Development of an essential medicines list for Canada

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ABSTRACT

Background: Some evidence supports the use of a short list of essential medicines to improve prescribing. We aimed to create a comprehensive essential medicines list for use in Canada.

Methods: The 2013 WHO Model List of Essential Medicines was initially adapted by the research team. Fourteen Canadian clinicians then gave suggestions for changes to the list. Literature relevant to each unique suggestion was gathered and presented to three clinician-scientists who used a modified nominal group technique to make recommendations on the suggested changes. Prescribing audits of two Toronto-based family health teams were then performed to identify common prescriptions that were not on the draft list. Literature relevant to each commonly prescribed medication was again gathered and shared with the clinician-scientist review panel to determine if each should be added to the list. The audits were then completed based on the final list to provide a preliminary assessment of the list.

Results: The multi-step process produced a list of 125 medications. These medications covered 91% and 93% of prescriptions at the inner city clinic and at the suburban sites, respectively. 93% of the patients seen at the inner city clinic and 96% of the patients seen at the suburban clinic had all or all but one of their medications covered by the list.

Interpretation: A short list of essential medicines was developed that covered most but not all prescriptions at two primary care sites. The list should be further refined based on wider input.

INTRODUCTION

Over 110 countries worldwide have developed essential medicines lists to fit their country's specific needs and context. (1) The World Health Organization (WHO) have created a model list of essential medicines that is updated every two years based on efficacy, safety, and tolerability. The WHO has stated that "each country has the direct responsibility of evaluating and adopting a list of essential drugs, according to its own policy in the field of health". (2) In 2012, The House of Commons Standing Committee on Health recommended the establishment of a list as soon as possible. (3) A recent commentary in the CMAJ discussed evidence from high-income countries that have implemented essential medicines lists and have shown positive results including improved quality of care, cost savings and more appropriate use of drugs. (4)

The large number of medications available in Canada poses a challenge for clinicians. (5) Provincial formularies such as the Ontario Drug Benefit formulary, the Alberta Drug Benefit List, and the Quebec Public Prescription Drug Insurance Plan list thousands of medications; over 3800, 4000, and 7000 medications respectively. (6-8) A short list of essential medications might make it easier for clinicians to prescribe the most effective, safe, and appropriate medications for their patients. (9-11) In contrast to these large formularies, other countries have developed small lists that include only essential medicines. Sweden's "Wise List" of approximately 200 medications and the United Kingdom's regional short lists are successful examples of cost-effective, context-driven, evidence based formularies in high income countries. (12, 13)

The adoption of an essential medicines list into public policy might also lead to lower medication costs by concentrating price competition on a smaller number of drugs and

could serve as a starting point for the development of a national drug coverage system. (4) In Canada, approximately one in ten people cannot afford prescribed medications and more than one-in-five Canadians report that they or someone in their household has skipped doses, split pills, or not filled their prescriptions to save money on medication in the last 12 months. (14, 15) An essential medicines list could also serve as a national formulary or assist in the development of one. The creation of a national formulary has been recommended in Canada for decades. (16-19)

The objective of this study was to create a preliminary essential medicines list for Canada based on the WHO Essential Medicines list through a multi-leveled peer-reviewed process based on the most up to date clinical evidence, Canadian clinical practice guidelines, and retrospective prescribing data.

METHODS

Adaptation of WHO list

We adapted the 2013 WHO Essential Medicines list to create an initial essential medicines list for Canada. (20) Removals from the WHO list were made for one of five reasons: items were not medications, other medications on the list had better tolerated routes of administration, the medications had the same indication as other listed medications, the medications were used for conditions that are uncommon in Canada, or the medications were not medications prescribed by primary care providers. Additions to the list were based on evidence from Canadian clinical practice guidelines, systematic reviews, health technology assessment reports and primary care formularies in Sweden (“Wise List”) and the United Kingdom (National Health Service local formularies).

Peer reviewer feedback

The adapted list of essential medicines was made publicly available (cleanmeds.ca) and feedback on suggested changes to medications on the list was collected through the website. Each proposed change was classified as either a replacement, additions to or removals from the list and had to be justified by at least one of the following: evidence of efficacy, evidence of safety, route of administration and tolerability, dosing schedule, usefulness for other medical conditions, and interactions with other medications.

Multiple methods were used to recruit peer reviewers, which included primary care physicians, nurse practitioners, pharmacists and consultants or specialists practicing in Canada. The first recruitment strategy involved the random selection of potential clinicians. The College of Physicians and Surgeons of Ontario “Doctor Search” Tool and the Ontario College of Pharmacists “Member Search” Tool and a random sequence generator were used to select physicians and pharmacists, respectively. The College of Nurses of Ontario “Find a Nurse” Tool was used to select registered nurses by entering two randomly selected letters in the last name search box and contacting nurses from that list using a random sequence generator. 100 potential peer reviewers were contacted through this method. The second recruitment strategy involved carefully selecting peer reviewers based on expertise, publications and academic involvement. Randomly and selected reviewers were contacted through mail, fax, or email with a description of the study and a website where they could submit their proposed list changes. 60 peer reviewers were contacted after being selected. The third recruitment strategy involved direct advertising to clinicians at meetings, presentations, conferences, and informal settings. An e-mail was also sent inviting clinicians to

provide feedback via the St. Michael's Hospital (SMH) Department of Family and Community Medicine mailing list and the Innovations Strengthening Primary Healthcare through Research (INSPIRE-PHC) Network mailing list, which consists of over 100 primary health care oriented researchers and clinician-scientists.

Clinician-scientist review of suggested changes

Clinician-scientists were invited to join a panel that would discuss the suggestions made by the peer reviewers. Clinician-scientists were asked to participate based on their familiarity with clinical issues relevant to the medications on the list, their experience critically appraising clinical evidence, and a lack of relevant conflicts of interest (including a lack of potential financial conflicts of interest with the pharmaceutical industry).

Based on the suggested changes to the list made by the peer reviewers, literature questions focused on efficacy and safety were developed and a literature search was performed for each question. Duplicate or similar suggestions were grouped together in one question and search. Evidence was gathered from systematic reviews, meta-analyses, randomized control trials, the Compendium of Pharmaceuticals and Specialties, clinical practice guidelines, and health technology assessment reports. The evidence for each recommendation was compiled into a document that was shared with three clinician-scientists.

The results of the literature search were reviewed with a modified nominal group technique by a panel of three clinician-scientists, which involved independent consideration prior to the meeting, group discussion, and voting on recommended changes to the list. (21) Each clinician-scientist was given the compiled document to

review prior to the meeting and submitted comments on each suggestion to the research team. The research team compiled these comments and presented them during the meeting to facilitate discussion. Each clinician-scientist discussed their opinion without interruption and then there was open discussion. After each group discussion, the clinician-scientists independently recommended whether or not the suggested change should be made based on the evidence gathered and from their own clinical expertise. The *strength of each recommendation* (strong or weak) was determined by the clinician-scientists. The final recommendations were deemed strong if the three clinician-scientists were in agreement for or against the recommendation and at least two clinician-scientists made strong recommendations. If this criterion was not met, the recommendation was deemed weak in the direction of the majority of clinician-scientist votes. Then the *strength of evidence* supporting their answers was voted on using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. (22) The *strength of the recommendation* reflects the importance of the decision while the *strength of the evidence* reflects how unlikely it is that new evidence would change the recommendation.

Identification and addition of commonly prescribed medications

To identify medications commonly prescribed that were missing from the list, we audited all prescriptions written in two primary care sites: an “inner city” site, located in downtown Toronto and serves a diverse inner city population (SMH Academic Family Health Team) and a “suburban” site, the North York Family Health Team (NYFHT), which is one of the largest family health teams in Ontario. All prescriptions made between August 1st, 2013 and Jul 30th, 2014 were included in the audit. Data for all

patients seen at the SMH site were extracted from the electronic medical record. Data was obtained from the University of Toronto Practice-Based Research Network (UTOPIAN) for 65 family physicians who were members of the NYFHT.

For each prescription we determined whether the prescribed medication was included on the list or, if the prescribed medication was not on the list, whether there was an equivalent medication on the list. Medications were considered equivalent if they treated the same condition (eg. atomoxetine and methylphenidate for ADHD) and/or were from the same class of medications (eg. ACE inhibitors). Repeat prescriptions of the same medication prescribed to the same patient were removed.

A medication was considered to have coverage if the medication or an equivalent of the medication was on the essential medicines list. Frequently prescribed medications without coverage that were not previously reviewed underwent a literature review to determine their efficacy, safety, and tolerability. Three clinician-scientists then completed the previously described methodology and made recommendations whether individual medications should be added to the list.

Audit of the list using prescribing data

Upon completion of the list's development, the audit of the two Toronto clinics was updated to provide a preliminary analysis of the list's overall medication coverage and individual patient-level coverage.

Ethics

The study was approved by the Research Ethics Board of St Michael's Hospital.

RESULTS

Adaptation of WHO list

The WHO essential medicines list contained 448 items. A total of 368 of these items were removed in the creation of the initial list. Removals included 59 items that were not medications (e.g. condoms), 37 had other medications on the list with better tolerated routes of administration, 136 medications had the same indication as other listed medications (e.g. metoclopramide is listed but ondansetron is not), 52 medications were used for uncommon indications in Canadian primary care (e.g. the antiparasitic ivermectin), and 84 were medications used by specialists (e.g. the chemotherapeutic agent vincristine). 28 medications were added to the list based on Canadian clinical practice guidelines, systematic reviews, health technology assessment reports and international primary care formularies (e.g. the bisphosphonate alendronate). This adapted list contained 108 medications (Figure S1).

Peer reviewer suggestions

Eight of the 60 (13%) clinicians from the carefully selected group submitted feedback and six of the clinicians from the direct advertising group submitted feedback. None of the 100 clinicians who were randomly selected from the College databases of physicians, pharmacists and nurses responded. The 14 clinicians from across Canada included five primary care physicians, five pharmacists, two nurse practitioners, and two specialists. Seven of the clinicians were from Ontario and seven were from other Canadian provinces. A total of 46 unique suggestions were obtained from the peer reviewers. Among the suggestions given were 16 replacements of medications on the list, 20 additions to the list, and 10 removals from the list.

Clinician-scientist review of suggestions

The clinician-scientists reviewed each of the 46 suggestions and made recommendations on each. The clinician-scientists agreed with 11 of the 16 replacement suggestions, 12 of the 20 addition suggestions, and 6 of the 10 removal suggestions. Overall, they gave 13 strong recommendations and 16 weak recommendations for the changes and 6 strong recommendations and 11 weak recommendations against the changes. 76% of the GRADE levels agreed upon by the clinician-scientists indicated high or moderate level evidence for the recommended changes. A summary of the peer review suggestions, the panel's decisions and the changes made to the list can be seen in Table S1 and the literature package distributed to the clinician-scientists can be found at cleanmeds.ca.

Identification and addition of commonly prescribed medications

Prescribing audits of the two primary care sites were completed to identify frequently prescribed medications without list coverage. Literature was gathered for 16 medications identified and later discussed by the clinician scientist panel. They gave 4 strong recommendations and 7 weak recommendations for a total of 11 additions and 5 weak recommendations against changes. 81% of the GRADE levels agreed upon indicated high or moderate level evidence for the recommendations. A summary of the clinician-scientist decisions can be seen in Table S2 and the final list of 125 essential medicines is shown in Table 1. The 25 most prescribed medications at each site without coverage on the list are shown in Table S3.

Table 1: The List of Essential Medicines for Canada

WHO Class of Medicines	Medicines (* indicates medicines listed under multiple WHO classes) (^ indicates medicines not on the WHO List of Essential Medicines)		
Antiallergics and medicines used in anaphylaxis	Cetirizine^	Diphenhydramine^	Epinephrine*
Anticonvulsive medication	Carbamazepine Gabapentin^	Phenytoin	Valproic Acid*
Anti-infective medicines	Acabavir^ Amoxicillin Amoxicillin/Clavulanic Acid Azithromycin Cephalexin Ciprofloxacin Clindamycin Clotrimazole	Cloxacillin Dolutegravir^ Doxycycline Efavirenz Emtricitabine Fluconazole Gentamicin* Lamivudine	Levofloxacin Metronidazole Nitrofurantoin Nystatin Sulfamethoxazole/Trimethoprim Tenofovir Trimethoprim Valacyclovir^
Antimigraine medicines	Eletriptan^		
Antineoplastic and immunosuppressives	Methylprednisolone	Prednisone^	Tretinoin
Antiparkinsonism medicines	Benztropine^	Levodopa/Carbidopa	
Cardiovascular medicines	Amlodipine Atorvastatin^ Bisoprolol Candesartan^	Clopidogrel Diltiazem^ Labetalol^	Pravastatin^ Ramipril^ Nitroglycerin^
Dermatological (topical)	Benzoyl Peroxide Betamethasone Fusidic Acid^	Hydrocortisone* Mupirocin Permethrin	Salicylic Acid Urea
Diuretics	Chlorthalidone^	Furosemide*	Spironolactone*
Eye preparations	Latanoprost	Olopatadine^	Pilocarpine
Gastrointestinal medicines	Metoclopramide* Pantoprazole^	Polyethylene Glycol 3350^ Ranitidine	Senna* Sulfasalazine*
Hormones, other endocrine medicines, and contraceptives	Alendronate^ Conjugated Estrogens^ Copper Containing IUD Estradiol^ Ethinyl Estradiol/ Levonorgestrel Gliclazide	Insulin, Long Acting Insulin, Short Acting Levonorgestrel-Releasing Implant Levothyroxine Medroxyprogesterone Metformin	Methimazole^ Potassium Propylthiouracil Testosterone Vaginal ring eluting Etonogestrel and Ethinyl Estradiol
Medicines acting on the respiratory tract	Beclomethasone Budesonide* Fluticasone^	Ipratropium Salbutamol	Salmeterol^ Tiotropium^
Medicines affecting the blood	Ferrous Fumarate Folic Acid	Rivaroxaban^	Warfarin
Medicines for diseases of joints	Allopurinol*	Methotrexate*	
Medicines for mental and behavioural disorders	Atomoxetine^ Clozapine Diazepam* Fluoxetine* Haloperidol*	Lithium Methadone Naltrexone^ Nicotine Replacement Therapy	Nortriptyline^ Risperidone Sertraline^ Varenicline^
Medicines for pain and palliative care	Acetaminophen Acetylsalicylic Acid* Baclofen^	Dexamethasone* Hydromorphone Ibuprofen*	Loperamide Morphine* Naproxen^
Vitamins and minerals	Vitamin B12^	Vitamin D	
Medicines that do not fall under a WHO Class	Finasteride^ Oxybutynin^	Sildenafil^	Tamsulosin^

Audit of the list using prescribing data

There were 19,074 medications prescribed to 4,777 patients at the inner city site during the time period assessed. The average age of this patient group was 44 years and 56.8% were female. The inner city site had 90.8% total prescription coverage with the list of essential medications for Canada. 72.3% of inner city site patients had all of their medications covered on the list and 20.8% had all but one medication on the list covered (Table 3; Figure S2). 6.9% of patients had two or more medications not covered by the list, with 73.3% of those patients receiving six or more prescriptions over the year.

Table 2: Chart Review Demographic Information

Location	Number of Patients	Gender (%)	Mean Age
Inner city site (SMH)	4777	Male: 2063 (43) Female: 2714 (57)	44 ± 20
Suburban site (NYFHT)	35544	Male: 11643 (33) Female: 23900 (67) Not specified: 1	50 ± 22

Table 3: List Medication Coverage

Location	Number of Medications Prescribed	Number of Medications Included on the List	Number of Medications with Equivalents on the List	Number of Medications without List Coverage
Inner city site (SMH)	19074	10238 (53.68%)	7077 (37.10%)	1759 (9.22%)
Suburban site (NYFHT)	119862	59108 (49.31%)	51873 (43.28%)	8881 (7.41%)

There were 119,862 medications prescribed to 35,544 patients at the suburban site. The average age of this patient group was 50 years and 67.2% were female. There was a greater fraction of women at the suburban site because of a large obstetrical practice there and because the inner city site had a greater fraction of men than most primary care sites. The suburban site had 92.6% total prescription coverage with the list of

essential medications for Canada. 79.8% of suburban site patients had all of their medications covered on the list and 16.4% had all but one medication on the list covered (Table 3; Figure S3). 3.7% of the patients had two or more medications not covered by the list, with 74.3% of those patients receiving six or more prescriptions over the year.

INTERPRETATION

We adapted the WHO's Model List of Essential Medicines using a four step process involving a small group of Canadian clinicians and clinician-scientists. The essential medicines list for Canada contains only 125 medications, about half of the number of medications on the Swedish Wise List and about a quarter of the medications on the WHO essential medicines list. The small size of the list will allow clinicians to learn more information about fewer drugs and could improve clinician prescribing appropriateness. (13, 23)

The list had over 90% medication coverage at each of the clinics and over 90% of patients had all or all but one of their medications covered by the list. These preliminary results suggest that although smaller than the essential medicines lists of other countries, this list still covers the majority of medications and patients. With a more comprehensive assessment of the list's national coverage, the list could be used as the national list of essential medications alluded to in the Federal Minister of Health's mandate letter. (24)

Limitations

Only 14 peer reviewers of the hundreds of clinicians contacted provided feedback and the final list could have been different if a larger number of clinicians had provided input.

However, even with this number of peer reviewers, we received 46 unique list suggestions and reviewed an additional 16 medications based on prescribing data. We also had a small panel of three clinician-scientists making the final recommendations for the list and this could have limited the variety of opinions during discussion. On the other hand, the small number of clinician-scientists allowed for decisions to be made efficiently. To date, we have only compared the list with prescribing patterns in primary care sites from the Toronto area, which may not be representative of provincial and national prescribing. Efforts to obtain and analyze national and provincial data are in progress. We considered equivalent medications that others might view as different (e.g. atomoxetine and methylphenidate). The list excludes cancer treatments and other medicines prescribed outside of primary care.

Conclusion

We have developed a preliminary short list of essential medications that covers most but not all current prescribed medications in primary care. The list can be refined in the future based on wider input and it should be continuously revised based on new evidence. Future work should determine the applicability of the list across Canada, the impact of list adoption on actual prescribing and the effects of list-driven prescribing on patients.

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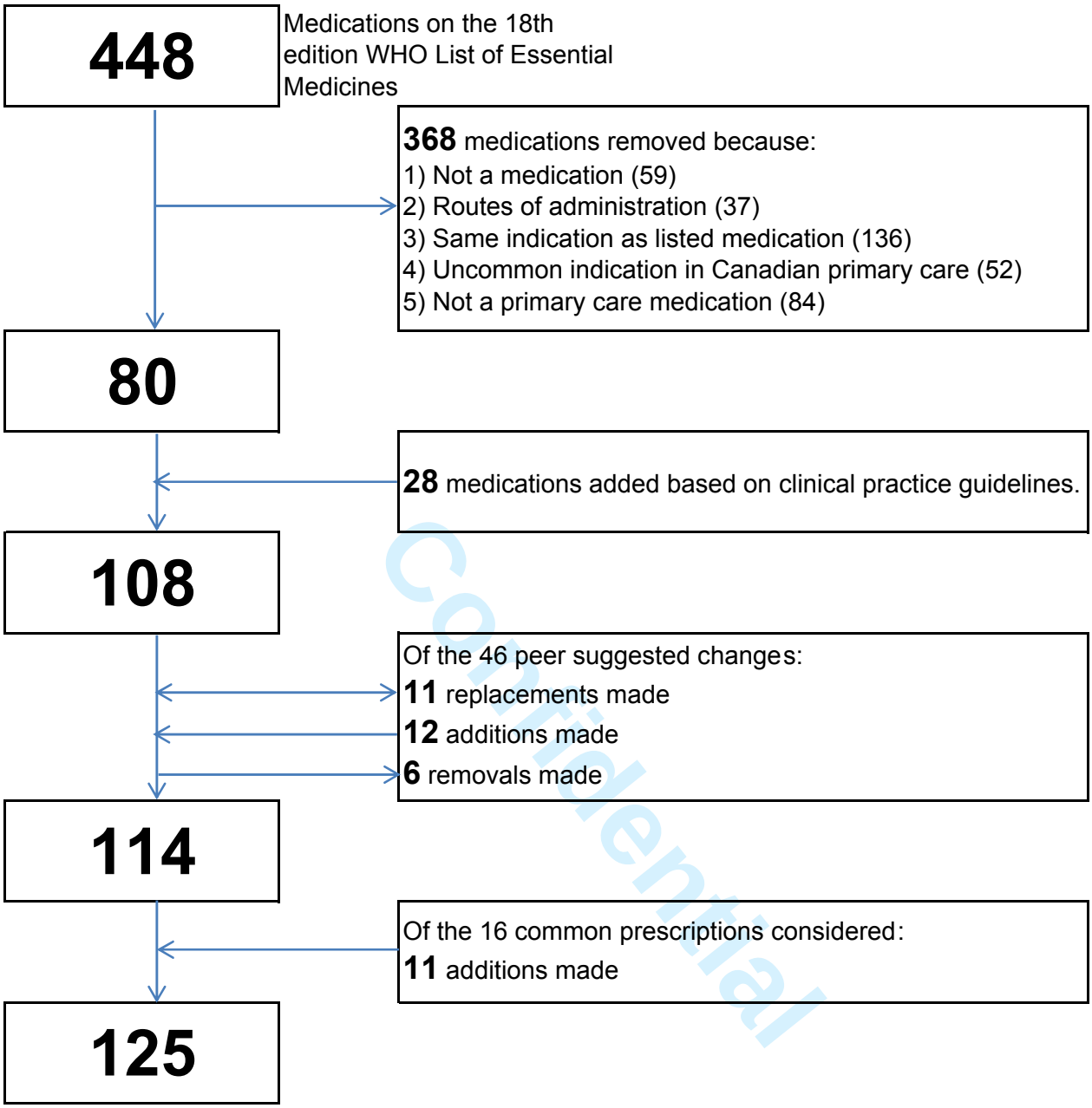

Figure S1. Additions, removals, and replacements to the list of essential medications throughout development

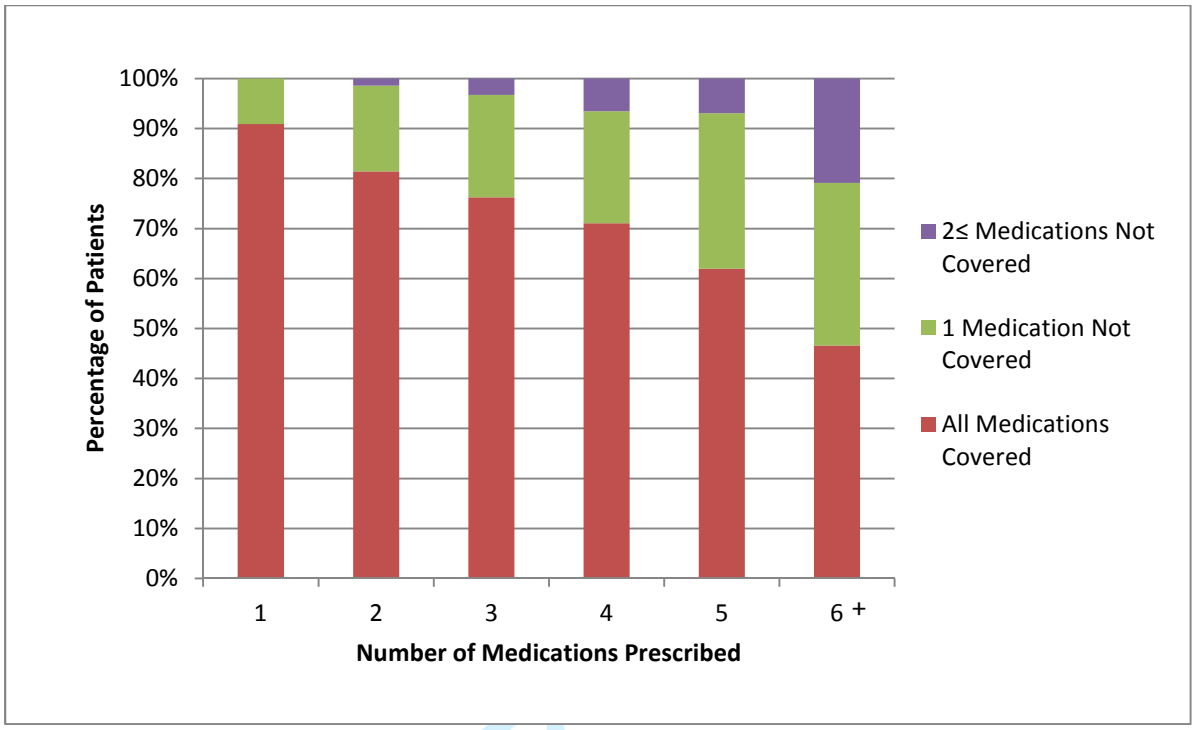

Figure S2. Coverage of the essential medicines list at the St. Michael's Inner City Clinic stratified by the number of prescriptions received by each patient

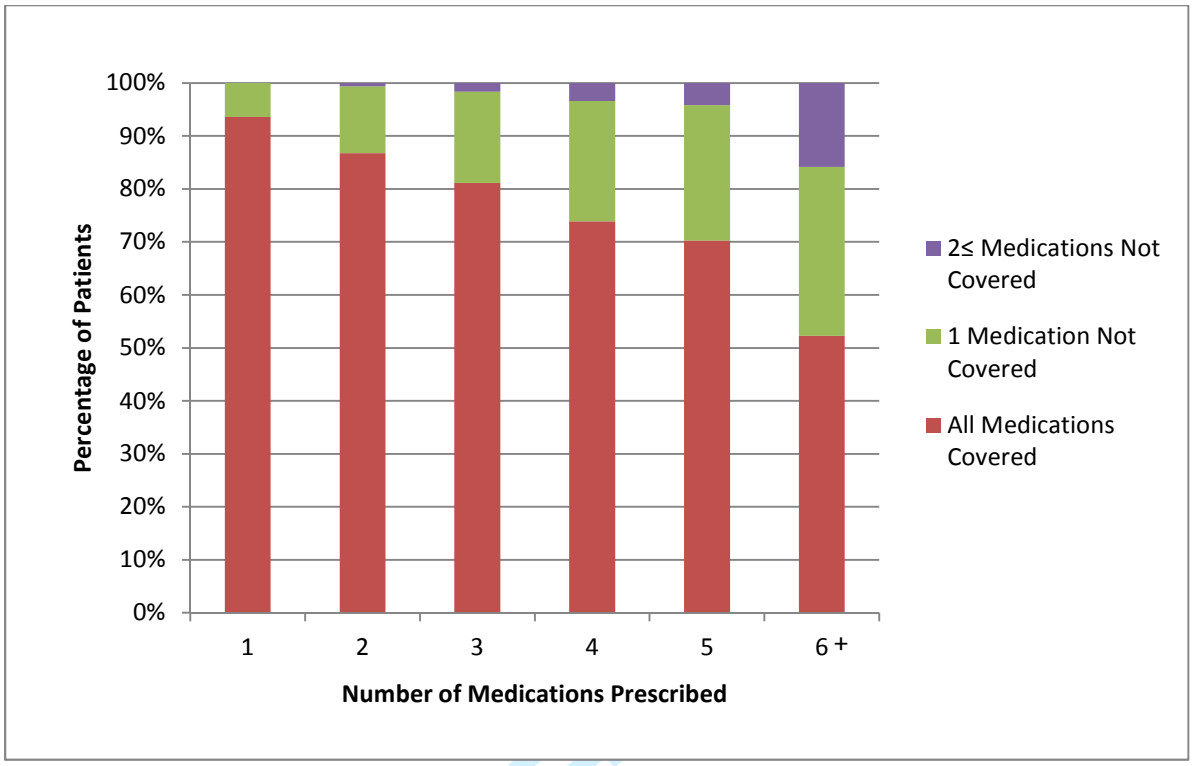

Figure S3. Coverage of the essential medicines list at the North York Family Health Team stratified by the number of prescriptions received by each patient

Table S1: Suggestions, recommendations, and final decisions of the collected peer feedback

Suggested Change	Collaborative Recommendation	Collaborative GRADE	Final Decision
ASA 81mg should be replace ASA 325 on the list.	Strongly for replacement	High	ASA 325mg replaced with ASA 81mg.
Digoxin should be added to the list.	Weakly against addition	High	Digoxin was not added to the list.
Enalapril should be replaced with ramipril.	Weakly for replacement	Moderate	Enalapril was replaced with ramipril.
Hydrochlorothiazide should be replaced with chlorthalidone.	Weakly for replacement	Moderate	Hydrochlorothiazide was replaced with chlorthalidone.
Labetalol should be replaced with another beta blocker.	Weakly against replacement	Low	Labetalol was not replaced with another beta blocker.
Losartan should be replaced with candesartan	Weakly for replacement	Very low	Losartan was replaced with candesartan.
Nifedipine should be removed from the list	Strongly for removal	High	Nifedipine was removed from the list.
The patch route of nitroglycerin should be added to the list.	Strongly against addition	Moderate	The nitroglycerin patch was not added to the list.
Simvastatin should be replaced with pravastatin.	Weakly for replacement	Moderate	Simvastatin was replaced with pravastatin.
Ticagrelor should be removed from the list.	Strongly for removal	Moderate	Ticagrelor was removed from the list.
Verapamil should be replaced with diltiazem.	Strongly for replacement	Moderate	Verapamil was replaced with diltiazem.
Ciclesonide should be replaced with beclomethasone (nasal inhaler).	Strongly for replacement	Low	Ciclesonide was replaced with beclomethasone.
Salmeterol should be replaced with combination salmeterol/fluticasone.	Strongly for replacement	Moderate	Salmeterol was replaced with a salmeterol/fluticasone combination.
Acyclovir should be replaced with valacyclovir.	Weakly for replacement	Moderate	Acyclovir was replaced with valacyclovir.
Erythromycin should be removed from the list.	Strongly for removal	High	Erythromycin was removed from the list.
Benzoyl peroxide should be removed from the list.	Weakly against removal	Very low	Benzoyl peroxide remained on the list.
Cetirizine should be removed from the list.	Weakly against removal	Low	Cetirizine remained on the list.
Riveroxaban should be added to the list	Weakly for addition	Low	Riveroxaban was added to the list.
Ferrous fumarate should be replaced with other ferrous salts.	Weakly against replacement	Very low	Ferrous fumerate remained on the list.
Timolol should be replaced with latanoprost.	Weakly for replacement	Moderate	Timolol was replaced with latanoprost.
Doxazosin should be removed from the list.	Weakly for removal	Moderate	Doxazosin was removed from the list.
Sildenafil should be removed from the list.	Strongly against removal	High	Sildenafil was not removed from the list.
Diclectin (doxylamine + pyridoxine) should be added to the list.	Weakly against addition	High	Diclectin (doxylamine + pyridoxine) was not added to the list.
Additional prenatal vitamins should be added to the list.	Strongly against addition	High	Prenatal multivitamins were not added to the list.
Amitriptyline should be replaced with nortriptyline.	Weakly for replacement	Low	Amitriptyline was replaced with nortriptyline.
Atomoxetine should be replaced with methylphenidate.	Weakly against replacement	Moderate	Atomoxetine was not replaced with methylphenidate.
Chlorpromazine should be removed from the list	Strongly for removal	High	Chlorpromazine was removed from the list.

Quetiapine should be added to the list.	Weakly against addition	Moderate	Quetiapine was not added to the list.
Clozapine should be added to the list.	Weakly for addition	Moderate	Clozapine was added to the list.
Diazepam should be added to the list.	Weakly for addition	High	Diazepam was added to the list.
Clonazepam should be added to the list.	Strongly against addition	High	Clonazepam was not added to the list.
Phenytoin should be replaced with lamotrigine or levitiracetam.	Weakly against replacement	Low	Phenytoin was not replaced on the list.
Venlafaxine should be added to the list.	Weakly against addition	Moderate	Venlafaxine was not added to the list.
Duloxetine should be added to the list.	Strongly against addition	Moderate	Duloxetine was not added to the list.
Gabepentin should be added to the list.	Weakly for addition	Low	Gabapentin was added to the list.
Eletriptan should be replaced with rizatriptan.	Strongly against replacement	Moderate	Eletriptan was not replaced with rizatriptan.
Methadone should be added to the list.	Weakly for addition	Moderate	Methadone was added to the list.
Naltrexone should be added to the list.	Weakly for addition	Moderate	Naltrexone was added to the list.
Nicotine replacement therapy should be added to the list.	Strongly for addition	High	Nicotine replacement therapy was added to the list.
Omeprazole should be removed from the list.	Strongly for removal	Moderate	Omeprazole was removed from the list.
Polyethylene glycol 3350 should be added to the list.	Weakly for addition	Moderate	Polyethylene glycol 3350 was added to the list.
Hydromorphone should be added to the list.	Weakly for addition	Low	Hydromorphone was added to the list.
Ibuprofen should be removed from the list.	Weakly against removal	Moderate	Ibuprofen was not removed from the list.
Dolutegravir should be added to the list.	Strongly for addition	Moderate	Dolutegravir should be added to the list.
Acabavir should be added to the list	Strongly for addition	Moderate	Acabavir should be added to the list
Lamivudine should be added to the list	Strongly for addition	Moderate	Lamivudine should be added to the list

Table S2: Additions discussed based on frequently prescribed medications in the clinic audits

Suggested Change	Collaborative Recommendation	Collaborative GRADE	Final Decision
Zopiclone should be added to the list.	Weakly against addition	Moderate	Zopiclone was not added to the list.
Varenicline should be added to the list.	Strongly for addition	High	Varenicline was added to the list.
Vitamin B12 should be added to the list.	Strongly for addition	Moderate	Vitamin B12 was added to the list.
Tretinoin should be added to the list.	Weakly for addition	Moderate	Tretinoin should be added to the list.
Baclofen should be added to the list.	Weakly for addition	Low	Baclofen was added to the list.
Pramoxine/zinc should be added to the list.	Weakly against addition	Very Low	Pramoxine/zinc was not added to the list.
Benztropine should be added to the list.	Weakly for addition	Low	Benztropine was added to the list.
Fusidic acid should be added to the list.	Weakly for addition	Moderate	Fusidic acid was added to the list.
Mupirocin should be added to the list.	Strongly for addition	Moderate	Mupirocin was added to the list.
Olopatadine should be added to the list.	Weakly for addition	Moderate	Olopatadine was added to the list.
Cromolyn should be added to the list.	Weakly against addition	Moderate	Cromolyn was not added to the list.
Montelukast should be added to the list.	Weakly against addition	Moderate	Montelukast was not added to the list.
Calcium should be added to the list.	Weakly against addition	Moderate	Calcium was not added to the list.
Vaginal ring eluting etonogestrel and ethinyl estradiol should be added to the list.	Weakly for addition	Moderate	Vaginal ring eluting etonogestrel and ethinyl estradiol was added to the list.
Conjugated estrogens should be added to the list.	Strongly for addition	Moderate	Conjugated estrogens were added to the list
Estradiol (17β) should be added to the list.	Weakly for addition	Moderate	Estradiol (17β) was added to the list.

Table S3. Top 25 most commonly prescribed medications not covered by the list (ordered by rank at inner city site)

Medications	Prescription Rank (inner city site)	Prescription Rank (suburban site)
Zopiclone	21	18
Vitamin B	27	73
Calcium	37	121
Multivitamin	50	165
Estradiol (17β)	56	26
Vitamins/Minerals	58	111
Conjugated Estrogens	66	83
Fusidic Acid	76	-
Tacrolimus	83	162
Varenicline	92	179
Ezetimibe	94	104
Tretinoin	101	180
Etonogestrel/Ethinyl Estradiol	105	126
Baclofen	107	-
Cyclobenzaprine	115	117
Montelukast	120	132
Cromolyn	123	-
Olopatadine	124	91
Vitamins/minerals/folic acid	135	-
Psyllium hydrophilic mucilloid	145	177
Zinc/pramoxine	152	-
Mupirocin	159	114
Fenofibrate	162	181
Benztropine	166	-
Betahistine	172	172
Hydrocortisone/Framycetin Sulfate/Cinchocaine Hcl/Esculin	-	101
Adapalene/Benzoyl Peroxide	-	142
Colchicine	-	156
Donepezil	-	163
Ketorolac	-	175
Atovaquone/proguanil	-	190