USING CLINICAL PATHWAYS FOR
CANCER DIAGNOSIS IN PRIMARY CARE
UNDERSTANDING FAMILY PHYSICIANS' MENTAL MODELS

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SUMMARY

OBJECTIVE

The objective of this study was to understand family physicians' thinking and approach to using three specific Clinical Pathways for Cancer Diagnosis: rectal bleeding, iron deficiency anemia, and suspected lymphoma. This understanding provides insights for the Cancer Strategic Clinical Network (SCN) on whether and how family physicians use the Pathways, how or where they would like to access them, and suggestions for how to integrate into existing workflow.

METHOD

We used a combination of mental simulation and "think-aloud" processes to gather information about: 1) how well the Pathway design supported family physicians' navigation or use of the Pathways; and 2) the fit between the family physician's mental model of the work and the proposed Pathways.

Setting: Primary Care in Alberta.

Selection: Eight family physicians whose clinics were not heavily oriented toward cancer patients, or who did not work in or closely with specialised clinics like the Cross Cancer Institute or other Cancer Centres

KEY FINDINGS

- The Pathways did not conflict with family physicians' mental models, meaning that they could fit within their diagnostic processes.

- Family physicians used the Pathways to scan for information, confirm what they already knew, support what they were already doing, or as a quick guide for what steps to take when unsure, or to check if they had missed anything. This was particularly true with the Iron Deficiency Anemia and Rectal Bleeding Pathways, as these are common issues family physicians see with patients.

- Physicians did not use the Pathways as algorithms, rather, they used the Pathways as resources to support well-known System 1 problem solving[3], typically either recognition-primed decision making[4] or satisficing . It was important to the participants that they be able to stay in System 1 thinking in order to quickly work through the issue at hand.

- Family physicians did not feel comfortable describing something as low-risk or not referring the patient when the outcome held any chance of missing or preventing cancer. Family physician's approach was instead to refer in order to ensure they were taking due diligence for the patient's sake.

SO WHAT?

- In general, family physicians indicated that the Pathways must be easy to find, easy to use, and easy to incorporate into their work-flow. The Pathways need to be designed to provide the key information up front and very succinctly.

- Pathways for health issues that family physicians see commonly (e.g., rectal bleeding, iron deficiency) are not necessarily going to be a tool that family physicians use, or perhaps not in the expected way, as they have already developed the pattern or decision tree in which to act by. This includes relying upon their own tools (e.g., TOP Guidelines, Specialist Link, UptoDate, Forzani Group).

- Pathways for uncommon health issues (i.e., lymphoma) would be more useful and something family physicians would more likely use.

- The Pathways could serve as a platform for developing a needed shared understanding among family physicians and specialists, but also among specialists themselves, as to what is considered "urgent" or "semi" urgent, "low" or "high" risk.

- Family physicians would be more likely to use the Pathways if they included clearer steps for the referral process, as opposed to the diagnostic or decision-making process. Being able to refer from within the Pathway itself (e.g., clickable form that can then be submitted for referral) would be an asset.

BACKGROUND & PURPOSE

Cancer related illnesses have a significant impact on the health system. Creating clinical pathways in an effort to streamline the diagnostic period could enhance symptom management and care delivery while improving the experiences of health care providers and patients throughout the diagnostic period. Toward this aim, the Cancer SCN developed Clinical Pathways for Cancer Diagnosis with input from primary care physicians and wanted to learn how best to integrate them into primary care practice.

A large body of research over the last several decades has established that the human mind has two distinct modes of decision making, usually termed System 1 and System 2.[1] In general, knowledge workers in time-pressured contexts actively avoid System 2 as much as possible. Given that the Pathways are intended for use in the environment of busy family medicine practices, it is crucial to understand the cognitive implications of that context. Family physicians operate at, or near, cognitive task saturation most of the time and are heavily dependent on "System 1" thinking strategies.

The objective of this study was to understand family physicians' thinking and approach to using three specific Clinical Pathways for Cancer Diagnosis: rectal bleeding, iron deficiency anemia, and suspected lymphoma. This understanding provides insights for the Cancer SCN on whether and how family physicians use the Pathways, how or where they would like to access them, and suggestions for how to integrate into existing workflow. This project also contributes to a local understanding of the integration of cancer clinical pathways into the primary care context.

Instinctive
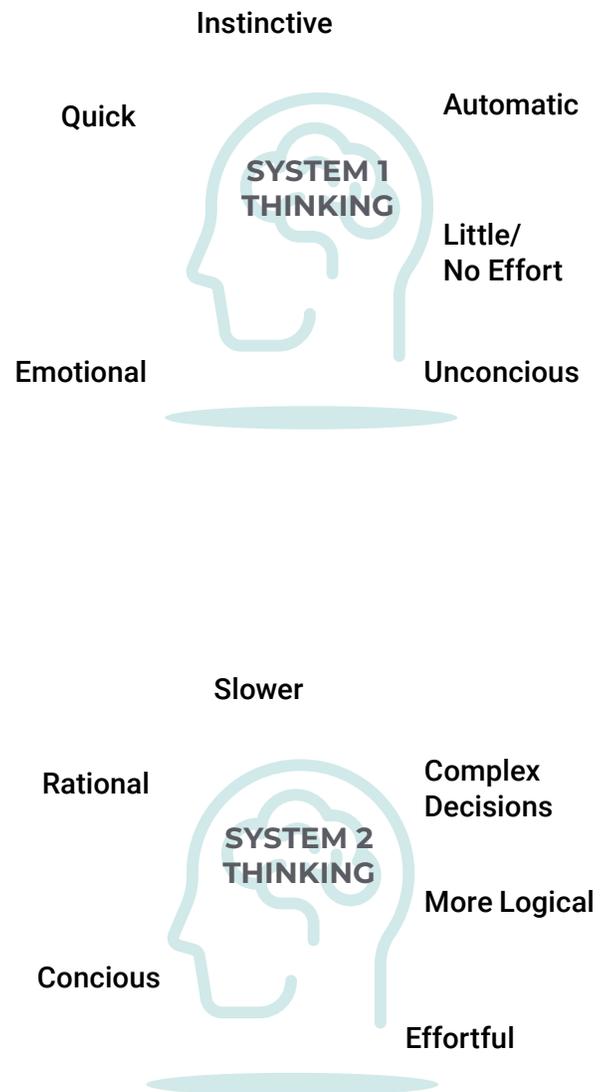
Quick

Automatic

SYSTEM 1 THINKING

Little/ No Effort

Emotional

Unconcious

Slower

Rational

Complex Decisions

SYSTEM 2 THINKING

More Logical

Concious

Effortful

Figure 1. Dual Process Model of Thinking (after Kahneman[1])

PROJECT DESIGN & METHODS

This Health Research Ethics Board of Alberta- Cancer Committee approved study, using mental simulation and "think-alouds" with family physicians, was conducted together with the Cancer SCN, Enhancing Alberta Primary Care Research Networks (EnACt), and the Alberta Medical Association Accelerating Change Transformation Team (AMA-ACTT).

The combination of CTA and "think-aloud" process provided information about 1) how well the Pathway design supported family physicians' navigation or use of the Pathways; and 2) the fit between the family physician's mental model of the work and the proposed Pathways.

Virtual interviews were conducted (via Zoom) by two members of our team (an interviewer and a note taker) where participants were shown three clinical Pathways: rectal bleeding, iron deficiency anemia, and suspected lymphoma and asked to think aloud as they described how a case would have gone with use of one of the Pathways.

We also briefly explored where they would want to find the Pathways, how they should be displayed (i.e., should they be kept together), and other suggestions in terms of low-risk pathways.

Mental simulation:

Mental simulation is one of the tools in the CTA methodology. It is the ability to imagine taking a specific action, and then developing the probable result before acting. It allows participants to consider events or scenarios, in this case using a cancer diagnosis pathway, as we question them and learn of possible consequences, results, and futures.[2] It also often exposes features of participants' mental models of which they were unaware.

"Think aloud":

The "think-aloud" process allowed us to assess the participant's information retrieval needs, their reasoning in how they used the Pathways, as well as the usability of the Pathways and how they might fit into or alter workflows or the thought processes of typical physicians.[3]

PARTICIPANTS

We used purposive sampling[4] to select family physicians (n=8) whose clinics were not heavily oriented toward cancer patients, or who did not work in or closely with specialised clinics like the Cross Cancer Institute or other Cancer Centres. This group was targeted as we believe they would be most representative of real-world users and most influential in uptake of the pathways.[5]

Unfortunately, the study sample is not representative of Alberta. All participants (n=8) are located in urban areas, therefore we are missing the rural voice and experience. In addition, only two of the physicians who participated practice in Northern Alberta; the rest practice in Southern Alberta (see Table 1, participant demographics).

COGNITIVE TASK ANALYSIS

Cognitive Task Analysis is a set of tools used to elicit and represent how people think when working in cognitively complex environments. It has been used to understand and improve team functioning in high stakes settings (e.g. aviation, firefighting, ICUs).

FINDINGS

Three participants chose the Iron Deficiency Anemia Pathway in thinking about and walking through a recent patient case. A fourth provided a brief review, and a fifth participant offered only a few comments. Four participants chose the Rectal Bleeding Pathway. Finally, only one participant chose the Lymphoma Pathway. A second participant provided a brief review, and a third just a few comments on the Pathway. Important to note is that the participant who provided a full review has his own business building e-referral forms, which meant he already had a sense of the development and usability required for creating such tools.

Though the Pathways present as algorithms, physicians did not use them as such. Rather, they used them as resources to support well-known System 1 thinking strategies, typically either recognition-primed decision making (i.e., pattern recognition)[6] or satisficing (i.e., quickly finding the minimum information necessary to make a satisfactory decision)[7]. It was important to the participants that they be able to stay in System 1 thinking in order to quickly work through the issue at hand.
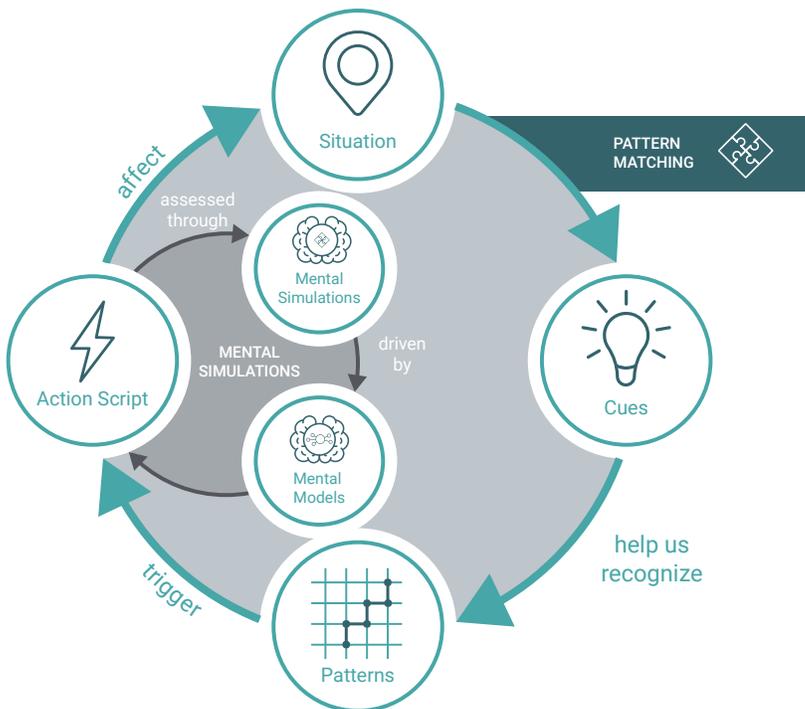
> " … I would probably have gotten a little flustered initially looking at it just because there is a lot of information on here. Because, again, your time is so limited that you really need to quick, … just glance and quickly follow what piece of information you need from the Pathway and be able to implement it quickly.

> " This is nine pages long. You don't want that when you are trying to quickly access something to jog your memory or trying to determine if someone is high risk or low risk for an investigation.

> " Yes, what I am looking for. I say I am a family doctor and I work from 'rules of thumbs' and I have two, so I don't want a long list of 20 thumbs. I want two thumbs. What do I look for and if this happens, send them to emerg.
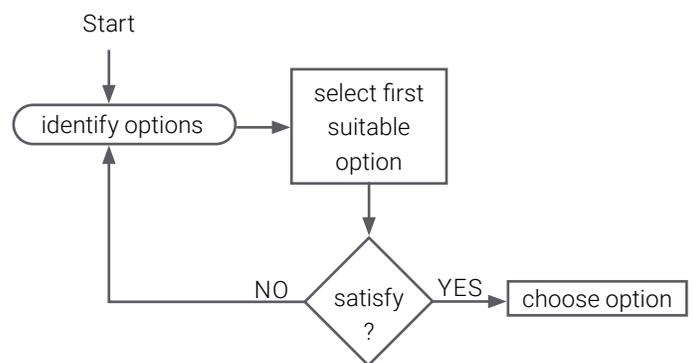

Figure 1. Recognition-Primed Decision (RPD) Model

Figure 2. Satisficing Decision Model

MENTAL MODELS

It was evident from the interview data that the Pathways did not conflict with family physicians' mental models, meaning that they could fit within their diagnostic processes. The family physicians mainly used the Pathways to scan for information, confirm what they already knew, support what they were already doing, or as a quick guide for what steps to take when unsure, or to check if they had missed anything. This was particularly true with the Iron Deficiency Anemia and Rectal Bleeding Pathways, as these are common issues family physicians see with patients.

> *I'd probably, just given my experience, I would probably see the patient and probably open this up after just to glance through to see, have I thought of everything I should? Almost like a checklist to make sure I haven't missed anything.*

> *I think what it would have done is just confirmed for me that I was doing the right thing.*

In some cases participants stated they would use the Pathways for providing information to patients, either to show them a process exists and where they are within that process, or to provide information in the form of patient handouts.

> *…if there is a patient that is insisting on seeing the specialist then I'll use the algorithm and say, "Actually, we have something that we follow. This is a pathway that we follow and the specialist won't see you until we follow through this pathway to the end where we need to go. And then, if something comes up, there are indications when I have to send you to the specialist, but we have to work through this together before we get to that point".*

> *Handouts for patients are the best. …I definitely would still share this with them. You just have to spend the time to go through each thing with them and make notes and give it to them so they can refer back to it.*

It was also thought that the Pathways could serve as a platform for developing a shared understanding among family physicians and specialists, but also among specialists themselves, as to what is considered "urgent" or "semi" urgent. This was pointed out as important in all Pathways. Family physicians perceived that specialists were not in agreement among themselves, and they could not reliably guess what a given specialist would consider urgent or not, nor what criteria they used. Pathways need to inform or validate decision making, importantly in situations of referral or not, which is tied to the clarification of semi-urgent vs. urgent, and low risk vs. high risk. Even with the Pathways, without the clarity about urgency, and with uncertainty about risk and worry for the patient, the majority stated they would simply "pick up the phone" and call a specialist.

> *"Semi-urgent criteria". Yes, that was pretty much what we fell into. I then just did the referral, although I marked it as urgent. Urgent, I suppose, when I mark a referral I'm just faxing through, I'm not expecting it to be necessarily quicker than that two months. If I'm thinking this needs to be seen in next week or two, that's when I'm picking up the phone and speaking to someone.*

> *…one is "Urgent". One is "Semi-urgent."…I think is a bit confusing to be honest because this is all the same thing in my opinion. Only because as primary care physicians, we don't really dictate when the person is going to be scoped or not, so "two weeks" or "eight weeks" unless they are bleeding… if you are looking for "Urgent" they should be picking up the phone and calling.*

Furthermore, given their context of experience, family physicians did not feel comfortable risking deeming something as low-risk and not referring the patient when the outcome could be missing or preventing cancer. Instead, their approach was to refer in order to ensure they were exercising due diligence for the patient's sake.

> " *Sometimes you have to go with your gut feeling though or refer them anyway, because it is better to rule out the cancer than to find out it was and it's too late... I may not fully always go to the "T", because if you think this is cancer, you should check it out, right?*

Pathways are not necessarily going to be a tool they use, or perhaps not in the expected way. One reason is that in certain cases (rectal bleeding, iron deficiency) family physicians have already gathered and rely upon their own tools (e.g., TOP Guidelines, Specialist Link, UptoDate, Forzani Group). Another is that for health issues they see commonly (e.g., iron deficiency, rectal bleeding), they have already developed the pattern or decision tree in which to act.

> " *A lot of it is stuff you just intrinsically think about. ... when you are doing your history and physical for the patient, you will always ask, if someone is coming in with anemia... "Any major sources of bleeding? How are your bowel habits? What do they look like? How many times a day do you go? How is your appetite? How is the shape of your stool?" There is just a fire of questions that you ask that I guess is intrinsic.*

> " *Like I said before, rectal bleeding is a very common patient complaint. ... I don't think it [Pathway] would have informed my practice. ... This kind of stuff, to be honest, most GPs should know it and have it in the back of mind or the back of their hand. .... I mean, sometimes Pathways give us a route for expedited diagnoses of certain conditions and I don't know that this Pathway really offers that.*

In these cases, family physicians would be more likely to use the Pathways if they included clearer steps for the referral process as opposed to the diagnostic or decision-making process, perhaps even being part of the referral itself (e.g., clickable form that can then be submitted for referral). A desire for clearer steps on the referral process was also due to negative experiences family physicians had with specialists either in terms of communication and coordination or having referrals rejected.

> " *I think the Pathway would be good ... just having it take one extra step... where you check off you meet this, this, and this criteria and just sending that sheet off. And referral done.*

> " *They [surgeons/specialists] are not easily approachable people. ... I find that I am always in an awkward position. I am the low man on the pole.... Surgeons don't want to talk to me. I don't want to waste the radiologist's time. And I also don't want to send the patient down the wrong path...*

MENTAL MODEL
Mental Models describe the lens through which individuals make sense of what's happening around them. More than our beliefs and values and dynamic in nature. Determines what we pay attention to, options and possibilities we consider, how we solve problems, make decisions and act. Our mental models are often so implicitly held that we have limited awareness of them and of the ways in which they constrain our thinking.

That said, they also noted that the information included could be useful to new physicians, either meaning new to the geographical area or new to family practice. Family physicians reported that Pathways for uncommon health issues (i.e., lymphoma) would be more useful and something they would more likely use.

> " *I think it is really helpful just to have these community specific pathways. Especially for people who practice in multiple communities. For people who are new to a certain community if they moved here and just don't know where to refer.*

> " *I could easily see, there would be part time family physician might see one high risk rectal bleed a year and you got to scratch your head, what do we do with this here? I can't remember what I did last year. Whereas the people that are receiving it for them it's the same old same old. They know what to do with it. But there are situations like this where I've got somebody with a four-centimetre lymph node. They say it is probably reactive, but maybe not. That's what they said on the report here, so what do I do with that? I don't want to waste time.*

Further to the case of the Lymphoma Pathway, family physicians typically did not maintain a well-developed mental model. Here, they did use the Pathway for more detailed information support, but not as an algorithm per se. Rather, depending on the individual, they mined the algorithm for information around which to build a pattern or for the crucial nuggets to drive a satisfactory decision. Participants stated that the Lymphoma Pathway would give confidence and reinforcement in decision making.

> " *I'd say all of it [use of Lymphoma Pathway], because I do struggle in this area. It's uncommon, so I don't have as much experience or comfort level with it, so I would [use it], especially the "clinical exam".*

> " *It [Pathway] would make a difference… I'll be seeing the patient next week. I'll be able to say, "Listen, I've sent this to the Lymphoma Diagnosis Program and they are going to call you." I know with confidence that I'm sending the patient to the right place.*

Usability and Access

In terms of asking participants where and how they wanted to access these Pathways, the majority stated that the Pathways needed to be located on the same web-page (e.g., all are found on a website that is dedicated to Cancer Diagnostic Pathways), easy to find, contain concise and valuable information, and be accessible with "ideally as few clicks as possible".

> " *I want it all in one spot. … it has to be just sort of in one sport and we know where to look for it.*

> " *I think if they are easy to access that people would use them. If you have to search within a website too far, if it gets too cumbersome to get to, then people will give up because they will forget to bookmark it or how to get there.*

Two participants suggested developing other Pathways that would be helpful to primary care. These included unintentional weight loss, as it is often a sign of cancer, hematology, and a follow-up pathway for patients who have had cancer and are now discharged back to their family physician. In this latter suggestion, it was noted that there are no standardized approaches for family physicians who are now monitoring a patient who has had major treatments for cancer such as chemotherapy.

Specific usability feedback was catalogued at the level of wording and format details and provided to the Cancer SCN team for further use by the SCN Pathway designers.

CONCLUSION

In general, family physicians indicated that the Pathways must be easy to find, easy to use, and easy to incorporate into their work-flow. This means they must be designed to support System 1 thinking. Because family physicians did not use Pathways algorithmically, and instead used satisficing and pattern-recognition, the Pathways need to be designed to provide the key information up front and very succinctly.

The most crucial goal, avoiding delayed referral for high-risk patients, requires that the Pathways paint a picture of how family physicians can recognize high risk quickly, and what the referral process is; all other information should be moved to an "expanded details page" physicians can scroll down to or reach by hyperlink.

The secondary important goal of reducing overuse among the low-risk can best be addressed not by trying to prevent family physicians from referring, but by ensuring that the referrals are sent with the information needed for the recipients to easily triage them as low risk. That can be achieved by a short simple checklist, again on the first page with explanatory material presented below or in hyperlinks.

The participating physicians reported that ideally the Pathways would be incorporated into their Electronic Medical Records; however, knowing this was likely not possible, the second option was to have them in one place, on a website, where they were grouped together but easy to find in the fewest clicks possible.

TABLES

Table 1: Participant Demographics

Self-Identified Gender	
Woman	6
Man	2
Age	
30-39 years old	6
50-59 years old	2
Place of Medical Education	
In Canada	6
Outside of Canada	2
Years Practicing	
Under 10 years	6
29-33 years	2
Geographic Location	
Southern AB Urban	6
Northern AB Urban	2

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