

CATARACT SURGERY AND NON- ATTENDANCE: RCT TO DETERMINE THE EFFECT OF A SMS REMINDER SYSTEM AND FINANCIAL IMPACT IN A DEVELOPING COUNTRY

BY DR LF MALHERBE

STUDENT NR: MLHLOD001

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Supervisor: Prof C Cook

Division Ophthalmology

University of Cape Town

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DECLARATION

CATARACT SURGERY AND NON-ATTENDANCE: RCT TO DETERMINE THE EFFECT OF A SMS REMINDER SYSTEM AND FINANCIAL IMPACT IN A DEVELOPING COUNTRY

I, Lodewicus Francois Malherbe (Student number: MLHLOD001), hereby declare that the work on which this dissertation is based is my original work (and where the work of others has been used, whether quoted verbatim, paraphrased or referred to, it has been attributed and acknowledged) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any university.

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16 August 2017

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“Individual commitment to a group effort - that is what makes a team work, a company work, a society work, a civilization work.”

Vince Lombardi

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Dr SH Mustak Data-analysis

LIST OF ABBREVIATIONS

CF	Count fingers
DOH	Department of Health
FTA	Failure to attend rate
GP	General Practitioner
HM	Hand movements
HREC	Human research and ethics committee
LP	Light perception
MMS	Multi-media message system
NLP	No light perception
NTT	Nippon Telegraph and Telephone Corporation
OPD	Outpatient department
SAMJ	South African Medical Journal
SMS	Short message system
STARD	Standards for Reporting of Diagnostic Accuracy Studies
UCT	University of Cape Town
UK	United Kingdom
WHO	World Health Organisation

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PART A: LITERATURE REVIEW

1 INTRODUCTION

At Groote Schuur, we have a priority based system categorized by the patient's best corrected visual acuity which allows individuals to have access to cataract surgery. Groote Schuur Hospital is a tertiary institution and in our ophthalmology department there are various sub specialities. This implies a limited amount of theatre time for all the disciplines involved including cataract surgery.

With current cataract waiting lists of approximately three months, non-attendance of our cataract lists leads to inefficient service delivery and increased waiting periods. Even though we are not solely a cataract unit this phenomenon prohibits us to comply with the World Health Organisation's (WHO) campaign to prevent avoidable blindness.

The WHO Programme for the Prevention of Blindness was created in 1978. The global eye health action plan 2014–2019 aims to reduce avoidable visual impairment as a global public health problem.^[1]

At present, the magnitude of globally visually impaired is estimated to be near 285 million people. This can be further subdivided into 39 million people being blind and 245 million people being visually impaired.^[2]

The WHO uses the following classification of visual impairment with best corrected visual acuity of the better eye.^[1]

Table 1: WHO visual impairment classification

CATEGORY	DEFINITION	VISUAL ACUITY
0	NO / MILD VISUAL IMPAIRMENT	> 6/18
1	MODERATE VISUAL IMPAIRMENT	< 6/18 (20/70)
2	SEVERE VISUAL IMPAIRMENT	< 6/60 (20/200)
3	BLINDNESS	< 3/60 (20/400)
4	BLINDNESS	*CF - LP
5	TOTAL BLINDNESS	*NLP

*CF Count fingers, HM Hand movements, LP Light perception, NLP No light perception

Blindness is therefore defined as a vision in a person's best eye of less than 3/60 (20/400) or a visual field of fewer than 10 degrees. ^[1]

Cataracts remain the leading cause of global blindness estimated at 19.9 million people of the global population, despite the advances of surgical techniques and cataract outreach programmes.^[2]

With the current cataract services at Groote Schuur, we have standardized surgical procedures, consultant supervision ensuring optimal outcomes and an acceptable complication rate. Our surgical rate is still limited and therefore non-attendance affects our service delivery.

We found it imperative to address this and thought it best to introduce a patient reminder system. With the global acceptance of mobile phone usage and low-cost implementation thereof, we decided to consider an SMS based reminder system.

Due to our patient's visual disability and possible generational inexperience with current technology it was best decided to perform a clinical trial to assess the efficacy of this patient reminder system in our setting.

“To establish and sustain these(cataract) services requires comprehensive strategies that go beyond a narrow focus on surgical technique.” ^[1]

2 OBJECTIVES

The aim of this literature review is to determine the effect of patient reminder systems on the non-attendance rate in any clinical setting and to assess whether SMS patient reminder systems are efficient.

The literature review should answer the following questions

- What is the effect of non-attendance?
- What are the reasons for non-attendance?
- Are patient reminder systems efficient?
- What is the monetary impact of non-attendance?
- What are the advantages and disadvantages of SMS reminders?
- Percentage of mobile phone usage in South Africa?

3 LITERATURE SEARCH STRATEGY

A literature search of the Medline and Cochrane databases was performed using the search terms “patient reminder systems”, “non-attendance rates”, “SMS notifications”, “mobile phone messaging”, “ophthalmology”, “cataracts” and “monetary impact”. All languages were

searched. Articles were excluded if they were not available in the University of Cape Town (UCT) library.

4 INTERPRETATION OF LITERATURE

4.1 THE NECESSITY FOR PATIENT REMINDER SYSTEMS

Non-attendance remains a burden to any health care system. This leads to economic loss, unnecessary administration, under-utilization of facilities, increased waiting periods before consultations and thus a delay in appropriate health care and diagnosis.

There are many different reasons for patients not attending their booked appointments of which the most common are listed below:^{[3]–[6]}

- Forgetfulness
- Mistakes and misunderstandings
 - Confusion over appointment date, time and location
 - Inadequate communication
 - Mistakes by practice
- Transport issues
- Health issues
 - Admission to hospital
 - Death of patient or relative
- Cultural beliefs
- Frustration with outpatient's department
 - Long waiting periods before consultation in OPD
 - Poor service delivery
 - Facilities in waiting area
 - Administrative clerical issues

- Site of care
- Scheduling of appointment
- Differences in appointment keeping behaviour
 - Age and gender
 - Race and ethnicity
 - Socio-economic status
 - Deprived communities

Neal et al. demonstrated that the biggest groups for non-attendance was due fell into “misunderstandings and mistakes”, “forgetfulness”, “illness or personal circumstances” and other commitments. Forgetfulness consisted of 40% of their patient population and up to 25% of those who missed their consultations attempted to cancel their appointments. They also obtained that up to 20% of the non-attendees were due to mistakes made by the practice. Interestingly the chances of patients missing their appointments decreased with increased age.^[6]

It was demonstrated by Bowman et al. that shorter waiting periods improved non-attendance.^[7] With an increased demand of ophthalmology services and limited theatre slates, this will remain an unavoidable factor.

Patients do not feel the need to timeously attend their appointments because they assume that another appointment will be easily arranged for them. In our setting, patients do not comprehend the implication of missing an appointment. With outpatient department (OPD) waiting lists extending to a year and surgical waiting lists of approximately 3 months for all elective procedures and non-emergency conditions, this leads to severe patient dissatisfaction and halt’s our productivity.

Casey et al. suggested to over book OPD appointments to avoid the underutilization of service delivery ^[8], but merely overbooking our slates are only effective if there are continuous non-attendance. On the day that all the patients do arrive to have their cataract surgery done it creates a large amount of pressure on the medical staff which may lead to ineffective service delivery, rebooking frustrated patients and increased clerical work.

Of all the factors mentioned above there are a few factors addressable by a healthcare institution, namely the prevention of forgetfulness by introducing a patient reminder system, addressing the frustrations in the outpatient department and eradicating clerical errors.

The last-mentioned factor remains an issue in many government based hospitals due budget constraints and limited resources, overbooked clinics, unmaintained facilities, inadequate staff to patient ratio's and lastly the sheer volume of patients seeking medical care. Therefore, the only addressable factor would be a patient reminder system.

An ideal patient reminder system would have the following characteristics:

- Inexpensive
- Immediate delivery
- Notification of receipt
- Personal touch
- Allow privacy and patient confidentiality
- Maintain an open communication channel
- Improve the patient non-attendance rate

Hasvold et al. stated that due to non-attendance being a multi-factorial issue, patient reminder systems will never eradicate non-attendance. Patient reminder systems will reduce non-attendance rates with beneficial effects on the health care system financially and with the implementation of appropriate medical care.^[9]

4.2 FINANCIAL EFFECTS OF PATIENT NON-ATTENDANCE

Non-attendance results to financial losses affecting any health care institution. In the UK with its national health system in place it was estimated that the direct costs involved related to non-attendance in a one year period amounted to 794 million United Kingdom (UK) pounds. This included general practitioner (GP) appointments, practice nurse appointments and hospital appointments. ^{[3], [10]}

With financial losses of this magnitude implementation of a low-cost patient reminder system will result in more efficient and appropriate management of national budgets and healthcare.

4.3 MODES OF COMMUNICATION

The Oxford dictionary defines communication as the “imparting or exchange of information by speaking, writing or using some other medium.” [11]

Synonyms include transmission, imparting, conveying, reporting, presenting, passing on, handing on, relay, conveyance, divulgence, divulgation and disclosure, spreading, dissemination, broadcasting, circulation and circulating. [11]

There are several mediums or modes of communication listed below:

- Face to face
- Postal
- Emails
- Pamphlets
- Phone calls to landlines or mobile phones, personal or automated
- Short message service (SMS) or multi-media message service (MMS)
- Social media networks or internet based sites
- Smartphone applications

Many of the mentioned modes of communication do comply with the ideal patient reminder system characteristics, but due to other factors such as patient population, generational use of technology, socio-economic status and hospital budget constraints the list of possibilities will be narrowed down substantially.

There are many studies that have looked at the various methods or modes of communication with regards to implementing patient reminder systems to reduce non-attendance. These modes of communication have also evolved over time with the introduction of technology and widespread use thereof.

Several clinical trials have proved that telephone reminders are effective in improving non-attendance rates in various clinical settings. ^[12]Postal reminders were also effective, but it was felt that the effect thereof decreased over time and that that it is also too time-consuming and costly. ^[12] With the advent of newer technology and the many advantages of mobile phone messages, non-inferiority trials were conducted to prove that text messages are non-inferior to phone message reminders. Systematic reviews revealed the effectiveness of mobile phone messaging and non-inferiority but felt that phone reminders were still slightly more advantages and patients appreciated the personal message delivery more than receiving a text message. ^{[3], [9], [13]} Phone call reminders were found to be too costly and time consuming to be implemented as a patient reminder system. ^[3]

Finkelstein et al. advocate the use of a tailored patient reminder system to patient preferences to improve the effectivity ^[14], but this might prove difficult in already over booked clinics and with limited resources.

4.4 HISTORY OF MOBILE PHONES

Motorola introduced the mobile phone in 1973. NTT (Nippon Telegraph and Telephone Corporation) in Japan launched the first commercial automated cellular network, in 1979. From there several other countries launched automated cellular networks in the early to mid-1980s. ^[15]

SMS text messaging remains the most commonly used function on all mobile phones or smartphones. In the UK, the first SMS was sent in 1991 from a computer to a mobile phone. The first SMS from mobile to mobile phone occurred in 1992 and took place in Finland. ^[15]

The first study to use text messaging in healthcare services was published in 2002 and the first systematic review of text messages in health was already published in 2009.

The usage of mobile phones was mostly restricted to the developed world, but the proliferation of mobile networks has transformed the communications in more developing countries such as Sub-Saharan Africa. ^[16]

4.5 MOBILE PHONE USAGE IN SOUTH AFRICA

Mobile phone usage in South Africa has been estimated to be in the vicinity of 89% in 2014, which has grown substantially since 2002 where mobile phone usage in sub-Saharan Africa was estimated to be 10%. Mobile penetration of available networks saw comparable results. This is comparable to mobile phone ownership and usage in the United States of America which grew from 64% in 2002 to 89% in 2014. ^[16] Landline penetration in Sub-Saharan Africa is a rare commodity due to the widespread use of mobile networks. ^[16]

The generational gap regarding mobile phone usage and ownership appears to have steadily diminished, with the same number of 18-35 years old and those 35 years and above own and use their mobile phones. As mentioned before the most popular activity is sending a text message and in South Africa it was estimated to be 95% of all mobile phone users. ^[16]

Due to the widespread use of mobile networks and mobile phone usage throughout all the generations, this makes it an efficient tool to be implemented as a patient reminder system in a developing country.

4.6 SMS BASED PATIENT REMINDER SYSTEMS

Several systematic reviews evaluated suitable randomized control trials and established that SMS reminder systems improved the non-attendance rate in various clinical settings compared to no reminders sent. ^{[3], [9], [17]}

The systematic reviews also demonstrated that SMS reminders were effective amongst different generations. [3], [17] Even though elderly patients tend to be more committed to attending clinical appointments they will mostly likely have multiple appointments, necessitating the need for appointment reminders. [17] Youthfulness is a strong predictive factor to non-attendance and thus the implementation of an SMS reminder system might be beneficial in this age group. [17]

With the proved effectiveness of mobile phone messages implemented as patient reminder systems, several clinical trials looked at the possible applications to improve clinical compliance and outcomes in the health sector. [3]

These included the following: [13], [18]–[20]

- Patient reminders
- Patient compliance to medications
- Monitoring chronic conditions
- Provide psycho-social support
- Public Health programmes (smoking cessation etc.)

With the global acceptance of mobile phone messaging on various platforms (SMS, MMS and web-based applications) and the potential health care benefits, this prospect creates ample opportunities to explore and to improve clinical outcomes, patient non-attendance rates and even patient compliance with regards to chronic medication.

4.7 ADVANTAGES OF SMS BASED REMINDER SYSTEMS

Compared to other modes of communication mobile phone based patient reminder systems appear to be superior due to low implementation costs, immediate message delivery and notification of receipt, accustomed use of mobile phones in developing countries and much-improved network coverage. It has also been estimated that 99% of mobile messages received are opened and that 90% of messages received will be read within 3 minutes. [13]

Of all the mobile phone messaging applications, the short message service (SMS) is the most simplistic and widely used and understood entity of mobile phone messaging. ^[15] The technological generational gap is also narrowed by the simplistic nature of this message system and widespread use thereof. The more advanced smartphone applications, social media networks or internet based sites are limited to more developing countries, higher socio-economic groups, and English literate and younger generations. ^[16]

The current unit cost per SMS notification of 160 characters is 22c per SMS. This can further be reduced to 15-18c per SMS if larger SMS bundles are purchased from the telecommunication carrier or web-based platform. ^[21] Another, yet controversial method of reducing SMS unit costs may be by means of advertising. This will inevitably lead to potential ethical and privacy issues ^[22] and it is, therefore, best avoided. The net effect of 45 – 55c for reminders per booked procedure is an unremarkable amount compared to the possibly gained benefit of service delivery.

Further advantages of SMS reminders include direct patient communication, privacy and convenience for health care providers and patients and SMS message systems also allow for automated dispatching of substantial numbers of messages simultaneously. ^{[3], [13], [17]}

4.8 DISADVANTAGES OF SMS BASED REMINDER SYSTEMS

As with any system, there are potential flaws in SMS based patient reminder systems, namely: ^{[3], [9], [12], [23], [24]}

- Misinterpretation of data or message sent
- Poor network coverage in certain areas
- Issues of technology usage among patients of different generations and disability profiles
- Possible security and confidentiality issues
- Incorrect contact details submitted
- Incorrect contact details entered into SMS platform

- Users with multiple SIM cards
- Reminder fatigue with multiple messages

Patients' perceptions regarding reminder preferences may also differ according to the type of healthcare setting and care provision. [9]

Lastly, Peron et al. mentioned that patient reminders shift the responsibility of attendance away from the patient to the involved institution. [12]

4.9 SMS REMINDER SYSTEMS IN OPHTHALMOLOGY

Koshy et al. performed an observational study that looked at the effect of an SMS reminder system implemented to improve their Ophthalmology OPD non-attendance rates. They found that there was a significant reduction of patient non-attendance in the interventional group (which received the SMS reminder) of 11.2% compared to 18.1% in the control group. The study was limited due to its design and potential bias where patients might have been more motivated regarding follow-up, knowing that they were being evaluated. [4]

Lin et al. performed a randomized control trial to evaluate whether parents were more motivated to return regarding their child's follow-up appointments after cataract surgery. They found that the non-attendance rates between the interventional group of 8.7% and 38% in the control group differed significantly. [25]

Boland et al. looked at an automated telecommunication-based patient reminder system to improve adherence with regards to once daily glaucoma medications. Patients initially found to be non-compliant were randomized into an interventional group which received a tailored reminder compared to the control group that received the standard of care. They found an increase in compliance from 53% to 64% ($P < .05$) related to medication adherence in the interventional group with no statistical difference in the control group. [26]

5 SUGGESTIONS FOR FUTURE RESEARCH

Most studies have shown a reduction in non-attendance rates for outpatient department appointments irrespective of the mode of communication.^{[3], [12], [13], [17]}

Hall et al. determined that many reviews recommended that there was a need for more high-quality study designs and those clinical trials should be done as randomized control trials with large sample sizes and appropriate population representation.^{[3], [13]}

Study designs should also focus on specific text messaging characteristics such as the specific message details, timing and frequency of reminders sent, notification of receipt, and additional modes of communication used simultaneously.^{[3], [13]}

There is a need to determine the general acceptance of reminders and evaluation of potential adverse effects and unintended consequences of these messaging modalities.^{[3], [13]}

Analysing cancellations and rescheduling which will indicate an enhanced effect of SMS reminders and this will inevitably lead to a better use of resources.^{[3], [9]}

It was also suggested to determine the effects of multiple reminders and whether this might induce 'reminder fatigue' of recipients.^[9]

Specific clinical conditions may also affect the need for patients to commit to an appointment and therefore it was suggested to collect additional information regarding the disease profile and whether future follow-up appointments were given.^{[3], [9], [13]}

Systematic reviews also determined the need to evaluate demographic data and assess patients' telemedicine preferences with regard to their morbidity in a specific clinical setting and determine the language preferences.^{[3], [12], [13]}

There is also a complete lack of research relating to the cost-benefit and cost-effectiveness of mobile messaging interventions.^{[3], [13], [17]}

6 REFERENCES

- [1] World Health Organization. Blindness: Vision 2020 - The global initiative for the elimination of avoidable blindness. <http://www.who.int/mediacentre/factsheets/fs213/en/> (accessed 2015).
- [2] Pascolini D and Mariotti SP. Global estimates of visual impairment: 2010. *Br. J. Ophthalmol* Vol. 96(5), pp. 614–618, 2012. <http://doi.org/10.1136/bjophthalmol-2011-300539>
- [3] Gurol-Urganci I, de Jongh T, Vodopivec-Jamsek V, Atun R CJ. Mobile phone messaging reminders for attendance at health care appointments (Review). *Cochrane Syst Rev*. 2013;(12):1–47. <http://doi.org/10.3912/OJIN.Vol18No02CRBCol01>
- [4] Koshy E, Car J, Majeed A. Effectiveness of mobile-phone short message service (SMS) reminders for ophthalmology outpatient appointments: observational study. *BMC Ophthalmol*. 2008;8:9. <http://doi.org/10.1186/1471-2415-8-9>
- [5] Van der Meer G and Loock JW. Why patients miss follow-up appointments: a prospective control-matched study. *East Afr. J. Public Health*, vol. 5(3), pp. 154–156, 2008. <http://doi.org/10.4314/eajph.v5i3.38994>
- [6] Neal RD, Hussain-Gambles M, Allgar VL, et al. Reasons for and consequences of missed appointments in general practice in the UK: questionnaire survey and prospective review of medical records. *BMC Fam. Pract.*, vol. 6, p. 47, 2005. <http://doi.org/10.1186/1471-2296-6-47>
- [7] Bowman RJ, Bennett HG, Houston C, et al. Waiting times for and attendance at paediatric ophthalmology outpatient appointments. *BMJ*, vol. 313(7067) p. 1244, 1996. <http://doi.org/10.1136/bmj.313.7067.1244>
- [8] Casey RG, Quinlan MR, Flynn R, Grainger R, McDermott TED, Thornhill J a. Urology out-patient non-attenders: Are we wasting our time? *Ir J Med Sci*. 2007;176(4):305–8. <http://doi.org/10.1007/s11845-007-0028-8>
- [9] Hasvold PE, Wootton R. Use of telephone and SMS reminders to improve attendance at hospital appointments: a systematic review. *J Telemed Telecare*. 2011;17(7):358–64. <http://doi.org/10.1258/jtt.2011.110707>
- [10] Atun R and Sittampalan S, A Review of the Characteristics and Benefits of SMS in Delivering Healthcare. The Vodafone Policy Paper Series, 2006. ISBN: 9780955257803
- [11] Oxford Dictionary, “Oxford Dictionary,” 2015. <http://www.oxforddictionaries.com/> (accessed 2015)
- [12] Junod Perron N, Dao MD, Righini NC, et al. Text-messaging versus telephone reminders to

- reduce missed appointments in an academic primary care clinic: a randomized controlled trial. *BMC Health Serv Res* [Internet]. 2013;13:125. <http://doi.org/10.1186/1472-6963-13-125>
- [13] Hall AK, Cole-Lewis H. Mobile Text Messaging for Health: A Systematic Review of Reviews. *Annu Rev Public Heal* vol. 36(20) pp. 393–415, 2015. <http://doi.org/10.1146/annurev-pubhealth-031914-122855.mobile>
- [14] Stacey R, Finkelstein R, Liu N, Jani B, et al. Appointment reminder systems and patient preferences: Patient technology usage and familiarity with other service providers as predictive variables. pp. 1–25.
- [15] Wikipedia, “Wikipedia,” 2015. http://www.en.wikipedia.org/wiki/Mobile_phone
- [16] Pew Research Centre. Cell Phones in Africa : Communication Lifeline. *Pew Res Cent.* 2015; <http://www.pewresearch.org>
- [17] Guy R, Hocking J, Wand H, et al. How effective are short message service reminders at increasing clinic attendance? A meta-analysis and systematic review. *Health Serv. Res.*, vol. 47(2) pp. 614–632, 2012. <http://doi.org/10.1111/j.1475-6773.2011.01342.x>
- [18] Perron NJ, Dao MD, Kossovsky MP, et al. Reduction of missed appointments at an urban primary care clinic: a randomised controlled study. *BMC Fam. Pract.*, vol. 11(1) p. 79, 2010. <http://doi.org/10.1186/1471-2296-11-79>
- [19] Patrick K, Norman GJ, Davila EP, et al. Outcomes of a 12-month technology-based intervention to promote weight loss in adolescents at risk for type 2 diabetes. *J. Diabetes Sci. Technol.*, vol. 7(3) pp. 759–70, 2013. <http://doi.org/10.1177/193229681300700322>
- [20] Huang HL, Li YCJ, Chou YC, et al. Effects of and satisfaction with short message service reminders for patient medication adherence: a randomized controlled study. *BMC Med. Inform. Decis. Mak.*, vol. 13, p. 127, 2013. <http://doi.org/10.1186/1472-6947-13-127>
- [21] BulkSMS.SMS automated platform. Available from: <https://www.bulksms.co.za> (accessed during study period June 2015 to June 2016 through account login)
- [22] Downer SR, Meara JG, Da Costa A, and Sethuraman K, “SMS improves outpatient attendance.pdf.” pp. 389–396, 2006. <http://doi.org/10.1071/AH060389>
- [23] Ahlers-Schmidt CR, Chesser A, Brannon J, Lopez V, Shah-Haque S, Williams K, et al. Necesita Una Vacuna: What Spanish-Speakers Want in Text-message Immunization Reminders. *J Health Care Poor Underserved* [Internet]. 2013;24(3):1031–41. <http://doi.org/10.1353/hpu.2013.0127>

- [24] Branson CE, Clemmey P, Mukherjee P. Text message reminders to improve outpatient therapy attendance among adolescents: A pilot study. *Psychol Serv.* 2011;10(3):298–303. <http://dx.doi.org/10.1037/a0026693>
- [25] Lin H, Chen W, Luo L, et al. Effectiveness of a short message reminder in increasing compliance with pediatric cataract treatment: A randomized trial. *Ophthalmology*, vol. 119(12) pp. 2463–2470, 2012. <http://doi.org/10.1016/j.ophtha.2012.06.046>
- [26] Boland MV, Chang DS, Frazier T, et al. Electronic Monitoring to Assess Adherence With Once-Daily Glaucoma Medications and Risk Factors for Nonadherence. *JAMA Ophthalmol.*, vol. 132, no. 7, p. 838, 2014. <http://doi.org/10.1001/jamaophthalmol.2014.856>

PART B: MANUSCRIPT

CATARACT SURGERY AND NON-ATTENDANCE: RCT TO DETERMINE THE EFFECT OF A SMS REMINDER SYSTEM AND FINANCIAL IMPACT IN A DEVELOPING COUNTRY

1 ABSTRACT

1.1 AIMS

Missed cataract surgical appointments are an important cause of inefficiency, with delays in appropriate treatment, loss of continuity of care, and wasted resources. This study was conducted to determine if an SMS reminder system will reduce the failure to attend (FTA) rate by our patients who are booked for cataract surgery.

1.2 METHODS

A randomised controlled trial was conducted at Groote Schuur Hospital between June 2015 and June 2016. Eligible patients were randomised into one of two study groups: either the “NO reminder control group” or the “SMS reminder intervention group”. Patients in the SMS reminder group were entered into a secure web platform from which the automated SMS reminder system dispatched an SMS reminder one month, four days and one day pre-operatively between 10am and 12am. The message contained the following:

“Dear “Mr/Mrs name”, this is to confirm your cataract surgery at Groote Schuur Hospital, booked for “date”. Please phone 021 404 3541 if any queries.”

1.3 RESULTS

234 patients were enrolled into this study, and 15 patients were excluded. Of the remaining 219 patients, 111 were randomised into the NO reminder group (control) and 108 into the SMS reminder group (intervention). SMS reminders reduced the FTA rate by 52.6% from

11.7% to 5.6% (p=0.11). Transport problems were identified as the most common reason for non-attendance.

1.4 CONCLUSION

An SMS reminder system aids in the reduction of non-attendance for booked cataract surgery. With an estimated cost of only 54 cents for three SMS reminders, this affordable intervention results in an improved efficiency of clinical service delivery.

2 INTRODUCTION

Missed cataract surgical appointments are a major cause of inefficiency, with delays in appropriate treatment, loss of continuity of care, and wasted resources^{[1]–[4]}. Non-attendance therefore indirectly affects the prevention of avoidable blindness in middle and low income countries^[5].

The main reasons for patients not attending appointments are due to forgetfulness, confusion over the date and time, and lost appointment cards^{[1], [3]–[5]}. Patient reminder systems may help reduce missed appointments and may help to timeously identify vacant slots on booked surgery lists^[5].

Mobile phone ownership continues to increase rapidly worldwide, especially in middle and low income countries^{[1], [6]–[8]}. A mobile phone short message system (SMS) could provide an effective and inexpensive delivery medium for appointment reminders^{[1], [4], [8], [9]}. Other advantages of SMS reminders include direct patient communication, swift message delivery and receipt of delivery, privacy, and convenience for healthcare providers and patients^{[2], [10]}. SMS message systems also allow for automated dispatching of substantial numbers of messages simultaneously^{[2], [5]}.

Although SMS reminders have been shown to be effective as phone call reminders, there remains a belief that patients might still prefer direct personal contact ^{[2], [5][11]}. The efficacy of SMS reminders also depends on the penetration rate of mobile phones ^[2]. Issues of technology usage among patients of different generations and disability profiles may also alter the effect of such a reminder system ^[4]. Patients' perceptions may also differ according to the type of healthcare setting and care provision. Unfortunately, reminders do shift the responsibility of attendance away from the patient to the involved institution ^[2].

This study was undertaken to determine the effect of an SMS reminder system in reducing the failure to attend (FTA) for cataract surgery in a hospital in a middle-income country.

3 METHODS

The study was conducted at Groote Schuur Hospital in Cape Town. It was performed as a parallel group randomised controlled trial between June 2015 and June 2016.

Ethical approval was obtained from the University of Cape Town Health Sciences Faculty Human Research Ethics Committee (HREC REF 097/2015). The study was registered with the Department of Health (currently awaiting DOH registration number).

3.1 SAMPLE SIZE

The study was a superiority trial, with the estimated sample size calculated as 194 patients required (Sealed Envelope Ltd. 2012. Power calculator for binary outcome superiority trial formula)^[12], having an 80% chance of detecting an increase in the primary outcome measure from 75% in the control group to 90% in the intervention group, with a statistical significance level of 0.05. It was therefore planned to recruit a minimum of 200 patients into the study.

3.2 RECRUITMENT

Our cataract slates are filled from various outpatient clinics, consisting of our cataract pre-assessment, general and sub-speciality clinics. Only patients with an obtainable mobile number attending our cataract pre-assessment clinic and booked for surgery on one of our cataract lists were enrolled into the study. Patients were not included if they were booked onto the cataract slate from elsewhere. Patients were excluded if they were unable to provide a mobile phone number by which they could be contacted. Patients were excluded if they had had previous cataract surgery on the other eye, or if they had previously been recruited and then cancelled or postponed their surgery. Patients were informed about the possibility of receiving reminder SMSs and were asked if they had any reservations about receiving reminders. They gave informed consent to participate in the study. Baseline data were collected on each patient.

3.3 RANDOMISATION

Eligible patients were randomised into one of two study groups: either the “NO reminder group” (control) or the “SMS reminder group” (intervention). The randomisation codes were generated using a random number generating website^[13] by an investigator not involved in recruitment or clinical care. Opaque envelopes were used to conceal the randomisation sequence.

3.4 STUDY GROUPS

3.4.1 CONTROL GROUP

Patients enrolled into the control group did not receive an SMS reminder. They were routinely booked for their surgery and given an appointment card. The card contained the date of surgery and the telephone number of our ward secretary to phone if they had any queries or to cancel or postpone their appointment.

3.4.2 INTERVENTION GROUP

Patients enrolled into the intervention group were given an appointment card with their surgery date and the telephone number of our ward secretary. In addition, these patients were entered into a secure web platform^[14] from which the automated SMS reminder system dispatched an SMS reminder one month, four days, and one day pre-operatively between 10am and 12am.

The SMS reminders were spaced accordingly to provide a response period in which the candidate could timeously cancel or postpone their surgery and limited to only three reminders to prevent reminder fatigue.

The SMS message contained the following:

“Dear “Mr/Mrs name”, this is to confirm your cataract surgery at Groote Schuur Hospital, booked for “date”. Please phone 021 404 3541 if any queries.”

If the patient did not understand English and an interpreter had been required when they were recruited, they received a translated message in their respective language.

3.4.3 SURGERY CANCELLATIONS AND NON-ATTENDERS

Patients that timeously cancelled or postponed their surgery were recorded by the ward secretary. The recruiting medical officer was notified of any resulting vacant surgical slots and these were filled if possible with patients not enrolled into the study to improve utilisation of our surgical lists.

Patients that did not attend their booked surgery and that failed to cancel or postpone their surgery were contacted and interviewed telephonically, to ascertain the reasons for their non-attendance.

3.5 OUTCOMES

The primary outcome was the attendance rate with and without an SMS reminder system.

The secondary outcomes were the cancellation rates and the reason for non-attendance.

3.6 DATA ANALYSIS

The data was analysed using the Stata 12 statistical program by an analyst not involved at enrolment or data capturing. The data analysis included a comparison of baseline characteristics to assess for potential bias. The Chi square and student t-test were used to assess significance for categorical and interval variables accordingly. Logistic regression was conducted for multivariate analysis of significant univariate factors. The effect of the SMS intervention was analysed by calculation of the relative risk, relative risk reduction and the numbers needed to treat.

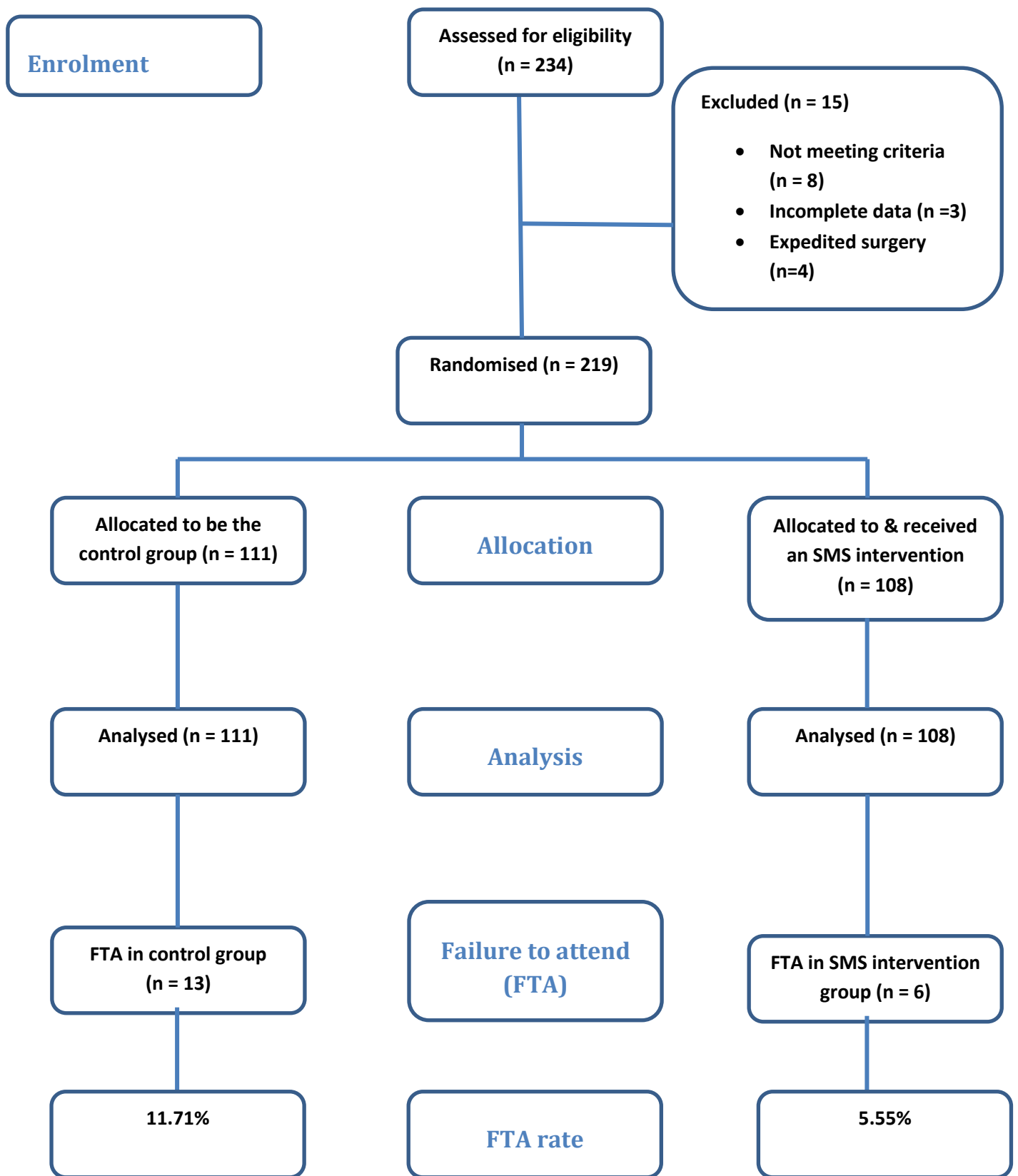
4 RESULTS

4.1 ENROLMENT, ALLOCATION, FOLLOW-UP, AND ANALYSIS OF CASES

Figure 1 shows the enrolment, allocation, follow-up, and analysis of the cases.

None of the patients were excluded because they did not have access to a mobile phone or because they did not want to give informed consent. There were no reported adverse effects during the study period.

Figure 1: Enrolment, allocation, Failure to attend, and analysis of the cases



4.2 BASE LINE CHARACTERISTICS

Randomisation was adequate as demonstrated in table 1 through the even distribution of baseline characteristics.

Table 1: Baseline characteristics of the cases in the two groups

CHARACTERISTIC		CONTROL GROUP	SMS INTERVENTION	*P VALUE
Mean age (years)		67.49	69.46	0.092
Gender	Female	N = 69	N = 67	0.85
	Male	N = 39	N = 40	
Language	English	N = 74	N = 64	0.39
	Afrikaans	N = 29	N = 37	
	Xhosa	N = 6	N = 9	
Mobile Ownership	Patient	N = 72	N = 70	0.93
	Relative	N = 39	N = 37	

*There were no differences between the 2 groups

Two thirds of our patients (64.5%) were female. English was the preferred language for communication (63%). Afrikaans was the preferred language in 30.1% and Xhosa in 6.9%. Of the patients included, 63.3% owned their own mobile phone, and 36.7% had access to a mobile phone owned by a family member. Only 4.5% of patients objected to having a family member receive an SMS reminder on their behalf due to privacy concerns, and these patients had their own mobile phones.

4.3 FAILURE TO ATTEND RATE

The FTA rate for the NO reminder group was 11.71% and for the SMS reminder group was 5.55%. This 52.6% reduction in the FTA rate with SMS reminders was not statistically significant ($p=0.11$). The number needed to treat is 18 (that means you would need to SMS 18 people for 1 person to benefit from the reminder of the SMS). Even though the results are not statistically significant overall, the results may be suggestive of a trend towards benefit if the study was better powered.

4.4 REASONS FOR NON-ATTENDANCE

Only one patient in the study group phoned to cancel their appointment and reschedule their surgery.

Of the 19 patients who failed to attend, seven were not contactable; the calls to their mobile phones went direct to voice mail. Table two shows the reasons given for non-attendance by those patients who could be contacted.

Table 2: Reasons for non-attendance

REASON	NUMBER	PERCENTAGE
Transport	N = 4	21.1 %
Forgot	N = 2	10.5 %
Medical	N = 1	5.2 %
Death	N = 1	5.2 %
Fear	N = 1	5.2 %
Relocated	N = 1	5.2 %
Miscommunication (relative)	N = 1	5.2 %
Inconvenience	N = 1	5.2 %
*Not available on given number	N = 7	36.8 %

*Patient's called on mobile number given during study period went directly voicemail and were not available to complete the telephonic questionnaire

5 DISCUSSION

5.1 INTERPRETATION OF RESULTS

There was more than a 50% reduction in the FTA rate in the SMS reminder group compared with the no reminder group, from 11.7% to 5.6%. Our sample size calculation was based on an estimated FTA rate of 25% over a three-month period prior to the start of the study, when, in fact, it was less than half this in our control group in our study. As a result, our sample size was too small to demonstrate statistical significance. Notwithstanding this lack of statistical significance, this halving of the FTA rate with SMS reminders in our study is operationally significant and is an important and useful finding.

The SMS reminder system did not improve the cancellation rate, with only one non-attender contacting us to cancel and rebook her appointment. This may be improved with appropriate counselling at the initial booking and with rephrasing our SMS message to emphasize the importance of timeous cancellations.

Transport problems were identified as the main reason for non-attendance. Our hospital has a patient transport courtesy bus, to assist patients from within the Metropole to attend their hospital appointments. Patients could be given details of this transport option when they are booked for their surgery, and details could also be included in an SMS message.

5.2 LIMITATIONS OF THE STUDY

In addition to our small sample size resulting in a failure to demonstrate statistical significance, it is important to note that this was a single centre study in a large metropole with reasonable ease of access to hospitals, a working referral system, and good mobile phone reception throughout the region. Data obtained in this study can therefore not necessarily be extrapolated to other regions with different geographic and social settings.

There were no notifications received to ensure that the message was delivered to those randomised into the SMS reminder group. This should be an option available on many SMS platforms to confirm message delivery to the recipients.

5.3 WHAT DOES THIS STUDY ADD?

SMS reminders halved our FTA rate. The estimated cost for three SMS reminders is 54 cents, and the SMS platform is a simple and convenient platform to use. SMS reminders are a simple and inexpensive option to reduce our FTA rate.

5.4 CONCLUSION AND RECOMMENDATIONS

Consideration should be given to the routine use of SMS reminders as a simple and inexpensive option to reduce our FTA rate.

6 REFERENCES

- [1] Gurol-Urganci I, de Jongh T, Vodopivec-Jamsek V, et al. Mobile phone messaging reminders for attendance at health care appointments (Review). *Cochrane Syst Rev*. 2013;(12):1–47. <http://doi.org/10.3912/OJIN.Vol18No02CRBCol01>
- [2] Junod Perron N, Dao MD, Righini NC, et al. Text-messaging versus telephone reminders to reduce missed appointments in an academic primary care clinic: a randomized controlled trial. *BMC Health Serv Res* [Internet]. 2013;13:125. <http://doi.org/10.1186/1472-6963-13-125>
- [3] Casey RG, Quinlan MR, Flynn R, Grainger R, McDermott TED, et al. Urology out-patient non-attenders: Are we wasting our time? *Ir J Med Sci*. 2007;176(4):305–8. <http://doi.org/10.1007/s11845-007-0028-8>
- [4] Gauthier C, Lindwall E, Davis W, et al. Spanning Generations—Appointment Reminder Preferences Among Patients With Rheumatic Diseases. *J Clin Rheumatol*. 2012;18(6):294–7. <http://doi.org/10.1097/RHU.0b013e3182676b6b>
- [5] Koshy E, Car J, Majeed A. Effectiveness of mobile-phone short message service (SMS) reminders for ophthalmology outpatient appointments: observational study. *BMC Ophthalmol*. 2008;8:9. <http://doi.org/10.1186/1471-2415-8-9>
- [6] Stockwell MS, Westhoff C, Kharbanda EO, et al. Influenza vaccine text message reminders for urban, low-income pregnant women: A randomized controlled trial. *Am J Public Health*. 2014;104(SUPPL. 1):7–12. <http://doi.org/10.2105/AJPH.2013.301620>
- [7] Pew Research Centre. Cell Phones in Africa : Communication Lifeline. *Pew Res Cent*. 2015; <http://www.pewresearch.org>
- [8] Déglise C, Suggs L, Oedermatt P. Short Message Service (SMS) Applications for Disease Prevention in Developing Countries. *J Med Internet Res*. 2012;14(1). <http://doi.org/http://dx.doi.org/10.2196/jmir.1823>
- [9] Branson CE, Clemmey P, Mukherjee P. Text message reminders to improve outpatient therapy attendance among adolescents: A pilot study. *Psychol Serv*. 2011;10(3):298–303. <http://dx.doi.org/10.1037/a0026693>
- [10] Ahlers-Schmidt CR, Chesser A, Brannon J, et al. Necesita Una Vacuna: What Spanish-Speakers Want in Text-message Immunization Reminders. *J Health Care Poor Underserved* [Internet]. 2013;24(3):1031–41. <http://doi.org/10.1353/hpu.2013.0127>
- [11] Hasvold PE, Wootton R. Use of telephone and SMS reminders to improve attendance at hospital appointments: a systematic review. *J Telemed Telecare*. 2011;17(7):358–64. <http://doi.org/10.1258/jtt.2011.110707>
- [12] Sealed Envelope. Sealed Envelope, 2015; Available from: <https://www.sealedenvelope.com/power/binary-superiority>
- [13] Random.Org. Random.Org. <https://www.random.org/> Available from: https://www.random.org (accessed 2015)
- [14] BulkSMS.SMS automated platform. Available from: <https://www.bulkSMS.co.za> (accessed during study period June 2015 to June 2016 through account login)

PART C: SUPPORTING DOCUMENTS

APPENDIX 1: INFORMED CONSENT

INFORMATION SHEET: RANDOMISED CONTROLLED TRIAL TO DETERMINE THE EFFECT OF A SMS REMINDER SYSTEM ON OUR NON-ATTENDANCE RATES FOR OUR CATARACT THEATRE LISTS

Why are we doing this study?

We have a limited ability to perform cataract surgery every year. People not attending their booked surgery cause a delay in our waiting lists and leads to an ineffective service. We want to start a sms reminder system, but need to know if this will be efficient.

What is the difference between the two reminder systems?

You will be divided into one of two groups. One group will receive sms reminders of their booked surgery and the other group will not receive a sms reminder. If you are chosen not to receive a sms reminder, you will be given a hospital card with your booked date and the telephone number for the ward secretary. This is the standard procedure at the moment.

How will we decide which group you will be chosen for?

The study is randomised. Your reminder group will be randomly chosen and the doctor does not make the choice for you.

What happens if you don't take part in this study?

You are not compelled to take part. If you opt out, you will then be given the standard appointment and you will not be penalised for not taking part in the study. You will still receive the optimal care.

Is the information that will be gained confidential?

The information is handled confidentially and your identity is not disclosed even if the information is used at medical meetings afterwards.

Do you have any questions with regards to this study?

If so, please direct them to the doctor taking consent from you or contact the researchers or human ethics committee involved in this study. We will also appreciate it if you can inform us if you felt uncomfortable during the study process and where we might improve.

If you agree to participate in this study.

You will be asked to take part in the SMS REMINDER study by completing a quick questionnaire with the doctor in the clinic. You will remain in the study until your booked cataract surgery. You will give us permission to use your clinical and folder data only, which will remain confidential. Please read through the consent form below.

CONSENT FORM: RANDOMISED CONTROLLED TRIAL TO DETERMINE THE EFFECT OF A SMS REMINDER SYSTEM ON OUR NON-ATTENDANCE RATES FOR OUR CATARACT THEATRE LISTS

If you agree to participate in the study, please indicate your willingness by signing or making a cross in the box below.

Name of patient	
Signature	
Date	

Declaration of doctor taking the consent

I have explained the study to the patient.

I have answered all the patient's questions as best I could.

Name of doctor taking consent	
Signature	
Date	

If any queries please contact

Researcher's	Dr LF Malherbe	021 404 3533
	Prof C Cook	021 404 5008
	HREC	021 406 6338

APPENDIX 2: STARD CHECKLIST (STANDARDS FOR REPORTING OF DIAGNOSTIC ACCURACY STUDIES)

Section and Topic	Item		Page
TITLE/ABSTRACT/ KEYWORDS	1	Identify the article as a study of diagnostic accuracy (recommend MeSH heading 'sensitivity and specificity').	32
INTRODUCTION	2	State the research questions or study aims, such as estimating diagnostic accuracy or comparing accuracy between tests or across participant groups.	33
METHODS			
<i>Participants</i>	3	Describe the study population: The inclusion and exclusion criteria, setting and locations where the data were collected.	34-35
	4	Describe participant recruitment: Was recruitment based on presenting symptoms, results from previous tests, or the fact that the participants had received the index tests or the reference standard?	35
	5	Describe participant sampling: Was the study population a consecutive series of participants defined by the selection criteria in items 3 and 4? If not, specify how participants were further selected.	35
	6	Describe data collection: Was data collection planned before the index test and reference standard were performed (prospective study) or after (retrospective study)?	34
<i>Test methods</i>	7	Describe the reference standard and its rationale.	34
	8	Describe technical specifications of material and methods involved including how and when measurements were taken, and/or cite references for index tests and reference standard.	35-36
	9	Describe definition of and rationale for the units, cut offs and/or categories of the results of the index tests and the reference standard.	36
	10	Describe the number, training and expertise of the persons executing and reading the index tests and the reference standard.	-
	11	Describe whether or not the readers of the index tests and reference standard were blind (masked) to the results of the other test and describe any other clinical information available to the readers.	-
<i>Statistical methods</i>	12	Describe methods for calculating or comparing measures of diagnostic accuracy, and the statistical methods used to quantify uncertainty (e.g. 95% confidence intervals).	37
	13	Describe methods for calculating test reproducibility, if done.	-
RESULTS			
<i>Participants</i>	14	Report when study was done, including beginning and ending dates of recruitment.	34
	15	Report clinical and demographic characteristics of the study population (e.g. age, sex, Spectrum of presenting symptoms, comorbidity, current treatments, recruitment centres).	37
	16	Report the number of participants satisfying the criteria for inclusion that did or did not undergo the index tests and/or the reference standard; describe why participants failed to receive either test (a flow diagram is strongly recommended).	38
<i>Test results</i>	17	Report time interval from the index tests to the reference standard, and any treatment administered between.	-
	18	Report distribution of severity of disease (define criteria) in those with the target condition; other diagnoses in participants without the target condition.	-
	19	Report a cross tabulation of the results of the index tests (including indeterminate and missing results) by the results of the reference standard; for continuous results, the distribution of the test results by the results of the reference standard.	-
	20	Report any adverse events from performing the index tests or the reference standard.	37
<i>Estimates</i>	21	Report estimates of diagnostic accuracy and measures of statistical uncertainty (e.g. 95% confidence intervals).	39
	22	Report how indeterminate results, missing responses and outliers of the index tests were	-

		handled.	
	23	Report estimates of variability of diagnostic accuracy between subgroups of participants, readers or centres, if done.	-
	24	Report estimates of test reproducibility, if done.	-
DISCUSSION	25	Discuss the clinical applicability of the study findings.	40-41

APPENDIX 3: ETHICS APPROVAL LETTER



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



Room E52-24 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6338 • Facsimile [021] 406 6411
Email: shuretta.thomas@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

15 July 2015

HREC REF: 097/2015

Prof C Cook
Ophthalmology
H53
OMB

Dear Prof Cook

PROJECT TITLE: CATARACT SURGERY AND NON-ATTENDANCE: RCT TO DETERMINE THE EFFECT OF A SMS REMINDER SYSTEM AND FINANCIAL IMPACT IN A DEVELOPING COUNTRY (MMed-candidate-Dr L Malherbe)

Thank you for your response to the Faculty of Health Sciences Human Research Ethics Committee dated 12 July 2015.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year until the 30th July 2016.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

We acknowledge that the student, Dr LF Malherbe will also be involved in this study.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Yours sincerely

Signed

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH

HREC 097/2015

APPENDIX 4: DEPARTMENTAL RESEARCH COMMITTEE



UNIVERSITY OF CAPE TOWN

Department of Surgery

Departmental Research Committee

Professor Anwar Suleman Mall

J-45 Room Old Main Building, Groote Schuur Hospital,
Observatory 7925, South Africa

Tel (021) 406 6166/6230/6227 Fax (021) 448 6461

Email: Anwar.Mall@uct.ac.za

23rd January 2015

Dr LF Malherbe
Department of Surgery
Division of Ophthalmology
Groote Schuur Hospital
University of Cape Town

Dear Dr Malherbe,

RE: PROJECT 2015/001

PROJECT TITLE: Cataract surgery and non-attendance: The effect of a sms reminder system and financial impact in a developing country

The above proposal was reviewed by the Department of Surgery Research Committee and I am pleased to inform you that the committee approved the study.

Please use the above project number in all future correspondence.

Yours sincerely

Signed

PROFESSOR ANWAR S MALL
CHAIRMAN: RESEARCH COMMITTEE

"OUR MISSION is to be an outstanding teaching and research university,
educating for life and addressing the challenges facing our society."

APPENDIX 5: SAMJ MANUSCRIPT SUBMISSION CRITERIA



Submissions

- » Online Submissions
- » Author Guidelines
- » Copyright Notice
- » Privacy Statement

Online Submissions

Already have a Username/Password for South African Medical Journal?

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Author Guidelines

The *SAMJ* has launched a new submission and tracking system. Authors will be required to register a profile on the Editorial Manager platform in order to submit a manuscript.

To submit a manuscript, please proceed to the *SAMJ* Editorial Manager website:

www.editorialmanager.com/samj

Authorship

Named authors must consent to publication. Authorship should be based on: *(i)* substantial contribution to conceptualisation, design, analysis and interpretation of data; *(ii)* drafting or critical revision of important scientific content; or *(iii)* approval of the version to be published. These conditions must all be met (uniform requirements for manuscripts submitted to biomedical journals; refer to www.icmje.org)

Conflicts of interest

Authors must declare all sources of support for the research and any association with a product or subject that may constitute conflict of interest.

Research ethics committee approval

Authors must provide evidence of Research Ethics Committee approval of the research where relevant. Ensure the correct, full ethics committee name and reference number is included in the manuscript.

Clinical trials

Since 1st December 2005, all clinical trials conducted in South Africa have been required to be registered in the South African National Clinical Trials Register.

Protection of rights to privacy

Information that would enable identification of individual patients should not be published in written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) has given informed written consent for publication and distribution.

Manuscript preparation

General article format/layout

Accepted manuscripts that are not in the correct format specified in these guidelines will be returned to the author(s) for correction, which will delay publication.

- Manuscripts must be written in **UK English**.
- The manuscript must be in Microsoft Word or RTF document format. Text must be single-spaced, in 12-point Times New Roman font, and contain no unnecessary formatting (such as text in boxes).
- **Qualifications, full affiliation and contact details** of ALL authors must be provided in the manuscript and in the online submission process.
- **Abbreviations** should be spelt out when first used and thereafter used consistently, e.g. 'intravenous (IV)' or 'Department of Health (DoH)'.
- **Scientific measurements** must be expressed in SI units except: blood pressure (mmHg) and haemoglobin (g/dL).
- **Units** should be preceded by a space (except for % and °C), e.g. '40 kg' and '20 cm' but '50%' and '19°C'.
- **Numbers** should be written as grouped per thousand-units, i.e. 4 000, 22 160.
- **Quotes** should be placed in single quotation marks: i.e. The respondent stated: '...'
- **Round brackets** (parentheses) should be used, as opposed to square brackets, which are reserved for denoting concentrations or insertions in direct quotes.

*** ALL of the above technical points were noted and adhered to as far as possible. I have kept my initial spacing and font throughout the dissertation to ensure continuity.**

Clinical trials

Guideline word limit: 4000 words

As per the recommendations published by the International Committee of Medical Journal Editors (ICMJE), clinical trial research is any research that assigns individuals to an

intervention, with or without a concurrent comparison/control group to study the cause-and-effect relationship between the intervention and health outcomes. All clinical trials should be registered with the appropriate national clinical trial registry (or any international primary register, if relevant), and the trial registration number should be cited at the end of the abstract. Since 1st December 2005, all clinical trials conducted in South Africa have been required to be registered in the *South African National Clinical Trials Register*.

***The application was submitted to the Department of Health. The registration number is still pending. I will only submit the manuscript to the SAMJ once the registration number has been allocated.**

Structured abstract

This should be **250-400 words**, with the following recommended headings:

Background: why the study is being done and how it relates to other published work.

Objectives: what the study intends to find out

Methods: must include study design, number of participants, description of the intervention, primary and secondary outcomes, any specific analyses that were done on the data.

Results: first sentence must be brief population and sample description; outline the results according to the methods described. Primary outcomes must be described first, even if they are not the most significant findings of the study.

Conclusion: must be supported by the data, include recommendations for further study/actions.

Illustrations/photos/scans

If illustrations submitted have been published elsewhere, the author(s) should provide consent to republication obtained from the copyright holder. Figures must be numbered in Arabic numerals and referred to in the text e.g. '(Fig. 1)'. Each figure must have a caption/legend: Fig. 1. Description (any abbreviations in full). All images must be of high enough resolution/quality for print. All illustrations (graphs, diagrams, charts, etc.) must be in PDF form. Each image must be attached individually as a 'supplementary file' upon submission (not solely embedded in the accompanying manuscript) and named Fig. 1, Fig. 2, etc.

Tables

Tables should be constructed carefully and simply for intelligible data representation. Unnecessarily complicated tables are strongly discouraged. Large tables will generally not be accepted for publication in their entirety. Please consider shortening and using the text to highlight specific important sections, or offer a large table as an addendum to the publication, but available in full on request from the author. Embed/include each table in the manuscript Word file - do not provide separately as supplementary files. Number each table in Arabic numerals (Table 1, Table 2, etc.) and refer to consecutively in the text. Tables must be cell-based (i.e. not constructed with text boxes or tabs) and editable. Ensure each table has a concise title and column headings, and include units where necessary. Footnotes must be indicated with consecutive use of the following symbols: * † ‡ § ¶ || then ** †† ‡‡ etc.

References

NB: Only complete, correctly formatted reference lists in Vancouver style will be accepted. Reference lists must be generated manually and not with the use of reference manager software. Endnotes must **not** be used.

Authors must verify references from original sources.

Citations should be inserted in the text as superscript numbers between square brackets, e.g. These regulations are endorsed by the World Health Organization,^[2] and others.^[3,4-6] All references should be listed at the end of the article in numerical order of appearance in the Vancouver style (not alphabetical order). Approved abbreviations of journal titles must be used; see the List of Journals in Index Medicus. Names and initials of all authors should be given; if there are more than six authors, the first three names should be given followed by et al. Volume and issue numbers should be given. First and last page, in full, should be given e.g.: 1215-1217 **not** 1215-17.

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Journal references: Price NC, Jacobs NN, Roberts DA, et al. Importance of asking about glaucoma. *Stat Med* 1998;289(1):350-355. <http://dx.doi.org/10.1000/hgjr.182>

Book references: Jeffcoate N. Principles of Gynaecology. 4th ed. London: Butterworth, 1975:96-101.

Internet references: World Health Organization. The World Health Report 2002 - Reducing Risks, Promoting Healthy Life. Geneva: WHO, 2002. <http://www.who.int/whr/2002> (accessed 16 January 2010).

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APPENDIX 6: LIST OF AUTHORS

1. LF Malherbe MBChB, Dip Ophth (SA), FC Ophth (SA)
Principle investigator
2. C Cook MBChB, DO, MPH, FRC Ophth, FCS Ophth (SA)
Co-author
3. SH Mustak MBChb, Dip Ophth (SA), FC Ophth (SA), MMED (UCT)
Statistical analysis