

Outcomes of Urinary Tract Infection Management by Pharmacists (RxOUTMAP?)

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Introduction:

Urinary tract infection (UTI) is one of the most common indications for which antibacterial agents are initiated.¹⁻³ It is also the 8th most common reason for ambulatory clinic visits and the 5th most common reason for emergency department visits in Canada.^{4,5} UTIs produce symptoms that may be unpleasant and distressing for patients and have the potential to lead to complications. It is also commonly misdiagnosed and treated inappropriately, resulting in unnecessary antimicrobial exposure and increased potential for adverse effects (including secondary infections, such as *Clostridium difficile*), as well as the selection of resistant pathogens.^{3,6,7} The incidence of UTI in women is 12% annually, with 50% of women reporting to have had a UTI by 32 years of age.² Recurrence of infection occurs in

25% of women within 6 months of the first UTI, and this rate increases when more than one prior UTI has been experienced.² In the elderly, the prevalence of asymptomatic bacteriuria (ASB) increases, with up to 20% of women at the age of 75 or older affected and up to 50% of institutionalized, non-catheterized elderly women affected,⁶ a finding that often results in the overuse of antibacterials.⁸ With bacterial resistance on the rise and a limited pipeline of antibacterials with novel mechanisms of action, antimicrobial stewardship has become imperative to maintain the effectiveness of available antimicrobials.⁹

Pharmacists are accessible primary care professionals that are well-positioned to take on a larger role in the management of medical conditions, including UTIs, and have an important role to play in antimicrobial stewardship. The scope of practice of pharmacists in New Brunswick has recently been expanded to include prescribing for uncomplicated urinary tract infections.¹⁰ Therefore, it would be of great value to quantify the real-world impact of pharmacists providing care to patients with UTI, and then disseminate this information to inform best practice and policy change.

Objective: To track and quantify the impact of pharmacist management of patients with uncomplicated urinary tract infections.

Definitions:

- **Antimicrobial stewardship:** the coordinated interventions designed to improve the judicious use of antimicrobials with the goal of achieving optimal clinical outcomes while minimizing unintended consequences.⁹

- **Asymptomatic bacteriuria (ASB):** the isolation of bacteria from an appropriately collected urine specimen in quantitative counts that are consistent with growth in the bladder or kidneys in the absence of acute clinical signs or symptoms referable to the urinary tract.^{7,8,11} With the exceptions of pregnant patients and patients that will be undergoing invasive genitourinary surgery, the treatment of ASB has failed to demonstrate a beneficial effect and is associated with worse outcomes.^{7,8}
- **Cystitis (lower UTI):** symptoms of dysuria with or without urgency, frequency, suprapubic pain/discomfort, or hematuria.²
- **Pyelonephritis (upper UTI):** symptoms of fever, flank pain/tenderness, nausea/vomiting with or without the typical symptoms of cystitis.²
- **Complicated UTI:** symptomatic UTI in the presence of complicating factors, which are structural, functional, or metabolic conditions that promote UTI and put the patient at increased risk of resistant pathogens and treatment failure.^{2,12} Examples include male gender, chronic obstruction, poorly controlled diabetes, indwelling urinary catheter, nephrolithiasis, immunosuppression, and pregnancy.^{2,12}
- **Clinical cure:** full resolution of acute symptoms.

Methods:

Design: Prospective registry

Patients: Any adult (19 years of age or older) patient presenting to a pharmacy in New Brunswick with symptoms suggestive of UTI and who provides written,

informed consent to have their data collected. Any patient with complicated UTI or symptoms suggestive of pyelonephritis or systemic illness will be documented, but excluded from the registry and referred to their physician. Patients who present with a prescription for antibiotics for UTI from a physician are still eligible for participation as long as their UTI is considered uncomplicated (or if determined to be asymptomatic bacteriuria). Prophylaxis of UTI will be excluded.

Recruitment: Pharmacists will identify and recruit patients that present in one of two ways. The first is when patients present without a prescription; and the second is when patients present with a prescription from another healthcare provider. A public relations campaign already underway from the New Brunswick Pharmacists' Association will also help to raise awareness of pharmacists' availability to manage UTIs.

Procedures:

- All patients will receive a baseline assessment, which will include a thorough medication history (including allergies and recent antimicrobials)
- Pharmacists will have The assessment and management of urinary tract infections in adults: A pharmacist's guide, published in the Canadian Pharmacists Journal, and the New Brunswick Health Authorities Anti-Infective Stewardship Committee's Treatment of Adult Urinary Tract Infections made available to them as additional resources.

- Patient education will be central to the intervention and will include education on what to expect, as well as instructions to come back if symptoms are not improving or worsening after 3 days.
- Pharmacists will practice to their full scope, which may include prescribing of antibacterials, ordering labs, and systematic patient follow-up.
 - Any patient with complicated UTI will be referred to their physician. Reasons for referral of UTI's deemed complicated will be tracked, as will any UTI initially deemed uncomplicated that was in fact complicated.
 - For any patient presenting with a prescription for an antibacterial that is assessed to be for ASB and the patient is not pregnant and not undergoing a genitourinary procedure with expected mucosal breach, the prescription will, in collaboration with the patient/caregiver, just be put on file or returned to the patient. The outcome of all counselling regarding unnecessary ASB treatment and patient acceptance of pharmacist recommendations will be documented.
 - For any patient presenting with a prescription for an antibacterial that is assessed to be for uncomplicated UTI, but deemed by the pharmacist to be suboptimal therapy, the pharmacist will adapt the prescription or perform therapeutic substitution to optimize the regimen. The initial prescription provided, and therapeutic change, will be documented.

- Patients' physicians will be informed of all assessments and treatments provided by the pharmacist.

Data will be collected via a secure web-based portal, which will be designed and maintained by EPICORE Centre, University of Alberta.

Follow-up: Pharmacists will conduct a follow-up visit (which may be via telephone) at 2 weeks after initial presentation. At this follow-up, pharmacists will assess for resolution of symptoms, adverse reactions, and adherence to the treatment regimen. Assessment and outcome data will be captured by standardized questions built into the web-based registry. Other follow-up visits will be conducted, as deemed necessary. All follow-up visits will be collected in the study database.

Pharmacists/pharmacies will be compensated by the study for each initial assessment and for the 2-week follow-up (\$25 for the initial assessment and \$25 for follow-up) for enrolled patients. Some patients may require additional follow-up, but this will not be reimbursed by the study. Pharmacists should not also be billing the patient for this service (i.e. "double-billing"), but explain to the patient that the cost of the service is covered by enrolling in the study.

Outcomes:

The primary outcome will be clinical cure at 2 weeks. Secondary outcomes will include medications used, number and nature of pharmacist interventions, follow-ups conducted, patient adherence to initial recommendations and follow up,

adverse events, treatment failures (including reasons for; such as adherence, delay in accessing care, missed baseline complicating factors, presence of a resistant organism, and complications such as pyelonephritis), and patient satisfaction.

Patient satisfaction will be collected using a survey that has been used previously to gauge satisfaction in other general pharmacist prescribing activities^{13,14} with slight modification.

Subgroup analyses will include patients presenting without a prescription and those that present with a prescription from another healthcare provider. If the prescription from another healthcare provider is changed by the pharmacist, data collected will include the original regimen, the new regimen, and the reason(s) for the modification.

Analytical Plan and Sample Size:

Most outcomes will be descriptive in nature, including demographics, clinical cure at 2 weeks, patient satisfaction, and process outcomes.

Since cure rates for UTIs are very high, we have chosen a sample size based upon the descriptive outcomes outlined above. We propose to recruit 750 patients over an 8-month period. This number is higher than what will be necessary for the primary outcome, but the intention is to also have enough power for analyses of some of the secondary outcomes.

Ethical considerations:

This protocol will be submitted to the University of Alberta Research Ethics Board, as well as the Research Ethics Board at Horizon Health Network. All patients will be provided a consent form that describes the study and provides sufficient information for them to make an informed decision about study participation. Patients will be assigned a unique study identification number. This number and the patient's initials will be the only patient identifiers collected by EPICORE Centre.

Feasibility:

UTIs are common in the general population. Because of the unpleasant symptoms and potential complications associated with UTIs, timely access to care is important to patients and our healthcare system. The accessibility of community pharmacists (in terms of not needing an appointment and longer business hours) means that patients will likely embrace this service.

In addition, the issue of appropriate use of antibacterials (antimicrobial stewardship) is an important public health concern, which can be addressed by pharmacists' application of evidence-based practice guidelines.

Pharmacists will be interested in participating because of the reporting functions of the database. They can print individual patient summaries (to cut/paste into their clinic letters or other documentation requirements), and generate a report showing their impact in UTI patients (which helps to justify their positions).

Initial data on UTI treatment by pharmacists in New Brunswick suggest that approximately 150 patients were treated per month in 40 pharmacies. Therefore, we feel that recruitment of 750 patients in 8 months is feasible.

What this study adds:

At the local level, the generation of provider-specific reports will help pharmacists to show their impact on UTIs (important for justification of their advanced scope of practice and remuneration).

This registry may also encourage more pharmacists to get involved in providing clinical services to patients with UTIs. Our design of the registry will facilitate implementation of best practices in UTI management.

This study will also evaluate the appropriate use of antibacterials for UTI management. This has important public health implications with regard to the misuse of antibacterials and concern over antibacterial resistance – much of which can be prevented/minimized with judicious use of antibacterials (such as not using antibacterials for asymptomatic bacteriuria and following guideline recommendations when antibacterials are indicated).

From a health-system perspective, this registry will help to quantify the impact of pharmacist-managed UTIs. This information will demonstrate the uptake, patient satisfaction, and outcomes of pharmacist-managed UTIs. These data will be crucially

important for justification of remuneration and further expansion of pharmacists' scope of practice in New Brunswick and beyond.

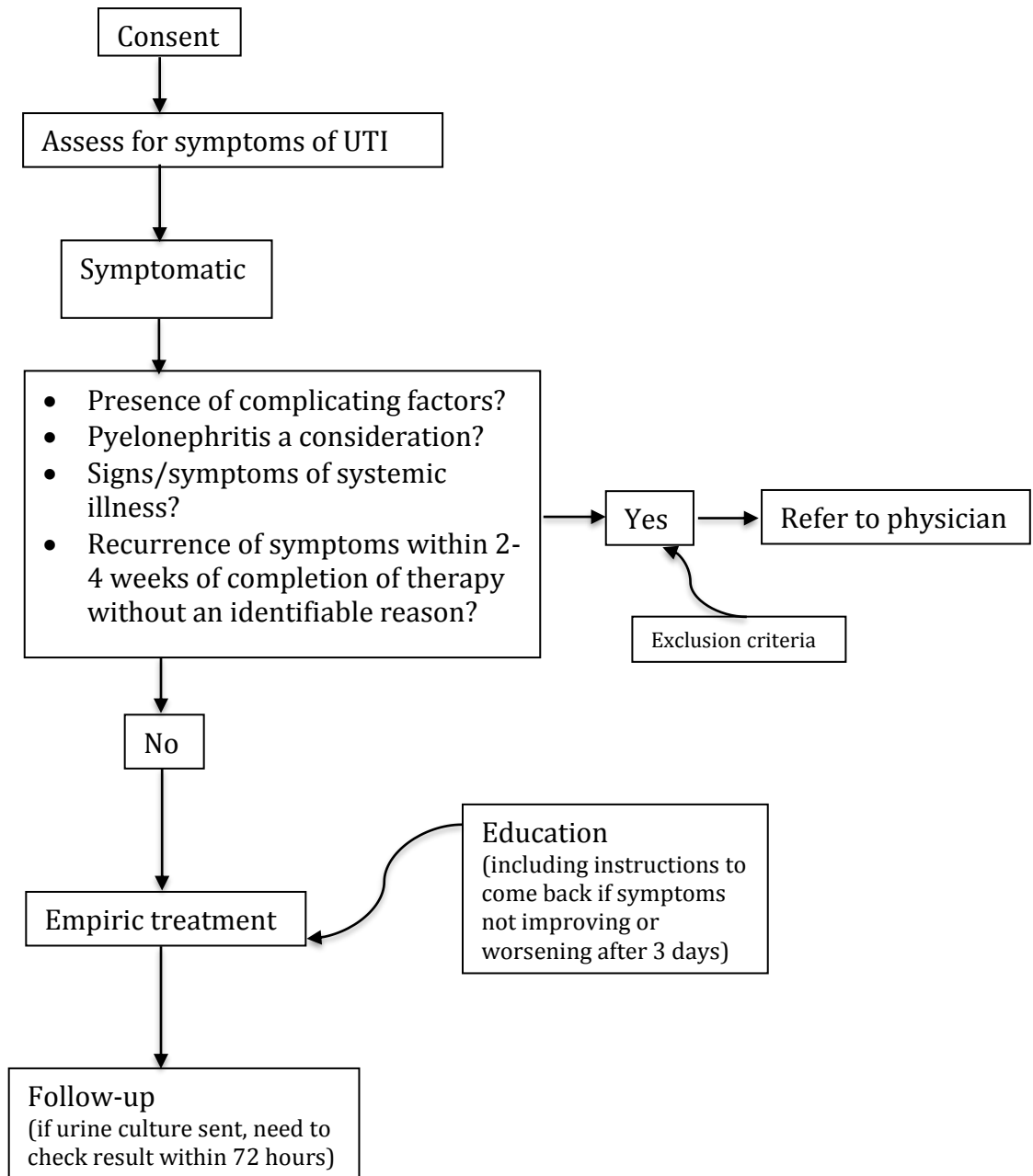
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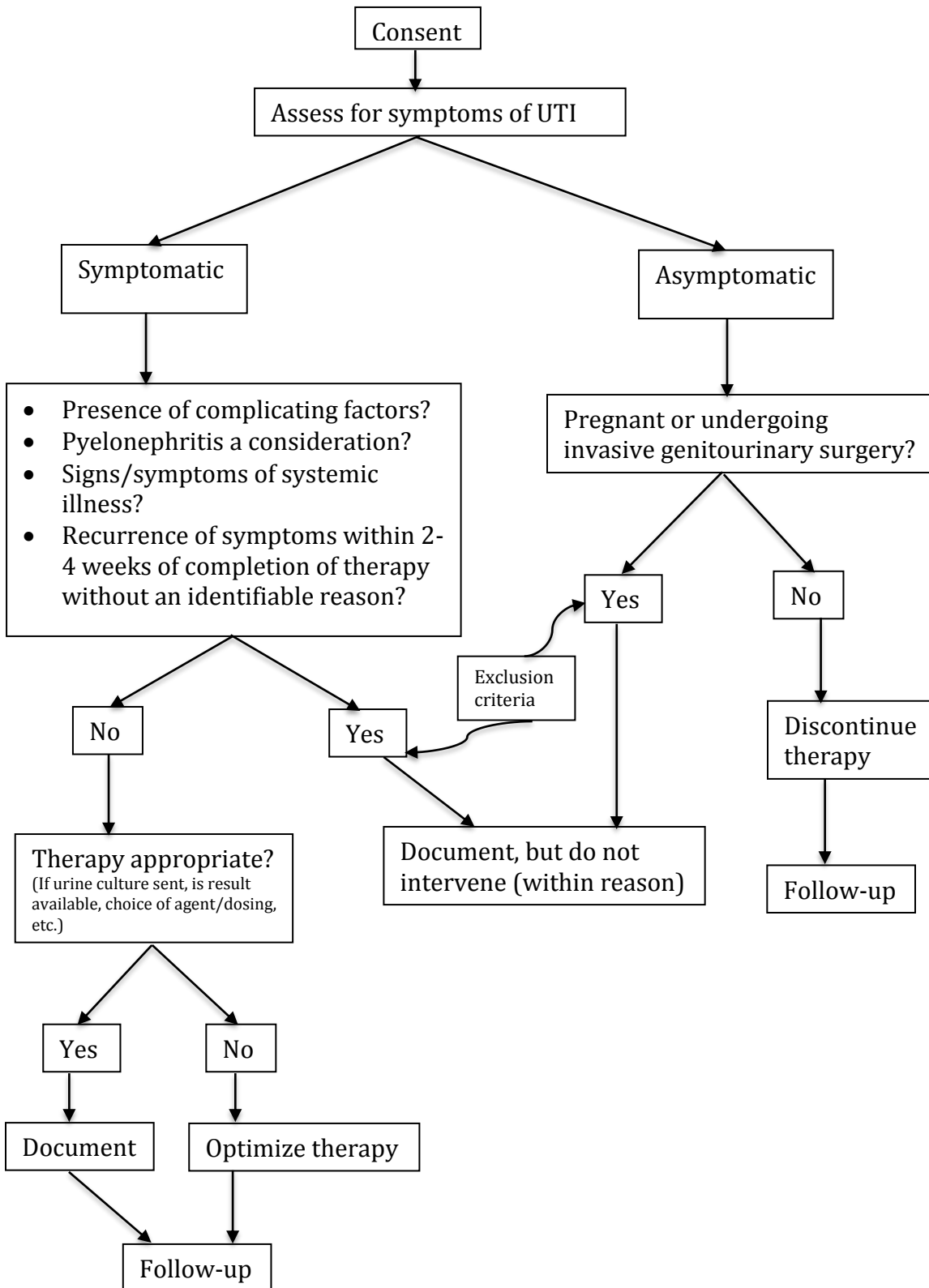
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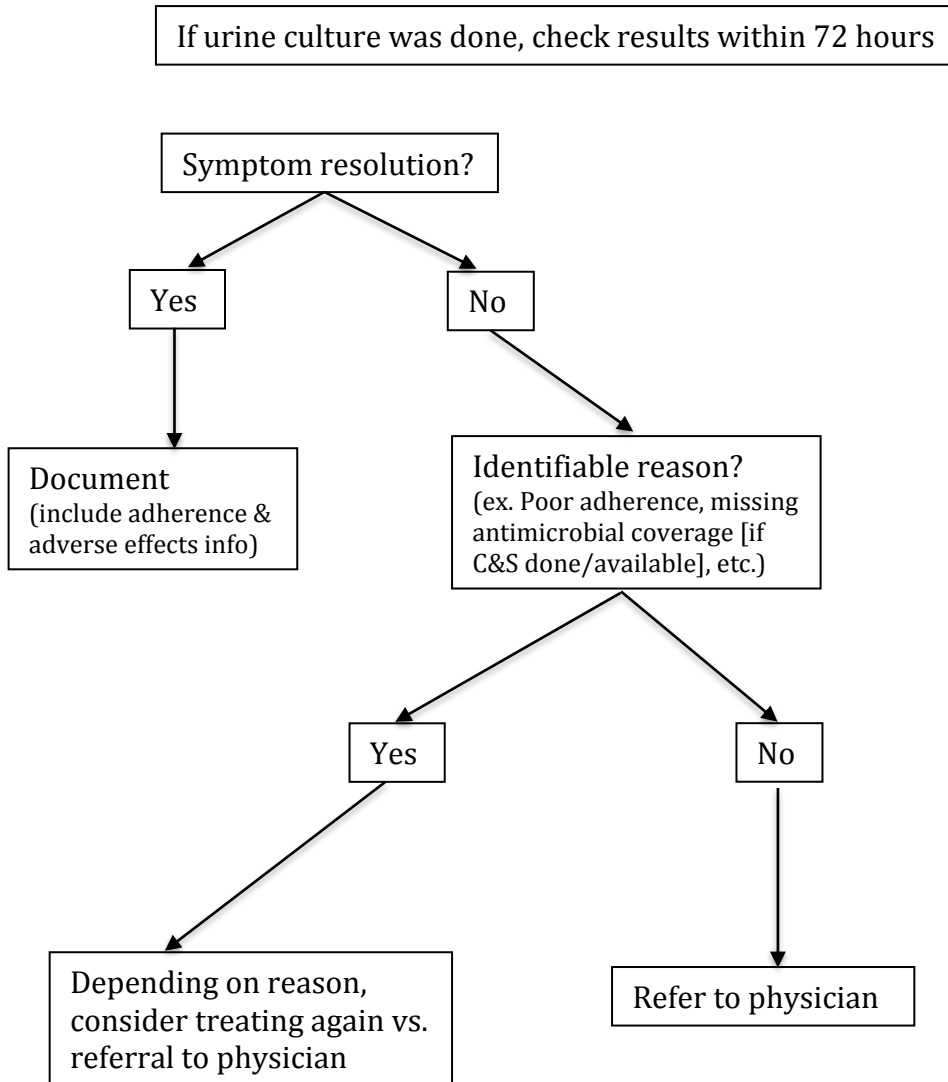
Appendix 1: Algorithm for new patient presentation (Not presenting with prescription)



Appendix 2: Algorithm for new patient presentation (Presenting with prescription for UTI treatment)



Appendix 3: Algorithm for patient follow-up



Appendix 4: Survey of patient satisfaction

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am totally satisfied with my visit to this pharmacist prescriber	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This pharmacist prescriber told me everything about my treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Some things about my consultation with the pharmacist prescriber could have been better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This pharmacist prescriber assessed me very thoroughly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This pharmacist prescriber was interested in me as a person, not just my illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I understand my illness much better after seeing this pharmacist prescriber	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt this pharmacist prescriber really knew what I was thinking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wish it had been possible to spend a little more time with the pharmacist prescriber	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would find it difficult to tell this pharmacist prescriber about some private things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I trusted the pharmacist prescriber's ability to prescribe before I went to see him/her for the first time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is easier to get an appointment to see the pharmacist prescriber than the doctor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I get more time with the pharmacist prescriber than my doctor(s) for discussing my health-related issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am more comfortable discussing medication-related issues with the pharmacist prescriber than my doctor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I am more interested in the quality of care than the profession of the person who provides it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prescribing by pharmacists is a way for the government to save money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend seeing a pharmacist prescriber to other people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>