflex screening. Yet this subjective, anonymous, self-reporting allows us perhaps greater honesty from respondents, who may be very reluctant to otherwise admit they are “underconfident” in performing this screening test, or that they do not always follow screening guidelines.

In conclusion, red reflex testing continues to be a relevant topic across several specialties and professions. This is emphasised by the large number of responses our survey attracted. While our survey demonstrated that there is good coverage of red reflex screening in neonates in the Auckland region, there is still improvement necessary. According to our experience, more than 70% of the congenital cataracts presenting to our referral centre over the last 12 months missed the red reflex test. A study in the UK reported that 29% of congenital/infantile cataracts were not detected before the first year of life,\(^7\) suggesting that issues with red reflex screening are not confined to New Zealand. It is not surprising to see almost one-fifth of screeners in our region felt “not sure/underconfident” about undertaking testing, and only 8.1% of respondents felt that they needed no additional support in developing their skills in this area. The development of an online resource, or practical ‘refresher’ sessions, would be well received and likely to improve current practices, which in turn may lead to the earlier diagnosis of congenital cataract.
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Competing interests:
Nil

Author information:
Naz Raoof, Fellow in Paediatric Ophthalmology, University of Auckland, Auckland; Shuan Dai, Consultant Ophthalmologist, Department of Ophthalmology, Greenlane Clinical Centre, Auckland and University of Auckland, Auckland, New Zealand.

Corresponding author:
Shuan Dai, Consultant Ophthalmologist, Department of Ophthalmology, Greenlane Clinical Centre, 214 Green Lane West, Epsom, Auckland 1051, New Zealand.
shuandai@me.com

URL:

REFERENCES:


