

Looking Inside the Black Box: A Theory Based Process Evaluation Alongside A Randomised Controlled Trial Of Printed Educational Materials (The Ontario Printed Educational Message (OPEM)) Trial [Registration number ISRCTN72772651]

Jeremy Grimshaw^{1,2,§ *}, Merrick Zwarenstein^{3,4*}, Jacqueline Tetroe^{1*}, Gaston Godin^{5*}, Ian Graham^{1,6*}, Louise Lemyre^{2,7*}, Martin Eccles^{8*}, Marie Johnston^{9*}, Jill Francis^{10*}, Jan Hux^{3*}, Keith O'Rourke^{1*}, France Légaré^{11*}, Justin Presseau^{7*}

1. Clinical Epidemiology Program, Ottawa Health Research Institute, Ottawa, Canada
2. Institute of Population Health, University of Ottawa, Ottawa, Canada
3. Institute of Clinical Evaluative Sciences, Toronto, Canada
4. KT Program, University of Toronto, Canada
5. School of Nursing, University of Laval, Quebec City, Canada
6. School of Nursing, University of Ottawa, Ottawa, Canada
7. School of Psychology, University of Ottawa, Ottawa, Canada
8. Centre for Health Services Research, University of Newcastle upon Tyne, Newcastle upon Tyne, UK
9. Department of Psychology, University of Aberdeen, Aberdeen, UK
10. Health Services Research Unit, University of Aberdeen, UK
11. Department of Family Medicine, University of Laval, Quebec City, Canada

*These authors contributed equally to this work

§Corresponding author

Email addresses:

JMG: jgrimshaw@ohri.ca
MZ: merrick.zwarenstein@ices.on.ca
JMT: jtetroe@ohri.ca
GG : Gaston.Godin@fsi.ulaval.ca
IDG: igraham@ohri.ca
LL: louise.lemyre@uottawa.ca
ME: martin.eccles@ncl.ac.uk
MJ: m.johnston@abdn.ac.uk
JF: j.francis@abdn.ac.uk
JH: jan@ices.on.ca
KO'R: korourke@ohri.ca
FL: France.Legare@mfa.ulaval.ca
JP : justin.presseau@alumni.uottawa.ca

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Abstract

Background

Randomised controlled trials of implementation strategies tell us whether (or not) the intervention results in changes in professional behaviour but little about the causal mechanisms that produce any change. Theory based process evaluations collect data on theoretical constructs alongside randomised trials to explore possible causal mechanisms and effect modifiers. This is akin to measuring intermediate endpoints in clinical trials to further understand the biological basis of any observed effects (for example, measuring lipid profiles alongside trials of lipid lowering drugs where the primary endpoint could be reduction in vascular related deaths). The current project aims to conduct a theory based process evaluation alongside the Ontario Printed Educational Message trial. We hypothesize that the OPEM intervention is most likely to operate through changes in physicians' behavioural intentions due to improved attitudes or subjective norms with little or no change in perceived behavioural control. We will test this hypothesis using a well validated social cognition model, the theory of planned behaviour (TPB) that incorporates these constructs.

Methods/Design

We will develop theory based surveys using standard methods based upon the theory of planned behaviour for the second and third replications and survey a sub sample of recipients from each arm of the trial 2 months before and six months after the dissemination of the index edition of *informed*. We will modify Dillman's total design method to maximise response rates. Preliminary analyses will initially assess the internal reliability of the measures and use regression to explore the relationships between predictor and dependent variable (intention to undertake the recommended practice). We will then compare groups using methods appropriate for comparing independent samples to determine whether there have been changes in the predicted constructs (attitudes, subjective norms or intentions) across the study groups as hypothesised. We will use the Cox-Wermuth method to explore dependencies and associations within systems to explore whether there is convergence between the theory based process evaluation results and the main trial results.

Background

Recognition of the knowledge translation (KT) gap has led to increased interest in more active KT strategies. Over the past five years a considerable body of KT research has developed[1],[2]. This research demonstrates that professional behaviour change interventions can be effective. However the effectiveness of interventions appears to vary across different clinical problems, contexts and organizations presumably due to the presence of different barriers and enablers to KT. Current quantitative evaluations of professional behaviour change strategies provide little insight into the causal mechanisms through which interventions lead to behaviour change and how they are moderated by different barriers and enablers to KT. This limits the ability to generalise from the findings of individual studies to other clinical problems, contexts and organisations. One of the challenges for KT researchers is to develop methods for exploring causal mechanisms alongside rigorous evaluations of different strategies.

The Ontario Printed Educational Materials (OPEM) trial – The OPEM trial (PI – MZ, Co-investigators JG, JH) is a large factorial cluster randomised trial. [3]. Participants will be randomised to one of four groups (control, short directive messages only, long discursive messages only, and both short and long messages). The messages will be embedded in the *informed* newsletter. This is produced by the Institute of Clinical Evaluative Sciences (ICES) and is a free, well regarded evidence-based practice synopsis, mailed quarterly since 1994 to 9825 subscribers in Ontario including all family practitioners (except 20 who opted to be removed from the mailing list). The short directive educational messages will be produced on a postcard-sized card stapled to the outside of *informed*. The long educational messages will be produced as a two page insert into *informed* (indistinguishable from the rest of the periodical in size, style and editing) excluding the directive statements and including more background, an evidence-based guideline and references. OPEM will involve three replicated randomized trials in three successive editions of *informed* for three separate tracer conditions (assertive hypertension and cholesterol treatment in diabetic patients, regular diabetic retinopathy screening, and use of thiazide diuretics in the initial management of hypertension). Routinely collected administrative data (OHIP, ODB and CIHI data) available within ICES will be used to measure changes in professional behaviour for the four quarters before and after each intervention.

Process evaluations alongside randomized trials of professional behavior change strategies – OPEM will be the largest and most rigorous evaluation of printed educational materials to date. It will tell us whether (or not) dissemination of printed educational materials results in changes in professional behaviour but nothing about the causal mechanisms that produce any change. This would not be an issue if we expected that the intervention would have a uniform effect across different conditions that could be generalised to practitioners outside of Ontario. However the current evidence base[4] indicates that the effects of interventions do appear to vary by condition, professional group and context presumably because the causal mechanisms of the interventions are modified in the presence of different barriers and enablers. Therefore the interpretation of the results of the OPEM trial and assessment of its likely generalisability would be enhanced if we had additional information about what are the causal mechanisms through which the intervention worked and how these were modified in the

presence of different barriers and enablers. There is increasing recognition of the value of process evaluations alongside trials of complex interventions such as professional behaviour change interventions. Commonly process evaluations have utilised qualitative methods to explore participants' attitudes towards and experiences of study interventions. For example ME and JMG conducted a nested qualitative study alongside a randomised trial of computerised decision support for chronic disease management in UK primary care that identified that the intervention largely failed because of poor software implementation that was not integrated into family practitioners' work patterns [5,6]. Qualitative process evaluations provide valuable information about context specific insights that can help interpret the results of an individual trial but may be less helpful in predicting the likely generalisability of findings due to the lack of standardised constructs and measurements. In contrast behavioural sciences have carefully developed and operationalised theories concerning determinants of behaviour and behaviour change. These standard definitions of constructs and measurement methods may be useful for exploring causal mechanisms of interventions and barriers and enablers to knowledge translation.

Theory based process evaluations collect data on theoretical constructs alongside randomised trials to explore possible causal mechanisms and effect modifiers. This is akin to measuring intermediate endpoints in clinical trials to further understand the biological basis of any observed effects (for example, measuring lipid profiles alongside trials of lipid lowering drugs where the primary endpoint could be reduction in vascular related deaths). Ferlie and Shortell[7] have suggested four levels at which knowledge translation interventions might operate: the individual health professional; health care groups or teams; organisations providing health care; and the larger health care system or environment in which individual organizations are embedded. Different types of theory will be relevant to interventions at different levels, for example, psychological theories will be more relevant to interventions directed at individuals and teams, theories of organisational change will be more relevant to interventions directed at hospitals or trusts, and so on. A full scientific rationale for interventions to translate research findings into clinical practice requires exploration of theories relevant to each of these four levels.

Aim and Objectives

1. To conduct a theory based process evaluation alongside the Ontario Printed Educational Message trial.
2. To advance the methodology of conducting theory based process evaluations alongside randomised trials of professional behaviour change strategies

The specific objectives of the proposal are:

1. To develop theory based survey instruments based upon the theory of planned behaviour (Phase I)
2. To conduct pre and post intervention postal surveys amongst family physicians in Ontario using the survey instruments for two of the OPEM study conditions (Phase II).
3. To analyse whether the OPEM interventions lead to significant improvements in theoretical constructs of the theory of planned behaviour (intentions, attitudes, subjective norms, perceived behavioural control) (Phase III).
4. To test the convergence of the results of the OPEM main trial and the theory based process evaluation (Phase IV).

Methods/Design

Project overview

As described earlier, OPEM was originally conceived as a 2X2 factorial design. This design was modified for the second and third iteration, transforming it into a 2x3 factorial randomised trial, for reasons documented in the OPEM Trial Protocol [3]. In the second iteration, the additional two groups had a reminder note added to the short directive message, formatted as a pad of patient-aimed reminder slips (short directive + pad, short directive + pad plus long discursive message). In the third iteration, the additional two groups had an outsert message developed by psychologists, in comparison with the “standard” short messages similar to those developed for the first two iterations[8]. Table 1 describes the groups in each iteration.

REPLICATE 2: Retinal screening for patients with diabetes			
		<i>Insert</i>	No insert
OUTSERT	Patient Reminder Note	1. Insert & Outsert & Patient Reminder	2. Outsert & Patient Reminder Note
	No Patient Reminder Note	3. Insert & Outsert	4. Outsert only
NO OUTSERT		5. Insert Only	6. No PEM
REPLICATE 3: Diuretics for first-line treatment of hypertension			
		<i>Insert</i>	No insert
OUTSERT	Theory-based Outsert	1. Insert & Theory-based Outsert	2. Theory-based Outsert Only
	Non-theory-based outsert	3. Insert & Non-theory-based Outsert	4. Non-theory-based Outsert only
NO OUTSERT		5. Insert Only	6. No PEM

Table 1 Description of the intervention groups within the two replicates of the OPEM Trial

Theory based process evaluations collect data on theoretical constructs alongside randomized trials to explore potential causal mechanisms. We hypothesize that the OPEM intervention is most likely to operate through changes in physicians' intentions due to improved attitudes or subjective norms with little or no change in perceived behavioural control. We will test this hypothesis using a well validated social cognition model, the theory of planned behaviour (TPB) that incorporates these constructs.[9] We will develop theory based surveys using standard methods[10] based upon the theory of planned behaviour for the second and third replications and survey a subsample of recipients from each arm of the trial 2 months before and six months after the dissemination of the index edition of *informed* (given the timing of the funding application and decision, we were unable to conduct a theory based replication for the first replication of the OPEM trials). We will use Dillman's [11] total design method to maximise response rates. Analysis will initially assess the internal reliability of the measures and use regression to explore the relationships between predictor and dependent variable (intention to undertake the recommended practice). We will then compare groups using methods appropriate for comparing independent samples (t-tests to compare two groups, analysis of covariance to compare groups adjusting for differences in baseline performance) to determine whether there

have been changes in the predicted constructs (attitudes, subjective norms or intentions) across the study groups as hypothesised. We will use the Cox-Wermuth method (described below) for exploring dependencies and associations within systems to explore whether there is convergence between the theory-based process evaluation results and the main trial results.

Phase 1 Development of survey instruments

We will develop the survey instrument using standard methods[10]. Theory of Planned Behavior instruments can be developed based upon direct measures of the TPB constructs or based upon belief measures of the TPB constructs. The direct measures are relatively straightforward to develop and are relatively short and easy to complete (3-5 items per construct, ie a total of 15-20 items). In contrast, belief based measures are more complex to develop, are considerably longer and more complex to complete. Belief based measures are likely to be most beneficial if the aim is content focused, that is if the goal is to identify specific beliefs that could be effectively targeted by an educational intervention. In the present study, the aim is to identify the causal mechanisms through which the OPEM interventions do or do not work; direct measure surveys are generally sufficient for this purpose and are more likely to be acceptable to physicians especially for repeated surveys.

We therefore plan to use a direct measure survey. Careful specification of the behavior is essential during the development of TPB surveys. We will decide on the specification of the behavior based upon drafts of the short and long educational messages and the primary outcome for the OPEM trial. The *specified behavior* will be defined in terms of the TACT (Target, Action, Context and Time) principle (for example: prescribing diuretics as the first line treatment in newly diagnosed elderly hypertensive patients in the next six months). We will measure *generalized intention* via respondents' responses to 3 items measured on a 7 point response format ('I will <behaviour>', 'I plan to <behaviour>', and 'I intend to <behaviour>', for example 'I plan to prescribe thiazide diuretics in newly diagnosed elderly hypertensive patients in the next six months'). Our direct measure of *attitude* will use a common stem (for example 'For me, prescribing thiazide diuretics in newly diagnosed elderly hypertensive patients in the next six months would be: ...) and four items using evaluative bipolar adjectives with a seven point response format (for example 'Good practice...Bad Practice'). We will use both instrumental items (reflecting whether the behavior achieves something, for example '<Behaviour> is necessary..... unnecessary) and experiential items (reflecting how the respondents feel when performing the behaviour, for example 'satisfying..... not satisfying). The specification of the bipolar adjectives will be considered carefully during both the development and pilot testing of the interview. Our direct measure of *subjective norms* will involve three items with a seven point response format anchored by Strongly Agree to Strongly Disagree (for example, 'Most people who are important to me think that <behaviour>', 'It is expected of me that I <behaviour>', and 'I feel under social pressure to <behaviour>', for example 'I think most general practitioners/family physicians would approve of me prescribing thiazide diuretics in newly diagnosed elderly hypertensive patients in the next six months'). Our direct measure of *perceived behavioral control* will involve four items with a seven point response format. We will use items relating to both difficulty (whether the respondent thinks that she can actually do the behavior e.g. 'Doing the <behavior> is difficult for me', 'I am confident that I could <behavior>') and controllability items (whether the respondent believes that she is in control of the behavior, for example, 'There are factors outside of my control that would prevent me from

prescribing thiazide diuretics in newly diagnosed elderly hypertensive patients in the next six months’). To avoid response set bias, we will mix items up throughout the questionnaire so that questions used to assess different measures are interspersed to avoid a response set bias. We will also measure habit (past behaviour) by asking the respondents: ‘Thinking about your last 10 elderly patients newly diagnosed with uncomplicated hypertension, for how many of them did you prescribe thiazide diuretics as a first-line drug treatment?’ The survey will also include demographic questions to provide information about the sample.

We anticipate that each survey will have 15-20 items and could be completed by practitioners in 5 – 7.5 minutes. Initial drafts of each survey will be circulated around the OPEM and OPEM theory based process evaluation project teams to ensure face and content validity. We will pilot each survey with 6 family physicians using a semi structured interview format.

Scoring of measures –Measures of generalised intention, attitudes, subjective norms and perceived behavioural controls will be calculated as the mean of the measure item scores.

See Appendix 1 for copies of the survey instruments.

Phase II - Postal survey implementation

The OPEM trial team will provide us with a sampling frame for the surveys. Physicians sampled for the first condition (regular diabetic retinopathy screening) will be excluded from the sampling frame for the second condition (diuretics for hypertension). The surveys will be administered using a modification of Dillman’s[11] tailored design method for mail surveys. This will involve sending a cover letter with the initial survey mail out to explain the purpose of the survey, why completing it is important, how the results might be used, and the confidentiality of survey results. A reminder post card will be sent at week 2 with a replacement questionnaire at weeks 4 and 6. Respondents will be offered the option of faxing the survey back to us. Cummings et al[12] found an average response rate of 61% in a random sample of studies using surveys mailed to physicians. To help promote an acceptable response rate the questionnaire will be kept to a maximum of 2 pages in length. In addition we will provide \$20 (CDN) to every physician who returns a completed questionnaire in recognition of the time required to complete the survey. Multiple studies have demonstrated that financial incentives increase response rates among both the public and physicians[11]; [13]; [14]; [15]. Physicians will be encouraged to return a blank questionnaire if they do not wish to participate in the study and will be deleted from the sampling frame. The pre intervention surveys will be sent 8 weeks before the distribution date for the relevant *informed* newsletter and the post intervention surveys will be sent to respondents of the pre intervention survey six months after the distribution date.

Quality assurance procedures will be implemented to ensure the integrity of the survey data collection[16,17]. All aspects of the protocol will be elaborated in a detailed protocol manual for the study team. For the survey, a log record will be initiated and maintained to track the study status of participants throughout the mailings of the survey. They will be assigned a code number to be used on all subsequent study documentation to ensure confidentiality.

Ten percent of case records, randomly selected, will be checked by data monitors to assess data entry accuracy. An error rate greater than 1% will be considered unacceptable, requiring all cases to be re-entered and rechecked.

Phase III – Planned analyses

We will test internal reliability of the measures using Cronbach's alpha. If internal consistency is <0.7 , we will explore whether we can improve this by omitting any individual item. We will use regression to explore the relationships between predictor (**attitudes, subjective norms, perceived behavioural control**) and dependent variable (intention to undertake the recommended practice). If the dependent variable is markedly skewed, we will use generalized linear modelling regression to allow for this[18].

We will then compare groups using methods appropriate for comparing independent samples (t-tests to compare two groups, analysis of covariance to compare groups adjusting for differences in baseline performance) to determine whether there have been changes in the predictor constructs (attitudes, subjective norms, perceived behavioural control or intentions) across the study groups as hypothesised.

Further analysis will be informed and guided by the approach developed by D.R. Cox and N. Wermuth and set out in their book "*Multivariate Dependencies, Models, Analysis and Interpretation*"[19]. Their approach is directed more at the study of dependencies and associations with the objective of "understanding" the system under study rather than just a "black box" empirical determination of the presence or absence of effects. This understanding is in the sense of gaining some knowledge of the underlying process, gaining some insight into the ability to predict in differing contexts and of relating the particular data under analysis to current knowledge of the field in question. The analyses proceeds by grouping variables into responses, intermediate responses and explanatory variables, usually in blocks over time and utilizing fairly standard and well understood statistical regression methods to investigate the dependencies between blocks and within blocks. If the dependencies within blocks can safely be ignored, the approach is implemented with just a number of simple regression analyses all involving univariate responses. The regression methods can be a mix of for instance linear and generalized linear regressions appropriate for the various responses and non-linear if required to properly model the effects of various covariates. The approach offers an alternative to Structural Equations modelling that allows the use of standard statistical techniques and the interpretation of parameters as regression coefficients. Analysis will initially use multiple regression analysis to explore the relationships between predictor and dependent variable (intention to undertake the recommended practice). This analysis will allow us to explore whether there was convergence between the theory based process evaluation and the main trial results.

Sample size considerations

A simple and often used approach to calculating the required sample size for 2x2 factorial trials is to calculate sample size for a two group study and then use the number per group for the four groups in the 2x2 factorial trial. In our case, using standard methods for continuous outcomes, we need 63 subjects per group to have 80% power of detecting an effect size of 0.5 standard deviations using a significance level of 5% giving a total sample size of $63 * 4 = 252$ for each experiment. Assuming a 50% response rate for each survey (pre and post intervention), we will mail the survey to 252 physicians per group to achieve this sample size (i.e. 50% or 126 per group complete the first survey and 50% of these or 63 per group complete the second survey).

To further investigate and demonstrate the appropriateness of this simple sample size calculation for our study we undertook a simulation. In the simulation we randomly generated scores for each of the four groups, equally for the null hypothesis and alternatively with the mean of the 2nd and 4th groups 0.5 standard deviations larger (alternative hypothesis of one main effect for short directive messages and no interaction). This data was then analyzed as a 2x2 factorial experiment where significance first was determined for any effect (Global F test) and then if significant, significance for main effects was determined. We simulated these trials 10,000 times (to give a standard error less than 0.5%) and under the null hypothesis the Global F test was significant 4.97% of the time and under the alternative hypotheses the Global F test was significant 92.45% of time and the test for main effects for short directive messages significant 99.80% of time to provide an observed power for the main effect of $92.45\% * 99.80\% = 92.27\%$. In an additional simulation in which the 4th group mean was set only 0.35 standard deviations larger (representing a negative interaction where 30% of the short directive message effect is negated by the addition of long discursive messages), the main effect for short directive messages was still significant 82.56% of time. To take into account the change in the OPEM trial from 4 to 6 groups, the design was switched to a 2x3 design (outsert, insert, post it note/theory based outsert) that omitted observations of post it/theory based outsert without insert (6 groups observed) and the survey was mailed to 252 physicians per group.

Ethical Approval

This study has received approval from the Research Ethics Board at The Ottawa Hospital.

List of Abbreviations

OPEM – Ontario Printed Educational Material
CIHR – Canadian Institutes of Health Research
TPB – Theory of Planned Behaviour
OHIP – Ontario Health Insurance Plan
ODB – Ontario Drug Benefit Program
CIHI – Canadian Institute for Health Information
ICES – Institute for Clinical Evaluative Sciences

Competing interests

None declared.

Authors' contributions

All authors contributed to the development of this study.
All authors read and approved the final manuscript.

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Appendix 1: Survey Instruments

Survey 1: Diabetic Retinopathy

Mrs. Janet White has been your patient for a few years. She is visiting you today for her diabetic check up. She is 57 years old, married, with no children. She works as a clerk in a small government office. About 5 years ago, you diagnosed her with type 2 diabetes. After having tried unsuccessfully to achieve the suggested glycemic target with lifestyle change, she was put on metformin 500mg BID. She takes no other medication. In her medical file, you notice that she has maintained an adequate control of her hemoglobin A1C (< 7%) since starting metformin. In the past year, her LDL-C has been < 3.5 and her ratio TC: LDL-C has been < 5.0. She had a negative retinal screening 12 months ago. Other lab results are non contributory. She does not smoke. Her physical exam today is as follows: she has a BMI of 25, her blood pressure is 125/75 and her foot exam was normal. Home monitoring indicates that her blood glucose is adequate.

Please read each question carefully and answer it to the best of your ability. There are no correct or incorrect responses; we are merely interested in your point of view. The questionnaire may appear to be monotonous since several of the statements are worded in a repetitive manner. It is the nature of this study that entails this methodological approach. However, your collaboration is vital. It is important to get *your opinion*.

I think the Canadian Diabetes Association (CDA) would approve of me advising this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I think most general practitioners/family physicians would approve of me advising this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

There are factors outside my control that would prevent me from advising this woman to make an appointment for retinal screening within the next 12 months

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I feel capable of advising this woman to make an appointment for retinal screening within the next 12 months

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

People who are important to me professionally think that I should advise this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I plan to advise this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I think the College of Family Physicians of Canada (CFPC) would approve of me advising this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I have complete control over whether to advise this woman to make an appointment for retinal screening within the next 12 months

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I think the Ontario Medical Association (OMA) would approve of me advising this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I will advise this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

For me, advising this woman to make an appointment for retinal screening within the next 12 months would be: (Please be sure to answer each question)

Very easy 1 2 3 4 5 6 7 *Very difficult*

Good practice 1 2 3 4 5 6 7 *Bad practice*

Helpful 1 2 3 4 5 6 7 *Unhelpful*

Appropriate 1 2 3 4 5 6 7 *Inappropriate*

Necessary 1 2 3 4 5 6 7 *Unnecessary*

Satisfying 1 2 3 4 5 6 7 *Not satisfying*

I am confident that I could advise this woman to make an appointment for retinal screening within the next 12 months

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I intend to advise this woman to make an appointment for retinal screening within the next 12 months.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

Thinking about your last 10 diabetic patients who had not had retinal screening in the previous two years, how many of them did you advise to make an appointment for screening? ____ of 10

In your view, how often should your diabetic patients be screened for retinopathy?

annually every one to two years every two years other _____

In your practice, who normally is responsible for your patients being screened for retinopathy?

I am the patient the optometrist the ophthalmologist other _____

In your practice, who can you rely on to ensure that your patients are screened for retinopathy?

me the patient the optometrist the ophthalmologist other

Please comment on factors that you think will influence (in a positive or negative way) whether or not this patient would be screened for diabetic retinopathy in the next 12 months.

Thank you for your time

Please fax back to XXX XXX-XXXX or mail, using the stamped self addressed envelope included in this package.

Please note: *If you do not wish to complete the questionnaire please send a blank one back to us so that we do not continue to send you reminder notices.*

Survey 2:Thiazides for Hypertension

Please note: If you do not wish to complete the questionnaire please send a blank one back to us so that we do not continue to send you reminder notices.

Scenario: One of your patients, Mrs. Muriel Kelly, is visiting you today for the fourth time since her last annual physical which she had just over 6 months ago. Mrs. Kelly is 72 years old, happily married, with children who live out of town. She is retired and spends most of her time with volunteer work. She has no previous medical history and has not taken medication for any chronic disease in the past. She has had an annual flu shot every year since she turned 65. After having unsuccessfully attempted lifestyle changes during the previous 3 months, she is visiting you today to consider the initiation of an anti-hypertensive drug. Lab results are non contributory. She does not smoke. Her physical exam today is non contributory except for her blood pressure reading, which is 160/90 for the fourth time since her last annual physical. The attempt at lifestyle modification was ineffective in getting her blood pressure under control.

Please read each question carefully and answer it to the best of your ability. There are no correct or incorrect responses; we are merely interested in your point of view. The questionnaire may appear to be monotonous since several of the statements are worded in a repetitive manner. However, the scientific nature of the study requires this methodological approach. Your collaboration is vital. It is important to get your opinion.

I will prescribe thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

People who are important to me professionally think that I should prescribe thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I am confident that I could prescribe thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I have complete control over whether to prescribe thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I think the Canadian Hypertension Education Program (CHEP) would approve of me prescribing thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I think most general practitioners/family physicians would approve of me prescribing thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I feel capable of prescribing thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I plan to prescribe thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I think the Heart and Stroke Foundation of Canada would approve of me prescribing thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

There are factors outside of my control that would prevent me from prescribing thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

For me, prescribing thiazide diuretics to this woman as a first-line treatment of her hypertension would be:

Good practice	1	2	3	4	5	6	7	Bad practice
Helpful	1	2	3	4	5	6	7	Unhelpful
Necessary	1	2	3	4	5	6	7	Unnecessary
Satisfying	1	2	3	4	5	6	7	Not satisfying
Very easy	1	2	3	4	5	6	7	Very difficult

I think that other general practitioners/family physicians in Ontario would prescribe thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I think the Ontario Medical Association (OMA) would approve of me prescribing thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

I intend to prescribe thiazide diuretics to this woman as a first-line treatment of her hypertension.

Strongly agree 1 2 3 4 5 6 7 *Strongly disagree*

In your view, what is the most effective first-line drug treatment for elderly patients presenting with uncomplicated hypertension, if lifestyle modification proves to be ineffective? (Check all that apply)

- ACE inhibitors Thiazide diuretics Beta blockers Angiotensin II receptor blockers (ARBs)
 Calcium channel blockers (CCBs) other _____

How important is the cost of antihypertensive drugs in your choice of first-line drug treatment for elderly patients presenting with uncomplicated hypertension?

Very important 1 2 3 4 5 6 7 *Not at all important*

What sources of information (or who) would you consult for clinical decision making around management of hypertension?

Thinking about your last 10 elderly patients newly diagnosed with uncomplicated hypertension, for how many of them did you prescribe thiazide diuretics as a first-line drug treatment? ____ of 10

In your experience, what are the reasons (medical and non-medical) for which elderly patients may not be prescribed thiazide diuretics as a first-line treatment for their hypertension?

Thank you for your time

Please fax back to XXX XXX-XXXX or mail using the stamped self-addressed envelope included in this package.

Additional files provided with this submission:

Additional file 1 : Notification from CIHR and TOH Ethics approval certificate.pdf :
220Kb

<http://www.implementationscience.com/imedia/1590081808928419/sup1.PDF>