Development of a web-based tool for assessing adherence to respiratory medications using pharmacy claims data in primary care

Electronic supplementary material

S1: INTERVIEW GUIDE - SUBJECTS WITH ASTHMA OR COPD

A. Disease experience

1. For how long have you been diagnosed with your respiratory disease (asthma or COPD)?
2. Who established the diagnosis? In which place?

B. Medication adherence and use

1. To you, what does it mean to take your medications correctly?
    - Have you heard of the term medication adherence?
2. Do you sometimes modify the prescribed doses of your respiratory medications? Why?
3. What strategies do you use to remember to take your medications? Do you sometimes forget to take your medications?
4. Do you notice a relationship between your respiratory medication use, your disease symptoms and your exacerbations?
5. Do you take medications to treat conditions other than your respiratory disease?

C. Patient-Physician relationship and communication

According to the scientific literature, the physician-patient relationship plays a vital role in promoting medication adherence.

1. How would you describe your relationship with your family doctor?
2. What is the nature of the communication with your doctor concerning your disease (medical explanations, medication use, side effects)?
3. Do you discuss your medication use with your doctor? If yes, what subjects are discussed?

D. Use of pharmacy claims data to assess and monitor medication adherence

Suppose your physician can have access to information on all the medications you purchased at your pharmacy. Would you be comfortable with your physician having access to this kind of information?

- How would such information affect your relationship with your family physician?

S2: INTERVIEW GUIDE - FAMILY PHYSICIANS

A. Patient-physician relationship and communication concerning medication use

1. What is your definition of medication adherence?
2. How do you address medication adherence in your practice?
    - Do you discuss medication adherence with your patients?
    - Which strategies do you use to verify medication adherence?
3. Is communication concerning medication use different in patients with chronic respiratory diseases (asthma, COPD), compared to patients with other chronic diseases?

B. Development of e-MEDRESP and use of pharmacy claims data to measure adherence

1. Do you access the prescription refill data found in the Quebec Health Record[1] to verify medication adherence with your patients?
    - What is your opinion on the ease of interpretability of this data?
2. Would a tool based on prescription refills (otherwise known as pharmacy claims data) be relevant in clinical practice? Would it help you assess medication adherence and use?
3. If we were to develop an electronic tool based on pharmacy claims data[2], what kind of information would like to see?
    - What would be the most appropriate metric to describe medication adherence and use (percentages, graphics, etc.)?
    - How would you like the medications to be categorized?
4. What additional information would you require to monitor your patients' medication adherence and use in a more adequate manner?
5. At which frequency would you like to receive updated information on your patients' medication use?
6. How would having access to an objective and easily interpretable information on your patients' medication use affect your relationship with your patient?

Brainstorming and presentation of various prototypes.

[1] Quebec Health Record (QHR): Electronic data repository in the Canadian province of Quebec that allows doctors, pharmacists, and other healthcare professionals to access health information on their patients (medical results, pharmacy prescription information

[2] Our definition of an electronic tool is a tool that is integrated in electronic medical records.

S3: BARRIERS TO ASSESSING AND MONITORING MEDICATION ADHERENCE

(First global theme)

Key quotes (translated from French), classified according to organizing and basic themes

Organizing Theme	Basic theme	Transcript excerpt	Participant characteristics
Patient beliefs	Disease perception	Patients with COPD never complain and always trivialize their symptoms. It's incredible how their disease worsened with time! So, we as physicians, come up with treatment plans, but what's the use? Compared to asthma patients, COPD patients do not realize the severity of their disease.	Dr, male, 64 years old, 40 years of experience in family medicine
	Disease perception	It seems that [COPD patients] have adapted to an inferior quality of life. So we see them, they are exhausted, they suffer from sleep apnea and when we ask them the question [on their general health], they respond " Oh no, I feel well."	Dr, female, 34 years old, 8 years of experience in family medicine
	Disease perception	Most patients say: "Oh I feel so much better, doctor!" And then you listen to their lungs and realize that they are not well at all. It's probably the only objective measure of compliance that I have, at least according to my short medical experience. So I tell myself, either compliance is the problem… or the drug is not effective. And to know which of these two is the problem can be quite obscure.	Dr, male, 26 years old, recent medical graduate
	Disease/Treatment perception	There is a lot of education that needs to be done with patients with COPD. I have a lot of patients who do not believe they have a disease, so whenever I prescribe them an inhaler, I often sense a feeling of mistrust from them. There is a lot of education to do in this respect. Indeed, respiratory therapists can be very useful but some patients do not even show up to their appointments with the therapists.	Dr, female, 34 years old, 8 years of experience in family medicine
	Treatment perception	P7: I do not feel the need [to take my respiratory medication]. That's the thing. In my everyday life. P11: But if the doctor prescribed it, it's because you need it. P7: I am not sure that I need it that much. That's the thing.	P7: Male patient, 40 years old, diagnosed with COPD for 14 years P11: Patient, 68 years old, diagnosed with COPD for 4 years
	Treatment perception	I heard that prolonged inhaler use can cause your lungs to dry up. Is this true?	Patient, male, 56 years old, diagnosed with COPD for 4 years
Lack of objective information regarding medication use	Patient reliability	We would like something more objective. Maybe not perfect, but at least objective so that we do not solely rely on what patients tell us.	Dr, female, 34 years old, 4 years of experience in family medicine

Organizing Theme	Basic theme	Transcript excerpt	Participant characteristics
	Patient reliability	We need to rely on the patient, and the patients often do not want to tell their doctor that they didn't exactly do what we told them to do (laughs). Or it could be that the patient himself makes suggestions and says: "I forget to take my medication… I would like it to be more simple... or could we change the medication?" It is the patient who is in charge of his health.	Dr, female, 57 years old, 32 years of experience in family medicine
	Patient reliability	We directly ask patients whether they took their medication, knowing full well that patient reliability is mediocre. We know that adherence in patients with COPD is about 40%. So there are two points here: does the patient take the medication and does he/she take it well? And relying on patients' accounts can be quite misleading.	Dr, male, 26 years old, recent medical graduate
	Patient reliability	It's not always easy [to assess adherence] because we rely on [patients]. Sometimes, the pharmacist communicates with us and tells that the [patients] did not renew their prescription, so that can help us. Otherwise, there isn't really a method to verify whether what they tell us is true. But they often end up telling us because we end up increasing doses, or changing inhaler and they know that it's because they didn't take it... they end up telling us.	Dr, female, 55 years old, 28 years of experience in family medicine
	Interpretability of pharmacy claims data	When it comes to the QHR, there is no organization! It's a jumble of information. There is no categorization; there is a lot of redundancy […] It's one line per medication, but sometimes I have to go through 2-3 pages to find the drug I am looking for. It's really not user-friendly! The information is there, but you need to look for it. For a patient who takes 2-3 medications, it is relatively simple, but for a lot of patients who take more than 7 medications, it becomes problematic. There is no order in the QHR... it was just given to us like that… ok well there is the name of the prescriber, the date of prescription, but there are no subcategories. There is no work that has been done within the QHR to make it more easily accessible. We need to reason from this data... the QHR is still at its preliminary phases.	Dr, male, 57 years old, 27 years of experience in family medicine
	Interpretability of pharmacy claims data	The QHR helps us, but you need to dig into the information. You need to play close attention, as if you were a detective!	Dr, female, 35 years, 10 years of experience in family medicine
Physician medical practices	Disease management	What is also complicated is that I often go to conferences on COPD and learn about available treatments and there seems to be uncertainty regarding the efficacy of inhalers on survival and morbidity. What they say [at the conferences] is that the inhalers will only help relieve the symptoms but then the patient tells me: "These inhalers are not helping me". So I don't have arguments to convince them, to insist that they take their medications. Maybe I am party to blame. So maybe I put less pressure on my patients to take their inhalers because I myself am not sure which medication has a better efficacy relative to another one. [...] What is also complicated is that there are always new COPD drugs entering the market each week!	Dr, female, 39 years old, 2 years of experience in family medicine

Organizing Theme	Basic theme	Transcript excerpt	Participant characteristics
	Importance given to assessment and monitoring of medication adherence	I must admit that I do not exert as much effort when reinforcing the adherence to an anticoagulant than to a COPD medication. I noticed that's the same problem with other doctors like me who do not have much experience. So sometimes we realize that the patient does not take his [COPD] medication. Is the COPD medication just as important as other medications to treat other diseases? Probably. [...] I don't systematically monitor the adherence to all medications.	Dr, male, 30 years old, 3 years of experience in family medicine
	Disease management	When I check their prescriptions and verify the technique of utilization, I sometimes look as lost as they are. So I can imagine why they do not always have trust in their prescribed therapeutic regimen. If I am lost, I can only imagine that they are too.	Dr, female, 35 years old, 10 years of experience in family medicine
Organization of healthcare services	Short duration of medical visits	[Medical visit durations] vary from doctor to doctor. I take about 15-20 minute during patients' annual visits, but other doctors take a lot less time. And COPD patients have a lot of other health problems, so I don't always have time to verify compliance. We must choose our battles.	Dr, female, 29 years old, 2 years of experience in family medicine
	Incomplete health information	When patients are hospitalized… often the hospital pharmacy does not have all the inhalers available... So doctors modify the prescriptions and often patients end up with many different inhalers.	Dr, male, 37 years old, 11 years of experience in family medicine
	Incomplete health information	The reality is that… especially when we take on new patients who have been previously followed by the same doctor for 30 years and I am not able to read previous doctors' handwriting [in paper medical records], I tell my patient " I am sorry, I will start my recipes all over again, and we will redo all the medical tests together. I am sorry, but there is no easy way for me to find out which drugs you have already tried" This is the reality of the disease management and care of an elderly patient.	Dr, male, 26 years old, recent medical graduate
	Healthcare accessibility	When my respiratory physician retired, I was told that I was going to be followed by a family doctor. I waited for three and a half years for a family doctor. I recently met her, so she obviously doesn't know me very well.	Patient, female, 81 years old, diagnosed with COPD for 35 years
	Healthcare accessibility	Medical visits. With respiratory physicians. It's been 25 years I haven't seen a respiratory physician. I am about to die. I only have 30% of my lungs left. So it would be the least of things to have a medical visit every 6 months. Patients are left on their own because some doctor retired. What's the deal?	Patient, male, 70 years, diagnosed with asthma/COPD overlap for 25 years

S4: FACILITATORS OF ASSESSING AND MONITORING MEDICATION ADHERENCE

(Second global theme)

Key quotes (translated from French), organized by theme

Organizing theme	Basic theme	Transcript excerpt	Participant characteristics
Patient-physician relationship	Communication	We should accompany patients rather than reprimand them.	MD, female, 50 years old, 17 years of experience in family medicine
	Patient empowerment	I always try to work in collaboration with the patient. Like I always say, I work WITH the patient, not above the patient. I am not a teacher, I am not the one who will scold them […] It's really to try to show that the patient is responsible for his own health and that I am not there to shove medications in their mouths.	MD, female, 57 years old, 32 years of experience in family medicine
	Communication	I think it's important that our doctor respects us. My doctor told me to stop smoking, but he knows I am not at this stage yet. He respects me and gives suggestions, without forcing his recommendations on me. He communicates with me.	Patient, male, 58 years old, diagnosed with asthma for 4 years
	Communication	One of the first questions I ask them is: "Do you take your medication regularly?" It's very simple, but if we do not ask, they may hide the truth from us and we lose them. So if I am open, they are open. So it will be easy to understand why they only take their medication at specific times during the year, or as needed... As long as we show that we are open, there won't be any secrets. Or sometimes, I reformulate my question: "Do you sometimes forget to take your medication?" And my patient says "yes". So finally I get an answer. So I continue" How often do you forget? Once every week? Once every month? Do you regularly get your prescription at the pharmacy? Do you sometimes prolong your prescription at the pharmacy? Do you get your prescription every month and a half?" Small questions like that...	MD, male, 32 years old, 2 years of experience in family medicine
Physician access to pharmacy claims data	Relevance of having access to pharmacy claims data	[Opinion on pharmacy claims data]: It's not perfect, but it's fine. It opens up new lines of inquiry for me. I think it would… it would satisfy an existing need.	MD, female, 57 years old, 32 years of experience in family medicine
	Relevance of having access to pharmacy claims data	Patients don't take their medications… they only wait until they have an exacerbation to take action. Then pharmacists send us a fax, indicating that the situation is critical.	MD, female, 35 years old, 10 years of experience in family medicine
	Relevance of having access to pharmacy claims data	It would be nice to have a history of medication adherence every year. To see which inhaler or medication worked, see if medication compliance changed after increasing a dose or after I changed their prescriptions. If would be nice to see if our interventions really have an impact on patient compliance.	MD, male, 65 years old, 42 years of experience in family medicine
	Patient acceptability	If doctors prescribe us medications, they assume that we take them. And they prescribe them because we need them. So yes, I very much agree that physicians should have access [to our prescription refill data]. I would even be okay with physicians knowing exactly if I took all the doses... that I didn't just hide my inhalers in a cupboard at home and use only use them when I need them. *Did I really use them?*	Patient, female, 38 years old, diagnosed with asthma for 22 years

Organizing theme	Basic theme	Transcript excerpt	Participant characteristics
	Patient acceptability	I believe it's a good idea. The doctor will be able to better understand the situation. The pharmacist knows which medication you took, but the doctor cannot exactly know which medication was purchased.	Patient, female, 37 years old, diagnosed with asthma for 8 years
	Patient acceptability	It's for sure a double-edged sword… for sure. At any given time, this is what happens: you see your doctor, you don't feel well. He gave you drugs but then he realizes that you only took half of them. What's the point of going back to the doctor?	Patient, male, 65 years old, diagnosed with COPD for 3 years
	Patient acceptability	I think this is a delicate issue… in the sense that the patient can ask himself: "What? You have access to all this information? You even know when I [purchased my medicine]" It's not really cool to feel like you are under the radar.	MD, female, 39 years old, 6 years of experience in family medicine
Inter-professional collaboration	Inter-professional collaboration - *respiratory therapists*	I often request pulmonary function tests and at the same time, respiratory technicians often check how the medications are taken. And then they send us a report. It's super useful.	MD, female, 57 years old, 32 years of experience in family medicine
	Inter-professional collaboration - *respiratory therapists*	Sometimes, they use their inhaler incorrectly so then they say that their medication doesn't work. So one strategy is to get help from the respiratory therapist […] that's when we realize that the medications are not taken correctly.	Dr, male, 37 years old, 11 years of experience in family medicine
	Inter-professional collaboration - *respiratory therapists*	We have a respiratory therapist who started to work with us at the clinic. She gives us a great service; we are very lucky. So I have a few patients who have been recently diagnosed, we start a new medication, and the therapist does a spirometry test. So that gives an objective measure to the patient. Maybe the patient does not feel any improvements, but clinically, objectively, the patients gained back 20% of his pulmonary function with the use of the inhaler.	MD, female, 50 years old, 17 years of experience in family medicine
	Inter-professional collaboration - *pharmacists*	Sometimes, the pharmacist communicates with us and informs us that the patient did not come fill their prescriptions. Otherwise, we don't really have a way of knowing that what patients tell us is true.	MD, female, 55 years old, 28 years of experience in family medicine