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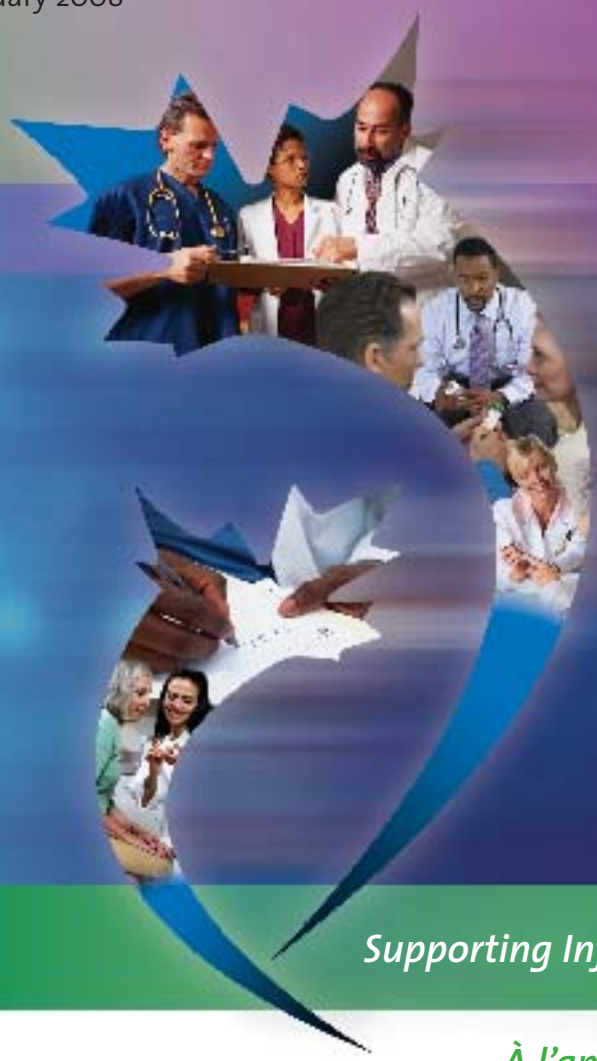
Current Practice Analysis: Insulin Analogues
A Qualitative Analysis of Canadian Physician Perceptions and Use of Insulin Analogues



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Current Practice Analysis: Insulin Analogues
A Qualitative Analysis of Canadian Physician Perceptions and Use of Insulin Analogues

Dr. Jarold L. Cosby, BA (Hon) MA PhD[1]

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[1] Principal Investigator Assessing Current Practices in the Use of Insulin Analogues
Assistant Professor, Applied Health Sciences
Brock University, St. Catharines, Ontario

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ABSTRACT

INTRODUCTION: For less than a decade, insulin analogues have been available to be used in combination with, or as replacements for, human insulins, providing new treatment options for patients with type 1 or type 2 diabetes. Recent reviews of randomized controlled trials comparing regular human and analogue insulins have concluded that insulin analogues should be used in clinical practice, while other reviews have shown analogues provide only minor benefits.

OBJECTIVE: The objective of this study was to foster an understanding of how insulin analogues are currently being prescribed and used in Canada, and to describe physician beliefs and perceptions regarding these agents.

METHODS: A qualitative research design was used. Brock University's Research Ethics Board provided ethics clearance before the study began. Individual telephone interviews were conducted with general practitioners, family medicine physicians, and endocrinologists who prescribe insulin analogues across Canada. An interview guide was developed based on the scientific literature, expert opinion, and consultation with CADTH staff members.

RESULTS: Telephone interviews were conducted with 22 physicians (17 family medicine and general practitioners (GPs), five endocrinologists) from seven provinces – including British Columbia, Alberta, Manitoba, Ontario, Quebec, Nova Scotia, New Brunswick – and the Northwest Territories. Nine participants were female, and the sample included physicians who graduated from medical school from 1981 to 2005.

A PRESCRIBING MODEL: The use of insulin analogues is guided by how well the analogue fits with the physician's practice of medicine. Although an analogue may be the perfect medication for one patient, it may not be used at all for another patient who has a very similar clinical need. Physicians discussed different phases of using analogues, each with their own fit issues. These included the initiation of insulin, switching to an insulin analogue, and adjusting existing insulins. Depending on the resources available to physicians, they may have little involvement in the overall use of insulin analogues (i.e., if they have access to an endocrinologist), or they may look after the entire spectrum of insulin care for the patient, along with their diabetic care team. A good 'fit' with an analogue exists if:

- there are sufficient physician resources to knowledge-share among the diabetes treatment team members
- patient beliefs and resources will accept the 'fit' of an analogue
- the quality of life of the patient can be improved
- there is a problem with the current insulin regime that needs correcting.

DISCUSSION AND IMPLICATIONS: The prescribing of insulins is customized to the individualized context of each physician-patient interaction, and is based on numerous complex variables, including physician knowledge and perceptions of insulin analogues, patient lifestyle concerns, and resources. The implications of the findings in the current study are important, especially regarding attempts to standardize insulin usage through guidelines. Guidelines are seen as only one of a number of tools and variables in deciding how and when to use an insulin analogue. This study provides the first qualitative analysis of insulin prescribing in Canada, and offers a unique perspective of physician perceptions and insulin analogues usage for the treatment of diabetes in Canada. The conceptual model of 'finding a fit' between an insulin and the patient provides a new and intriguing metaphor for insulin prescribing, with clinical applications in the family practice setting. The model also provides important insights for policy makers and professional associations involved in the development of diabetes guidelines.

INTRODUCTION

Evaluations of Insulin Analogues in the Literature

For less than a decade, insulin analogues have been available to be used in combination with, or as replacements for, human insulins, providing new treatment options with type 1 or type 2 diabetes. Several recent reviews of randomized controlled trials comparing regular human and analogue insulins have concluded that insulin analogues should be used in clinical practice, and have advised physicians on the appropriate protocols.[1-3] However, while another reviewer, Gough, agrees that most individual studies do report advantages to analogue usage, these advantages are minor, at best.[4] This is consistent with Cochrane and other systematic reviews focusing on long-acting[5,6] and short-acting[7,8] insulin analogues, which have shown only minor benefits when compared with human insulins.

Current published research has also questioned who is conducting the research on insulin analogues, and how the research is being done. The biased structure of some industry-sponsored studies of insulin analogues is currently being debated, with concerns that the benefits of insulin analogues may be exaggerated in some studies.[9] Other research has been investigating limitations with economic analyses performed by government agencies, such as the United Kingdom's National Institute for Clinical Excellence that compared insulin analogues to each other and to regular insulins.[10]

Rationale

Exactly how physicians are interpreting conflicting research results and economic analyses is unknown. A thorough search of multiple scientific databases has revealed that there has been no research to date that shows how physicians perceive and prescribe insulin analogues.

Simpson *et al.*[11] suggest that even if metabolic and clinical benefits are negligible when compared to human insulins, the convenience and flexibility of the insulin analogue injecting schedule is particularly appealing for physicians dealing with patients who have non-routine lifestyles, unpredictable eating, and poor exercise habits. This suggests that physicians may be making individualized treatment decisions based on issues other than research evidence and economic analyses of insulin analogues. Results of a recent survey of 886 physicians treating type 2 diabetics in the US found that the medication choice for these physicians was based much more on their qualitative assessment of patient psychosocial factors (expected adherence, fear of injections, motivation) than on evidence-based guidelines and quantitative clinical factors (e.g., hemoglobin A1c as a long-term indicator of blood glucose levels, weight, and age).[12] The authors recommend that further qualitative work be undertaken to increase our understanding of the complexity of medication choice and insulin initiation for diabetes treatment from a physicians' perspective.

Objective

The objective of this study was to foster an understanding of how insulin analogues are currently being prescribed and used in Canada, and to describe physician beliefs and perceptions regarding these agents. The study findings are contained within this Current Practice Analysis Report on insulin analogues, produced for the Canadian Agency for Drugs and Technologies in Health (CADTH).

METHODS

Study Design

A qualitative research design was used. Grounded theory has been shown to have scientific rigour in the exploration of chronic illnesses in general[13-17] and specifically in diabetes[18-21]. Grounded theory aims to develop a substantive theory, in this case to describe how physicians' beliefs about insulin analogues affect the initiation and choice of medications in the treatment of diabetes. The scientific credibility of grounded theory provides data that can be easily communicated and shared with physicians.[22]

Study Implementation

An initial recruitment letter, signed by this study's principal investigator, was faxed to each prospective physician participant (Appendix 1). A fax-back form for interested physicians was included with the letter. Upon receipt of a completed fax-back form, these physicians were contacted by telephone to confirm their interest in participating (Appendix 2). If they agreed to participate, the consent form was sent for them to sign (Appendix 3). The principal investigator – an experienced, trained interviewer (who is not a physician) – conducted all of the interviews (Appendix 4). Each interview was expected to take approximately 20 minutes, and was audiotaped. Written consent was obtained before the interview, and verbal consent was recorded at the beginning of each interview. Each participant was offered a $100 honorarium. The interviews were transcribed verbatim and the resulting transcripts were cleaned to ensure that all identifying information had been deleted.

Ethics

Brock University's Research Ethics Board provided ethics clearance before the study began (Brock University Research Ethics Board File 06-374 COSBY). All participants received a signed copy of their consent agreement. All identifying information was removed from disseminated study materials. All the interviews will remain confidential and only members of the research team will have access to the transcripts (following transcription on an anonymous basis). Participants were informed that they could withdraw from the study at any time and that all identifying data obtained from them would be removed from the study. Data from this study will be kept on a password-protected computer and all study materials (including audio recordings) will be stored in a locked cabinet in the research office. Only research team members directly associated with this study will have access to the study data.

Data Collection

Individual telephone interviews were conducted with general practitioners, family medicine physicians, and endocrinologists who prescribe insulin analogues across Canada. An interview guide was developed, based on the scientific literature available, expert opinion, and consultation with CADTH staff members. An outline of the 'initial interview guide' is included in Appendix 4. As interviews were conducted, the questions that were asked changed to reflect emerging themes that required further exploration.[22-24]

Sampling Frame

Organizational factors such as geographic location (i.e., urban versus rural, provincial health insurance), type of practice, level of insurance coverage of population served, and linkages to secondary/tertiary care teams can all impact the capacity and quality of diabetic treatment decisions.[25-27] A maximum variation sampling procedure was used with the intent to capture physicians that vary in these organizational factors.[28-30] Physicians from every province and territory were invited to participate in the study. An attempt was made to

access at least one physician and/or endocrinologist from each province and territory. A contact list of physicians was generated using MD Select, the Canadian Medical Directory master-file of physicians.[31] The MD Select is a comprehensive Canadian database, maintained and updated from over 20 accredited sources, and representing 99% of practicing physicians in Canada.

Analysis

Grounded theory analysis was used to categorize the data and develop an inductive theory from the qualitative data (Strauss and Corbin, 1994).[32] The author used manual sorting for this data set, as computer software for qualitative analysis is not required. Manual sorting can offer numerous advantages, including the ability to move beyond the restrictions placed upon an individual analysis through the use of software that has been standardized for all qualitative research, rather than targeted to specific types of research.[30,33] The rigour of the study was enhanced by using a number of measures.[34] One person conducted all interviews, reducing variability that can occur when different people are involved with data collection. A pharmacist then reviewed the data.

RESULTS

Participants

The sample included 22 physicians (17 family medicine and general practitioners, five endocrinologists) from seven provinces – including British Columbia, Alberta, Manitoba, Ontario, Quebec, Nova Scotia, New Brunswick – and the Northwest Territories. Nine participants were female, and the sample included physicians who graduated from medical school from 1981 to 2005. The table below provides additional information on the demographics of participants, the types of diabetes patients the physicians typically treat, and the level of usage of insulin analogues in their practice.

Table 1: Descriptive information regarding participant demographics and insulin use

Location	70% (15/22) were located in urban centres
Practice Type	41% (9/22) were located in private single/group practices only 36% (8/22) saw diabetic patients in a mixture of practice settings 23% (5/22) were located in academic hospitals
Patient Type	72% (16/22) saw mostly adult diabetes patients 14% (3/22) saw mostly senior diabetes patients 9% (2/22) saw mostly pediatric patients
Health Plan Coverage of Insulin Analogues	63% (14/22) stated that some of their patients had coverage 22% (5/22) thought most patients did not have coverage 13% (3/22) stated that 'most' of their patients did have coverage
Switching to an Insulin Analogue	78% (17/22) personally switched at least one patient to an insulin analogue 23% (5/22) have only had switches to insulin analogues done by an endocrinologist
Initiating Insulin Treatment	90% (20/22) personally initiate insulin with at least some of their patients 10% (2/22) never initiate insulin with a patient

INTERVIEWS

All interviews were conducted by telephone, at a time best suited for the physician. Seventy per cent (70%) of the interviews occurred during regular working hours (e.g., 8 am to 5 pm), and 30 % occurred before or after normal working hours (6:30 am to 8 am, and 7:30 pm to10:00 pm). All participants were informed that the interview could be completed in 20 minutes. However, when the interviewer would inform the participants that the 20 minutes had been reached, 14 of the 21 participants requested time to make further comments. Thus, the average interview lasted 27 minutes, with a range between a minimum of 15 minutes to a maximum of 38 minutes.

A semi-structured interview guide was used during the interviews, but was continuously modified to accommodate the emphasis of discussion that each participant chose to follow. For example, one participant spoke extensively about the cost of the insulin analogues, while another participant spoke extensively about various new innovations in medication delivery methods. The nature of qualitative research is to allow participants as much scope as possible to express, in-depth, the issues that they feel are most relevant to the topic at hand.

Data was collected until saturation (repetition of themes) had occurred. In this study, saturation occurred at approximately 17 interviews, but an additional 5 interviews were conducted to contribute to the richness and geographic variability of the study. Typically, saturation occurs between 20 to 30 interviews for grounded theory studies.[22] In this particular study, the topic was narrower and focused on insulin analogues, and thus one would expect saturation to occur sooner.

FINDINGS

Main Theme: Finding "the Fit" Between the Insulin and the Patient

The main theme in this study was finding "the fit" between the insulin and the patient. All but one participant felt the analogues were useful; at least, in some situations. While some physicians found that the analogues fit well with their practice and were easy to adapt, other physicians are still struggling to figure out how the analogues fit, and a few who feel that the current insulins they are using already fit well enough to do the task simply do not see the point in changing over to an analogue. The impact of the various subcategories in this analysis all hinge upon physician perceptions of how an insulin analogue fits into their practices of medicine.

The Metaphor of "the Fit"

Choosing the right fit in an analogue can be likened to purchasing a new shirt. Although a shirt may have all of the correct measurements for a given body type, that shirt still might not be a perfect fit. Even if one individual feels the fit is good, a person with a similar build may not. Similarly, it seems that physicians attempt to fit an insulin with a patient, looking to a variety of qualitative variables. These variables, if not properly aligned, will be felt to provide a poor fit. Finally, a shirt that might fit a person this year will not necessarily fit that same individual next year. Similarly, patients might experience significant clinical and lifestyle changes in a given year, or might simply change their minds and request a new fit.

Static Qualitative Categories

Finding "the Fit" Between the Insulin and the Patient

Perceptions of the utility of analogues and knowledge sharing

- Utility of analogues (A1c versus hypoglycemia)
- Knowledge of analogues (perceptions of evidence, physician education)

Patient factors

- Patient beliefs
- Patient resources

Analogues use (prescribing)

- Team (physician referrals, physician resources)
- Initiation of insulin
- Switching insulins (from traditional insulin to analogue)
- Adjusting insulins

Three Main Factors that Weave into "the Fit" Metaphor

In qualitative analysis, there can be different types of subcategories in an analysis. There are subcategories that can be isolated as separate but linked entities, and subcategories that weave throughout all of the static subcategories. In this particular study, there were three subcategories that wove throughout all of the static subcategories, that were discussed by all the participants.

Three Main Factors that Weave into "the Fit" Metaphor

Finding "the Fit" Between the Insulin and the Patient

Unique Decision Strategy: First, all participants discussed how prescribing insulin analogues utilizes a decision making strategy that is qualitatively different than decisions about most other medications.

Tailoring Decisions: The second consistent aspect of discussion found in all of the interviews was the terminology embedded in describing the decision making process used in prescribing insulin analogues. The term "tailoring to the patient" was used in some context by all participants. This same context included words such as "customizing", "patient-focused", "adapt", "adjust", and "responsive".

Finding the Fit is a Process: With the advent of the insulin analogues, diabetes care is no longer a single decision point for the patient or the health professionals involved. It is a care process that allows patients and caregivers to adjust and adapt as needs change. (Similarly, a shirt can be tailored and re-fitted to address changing styles and needs.) Words used to describe this concept included "evolving", "updating", "process of care", etc.

Main Theme Quotes and Overview Quotes

In the next two sections of this report, longer quotes will be cited to illustrate the main theme of finding "the fit" between the insulin and the patient. Overview quotes of statements that were commonly shared among the participants will also be provided, with an emphasis on understanding the facilitators and barriers to finding a fit between the patients and their insulins.

Main Theme Quotes: Finding "the Fit" Between the Insulin and the Patient

The main theme quotes provide longer versions of various statements that speak directly to "the Fit" theme. Almost all participants discussed, in some variation, fitting the insulin with the patient. The quotes selected below have been chosen to emphasize various aspects of finding a fit.

Finding the Fit: "Taking insulin is all about how you want to live and what you're willing to put up with. You know, you tailor it to the family, you tailor it to the person, and you now certainly try to tailor it because they have to do this every day, and it's a huge pain, so you try to make it as acceptable to the family or to the person, or to the parent or the teenager so that they will actually take their insulin. By and large, the analogues are an improvement over what we've had before in some ways, in many ways, so when you're moving a patient to an analogue, you're usually doing them a favour because you are trying to fix something that they don't like. Like the fact they are having lows in the nighttime, having to eat lunch on time every single day. It's finding a fit, tailoring the fit to the person." (D3)
Finding a Fit With Families: "I think it really varies. Some people are very nonchalant about it and I'm more worried about them. And others seem to go into a panic when their sugar hits 3, which is not necessarily anything to worry about, but they are quite worried about that. So it really varies. I know one patient in particular, his wife could never sleep at night because her husband could be confused, drenched in sweat, or comatose and so particularly with her, as we're trying to achieve tighter control, I think we're getting more of these patients coming in with hypoglycemic events." (D19)
Finding a Fit with Teenagers: "Instead of using Humulin-R, should we use one of the rapid analogues? Because maybe this kid doesn't eat so many snacks, or maybe they go to bed right after dinner. So we may start a kid out on rapid-acting insulin right away without really discussing it with the family, just saying, "Here is the insulin that we would suggest for your kid and this is the way we think." So we don't tend to still start kids on the long-acting analogues and the multiple daily injections. Lots of places do. We still don't for a couple of reasons. Mostly because most people with type 1 go into a honeymoon phase for the first year or so, and they can get by on two shots a day or three shots a day of insulin with perfect blood sugars, so we try not to make things too complicated at the beginning. We may do it for a highly motivated teenager; say, "You know, if this is what you want, let's slap you on the long-acting analogues; take a rapid-acting analogue with every meal and we'll teach you how to do that." But we tend to keep things simple at the start and then after a year or so, let them help us decide how to make it more tailored to them as they're coming out of the honeymoon stage. So parents often will come like that. But they've also heard that their auntie does it this way; you know, she takes Lantus every day and then Humalog every time she takes a meal, and that works great for her and she has all this flexibility. So, you know, families often come with educated opinions, as well, and just say, "You know, I'd like to try that way of taking insulin or whatever" and then, of course, parents talk to each other – "My kid did this and when we switched to this, this is how it worked." Parents will come to us and say, "Can we give this a try?" and we will often say, "Sure. Let's try it if it sounds like it's going to make sense for your kid." (D16)
Finding a Fit With How the Patient Wants to Live: "The most major influence on the choice of the insulin therapy – I would say, it's the patient; so, matching the insulins to the patient, the way the patient wants to live. Getting them on insulin, a lot of time, is the biggest challenge, and if you keep the patients happy, they

will pick their insulin, they will take the right dose of insulin, and they will measure their blood sugars, and that's really going to be the best way to prevent the problems of diabetes – keeping patients happy and doing something that works for them. Doing something that they can afford. And again, I think a lot of times the bottom line is always what's the A1c and they don't think about hypoglycemia and they don't think about quality of life, and hypoglycemia hugely affects their quality of life. So, those are just factors that they really have to put in there." (D17)

Comparing Different Patients With Different Fits: "Well, I figure if I need the analogue, part of it, to get control, then I would just probably switch to a multiple daily injection. So I usually reserve the pre-mix for, like, an older type 2 [patient] that has a pretty regular regimen of diet and schedule and all that kind of stuff, and maybe then I'm not aiming for tight control for whatever reason. Or, somebody who I don't think has the intellectual capacity to handle multiple daily injections. I guess it would depend on whether or not I actually thought they were stable and well- controlled, and it would depend a little bit, as well, on drug plan coverage. So, if they had a private drug plan that would cover the cost and they were interested in doing it and they were the ones requesting, it then I would give them the option. If they wanted to try it, I would help them out." (D22)

Patient Resistance to a New Fit: "This afternoon, as a matter of fact, I had a fellow who arguably should have been on insulin therapy five years ago and continues to resist the idea despite the fact that I've explained to him on numerous occasions the dire health consequences of inadequately controlled diabetes. Oh gosh, probably every two months or so, every two to three months, I would see him on an ongoing basis. His most recent A1c was 9.9%. I guess I see him about every three months because I reviewed with him his last four A1c's over the period of the last calendar year and the best that he ever was at was about 8.4 or 8.3%; but, you know, he just resists the whole idea of going on needles. It's become relatively easy to meet targets with respect to blood pressure with respect to lipid profiles, but once you've maxed out on the oral therapies, there aren't that many other options at this point. So, yes, it is very frustrating." (D7)

Patient Frustration and Readiness for a New Fit: "I think you have to select your patients, and I think that everyone probably at some point reaches a stage where they're ready for the analogues. And they're happy they've been on traditional insulins forever, but their A1c is gradually creeping up and I offer it to them as a way of improving control, but if they're not ready to change, they're not going to switch. People have to be willing, I think, at a point in their diabetes when they're willing to take more control, test more frequently and just be, I don't know how to describe it...just be overall more involved in their care. I'll give an example. I can actually think of a particular patient: a type 2 who's been on NPH at bedtime with metformin and maximum glyburide, and they've been on that for a long period of time. Their creatinine is creeping up, I have to stop the metformin, I know they're not going to be well-controlled without it and, at some point, we have a conversation that's okay, what are we going to do, we can't use oral agents plus and at bedtime. Are we going to jump right to a basal bolus regimen, which, you know for me, would be either b.i.d. with Humalog or NovoRapid, or Lantus with Humalog, or another rapid? Are we going to jump right to that, or are we going to mess around and do Humulin-R and Humulin-N or 30/70 b.i.d. and try to get them used to taking insulin more than once a day and then finally go to what we know is actually going to be the most flexible and ultimately probably the safest regimen? So that's a conversation I have with quite a few patients, actually, and I've recently had it with one when I said, "Look; you're going to have to come up here, learn to do your carb counting, get comfortable with the idea of a very rapid insulin and how it's going impact on your life. You'll have to do that or we can go ahead and do our best with these other things that might last us for a while, but are not ultimately going to be the best regimen for you." I've found that my more educated patients say, "Look; I'm ready to learn, I'm ready to do what I want. If I'm going to have to give myself shots more than once a day, I may as well go with four times a day and get this right the first time." So, those are patients that I would actually switch from oral agents with Humulin-N at bedtime right to a basal bolus regimen, right into it. So I find that it's a different level of patient acceptance. A lot of it

depends on the education of the patient. I mean, I have patients who are civil engineers and I have patients who are illiterate, and I want to offer them both good control. It's obviously going to be a little bit harder if someone can't read the instructions; say, patients from other cultures who might not speak very much English. So, that's sometimes a barrier and might sway me. I think, also, if the patient is actually frustrated with where they're at, that's a great tool, because if they're frustrated with their blood sugars, it means they're checking." (D2)

Overview Quotes

These are longer quotes that succinctly capture many of the issues described by physicians in the study. Note that the quotes balance many different decision factors, including physician comfort and knowledge with analogues, as well as patient beliefs and expected compliance.

Finding a Fit is Not Always Evidence-based: "Predominately because, so a couple of reasons for the long acting analogue, even though I know the literature doesn't support it, thinks the predictability and lack of variability is key and I think that can only, I mean people who don't manage people with diabetes don't appreciate that. So I've had long discussions with the guy who runs our formulary for the hospital about this; he's a cardiologist, he doesn't manage people. The risk of nocturnal hypoglycemia to him is not a big deal and the predictability, you know, the better predictability and ease of getting good control, he doesn't get that. I think people who don't prescribe insulin regularly don't understand the importance of that. The second is obviously the lower risk of nocturnal hypoglycaemia, and I definitely have seen that and the patient satisfaction is phenomenal when I switch them over from NPH to especially Levemir, but also Lantus. They just come back saying, "I can't believe how much easier it is and how much better my sugars have been since I switched over." These are not just people that I've necessarily seen once and there's other things that we might have done in terms of their diet and carb counting and stuff. These are people that I've had for five years in my practice, but once these insulins became available and we got them switched over, they just come back raving about them so.... I mean it's so difficult to have diabetes anyways and to have insulin that 44% of the time doesn't work the same way that it did yesterday is so frustrating for them. You might take a bunch of random diabetics at a diabetes clinic and try to put them in a clinical trial and you may not get any benefit, but I think in real life they do make a difference." (D11)

The Main Facilitators and Barriers to Finding a Fit: "Locally, we have really good pharmacists who are trained diabetes educators and I think they are definitely an asset to family practice; especially for someone who is insulin naïve, to initiate them on insulin. Often these are elderly patients who do not take very well to change. It really is useful to have somebody who can sit down for a good hour or so and answer all their questions and go over that without us having to necessarily go over all the details of starting insulin. So, we have some good pharmaceutical diabetes educators that can go over with the patient initially what we are planning on doing, and then [we] call that pharmacist and send the patient directly there for further education. Almost always, the patient ends up having a whole list of further questions once they arrive there. For us, it's definitely facilitating, to initiating insulin, to have access to those diabetes educators at the pharmacy, as well as the diabetes education clinic for dietician access and further controls. Usually, by the time you are starting them, they have already gone through that program, though. Some of the hindrances are always compliance; patients are somewhat needle-phobic when it comes to starting. I have a patient right now on the brink of needing it, he's in his early 70's, his A1c is hovering around .076 and he can't get lower. It's not too bad, but I've told him I'd rather have under .07. He's been trying for the last six months to get it below that and he can't on maximal oral therapy, but he's also now going to start insulin, so, technically, he probably should be given a little bit of insulin at night, but he's resistant; so patient resistance is a hindrance." (D12)

Physician and Patient Frustration with the Current Fit: "[For me, it's] the type of patient where I have

sort of tried the regular insulins and it's not working, and I am confident that it's not anything that they are doing; that they are compliant and reliable and doing everything that they can, and this is the nature of their disease that they need something that is a bit more consistent, a little bit more predictable in terms of it's absorption and the pharmacodynamics and all those types of things. It would be that type of scenario – where I have tried them on [the regular insulins], I am confident they are doing what they should be doing, they are on the insulins I am used to using, and I am getting these sugars that are quite variable. It is frustrating for me, frustrating for them. And then I would try something which would probably require more injections, but I would feel more comfortable; it would be more likely to be physiologic and make them feel better, because a lot of time the patients themselves are very frustrated. They don't understand what is going on, they think they are doing everything that they should. Once they get into it, [once] patients get into monitoring their sugar, they really get quite upset when it's up and they are doing everything that they can...It is the day that they think they are doing everything right and it's not right and I don't have a good answer for them, either, [that] it is frustrating. So I think that it would certainly be in those types of scenarios that I would feel very comfortable trying an analogue as an alternative." (D16)

The Fit Model and Subcategories

In this section of the report, the emphasis is placed on outlining the subcategories that describe the main theme of the analysis. After each paragraph summary, several shorter quotes are provided as examples of the subcategory.

Perceptions of the Utility of Analogues and Knowledge Sharing

For participants, the first step in determining the fit of an analogue with their practice was based on their perceptions of the analogue. Physicians judged the overall utility of the drug, sometimes admitting that their knowledge was limited. All but one of the physicians interviewed perceive insulin analogues to be useful medications for treating diabetes. The main benefit they all discuss with the long- acting basal medications such as Levemir is the reductions in hypoglycemia, especially at night.

Seeking Information: "Before, I would say a few years ago, I could just refer them away and they could get started and get on their insulin. But now, I think we are seeing that it's probably just too much of a burden even for the endocrinologists to do it all, that we have to do it and are going to have to do it more and more. So I think the onus is on us to try to get more information, so I kept looking for more information about starting patients on insulin, and keeping patients on insulin." (D2)

Analogues are Useful but not for First-line Treatment...Yet: "Not as a first-line, I haven't seen enough to suggest that that an analogue should be a first-line. But, I wouldn't dismiss it if what I tried didn't work. But, I am still not at that point where I would be using an insulin analogue as a first-line. I would still be trying what, for the most part, has worked, and it would still be more of a second-line for me, not a first-line." (D13)

Why Analogues are Being Used More Often: "I think more information, more comfort, and you know the local specialists using those products, as well. I think, to some extent, there's a little bit of increased comfort in the reduced side-effect profile as far as hypoglycemia, so initiating a long- acting insulin is starting to become more involved as opposed to using the shorter-acting analogues." (D19)

Analogues are Usually Effective: "I think so, and I think the patients seem to be controllable a lot better, too, in terms of their sugars, and seem to have fewer side effects, and less weight gain, I think, is a big thing with the insulin analogues." (D17)

Although all participants felt that the analogues were useful medications, their knowledge can limit how often they will use an analogue. Their own personal knowledge seems to be directly linked to the comfort level they have in using an analogue. ("So, it's essentially a comfort, because I find that initiating insulin is always an uncomfortable thing for the patient and for me.") They all described the importance of endocrinologists in the community as knowledge leaders in new medications, as well as the need for more physician education that is appropriately targeted towards their specific information deficits.

Need for More Education Regarding Analogues: "I'm not as comfortable with the longer- acting ones even though they are once a day. I don't feel as comfortable adjusting them because there's no rapid-acting component and, to that end, I feel, probably erroneously, that the person would need both the long-acting one and then the short-acting one if their sugars spike up to 15 after eating, so it would just complicate things for the patient for me to do that. I have used them in people who have been very stable for a long period of time, or specifically asked, and patients who are really comfortable with their insulin, with taking insulin, I will switch them to something like that...Lantus. I think I've used Levemir once but I don't remember the dose. Again, it's my ignorance of how to do it that prevents me from doing it, too." (D9)
Endocrinologists as Leaders in Analogue Use: "For me in my practice, number one, it is the endocrinologist, what they use, what they do, in talking with them, discussing cases or just seeing people that they look after and seeing what happens in the hospital. That is true for most of what I do, actually. I have a subgroup of specialists that I have a lot of confidence in." (D7)
Changing Use and Knowledge of Analogues in Past Two Years: "I would say there is some shifting occurring in our insulin prescriptions in the last couple of years; that we are starting to use more of the 24-hour, the long-acting insulins like Levemir and Lantus, and more so, as we are becoming more educated in their use...more information, more comfort, and you know the local specialists using those products, as well. I think ,to some extent, there's a little bit of increased comfort in the reduced side-effect profile as far as hypoglycemia, so initiating a long-acting insulin is starting to become more involved as opposed to using the shorter-acting analogues." (D4)
Endocrinologist View of Insulin Knowledge and Use: "If they do start insulin, they either start just neutral protamine Hagedorn at bedtime or they start b.i.d. 30/70 pre-mixed. I've given a few CME [Continuing Medical Education] things to GP's about starting insulin but more so, obviously, in type 2, and tried to teach them how to do that, but they usually send them on. Even emergency doctors are sending them on without starting them on insulin. So, I don't know, I think they're probably afraid of insulin in general, no matter what kind it is, and they don't know how to start it. It's not necessarily just the GPs, either. We get consults in hospitals even from medical services about insulin, by internists that should be able to do it, but they don't. So, I think insulin is a little bit of a scary black box for people." (D6)

Because they perceive the analogues to be useful medications, all the participants described their efforts, over the past year or two, to increase their knowledge. However, all the GP/family medicine participants noted that they still feel the evidence does not reflect their needs in prescribing analogues in the real world clinical setting. In fact, in the category "Analogue Use", it will be seen that physicians approach analogue use based on a team approach that involves a variety of experts in the treatment decisions, and the reliance on this team approach allows physicians to share the knowledge responsibilities in this challenging area of prescribing.

Evidence Deficit for Real World Prescribing: "I actually find, when I switch people over initially, their A1c goes up, because you get rid of a lot of the hypoglycemia, especially the nocturnal hypoglycemia that may be unnoticed. So, they're having less lows and their A1c's actually go up a little bit until you can work a little bit more on the carb counting and stuff to tighten them up that way. It's interesting because I have a Master's in epidemiology so I've been brought up on evidences-based medicine, and you shouldn't do things if clinical trials don't show any benefit kind of thing. But in this one instance, I don't listen. I mean, you have to, to some extent, but it doesn't bother me that the clinical trials don't show a decrease in A1c when I've used them and generally I wouldn't be of the mind to say, "Well, anecdotal evidence," but I think it's overwhelming in my experience that they're better. Just that I would say that everything that I've said stands in terms of the lack of evidence about the clinical effect. I think what happens is without coverage for all of these agents, without good coverage from Ontario Drug Benefit and Trillium, we've got a whole second class, a whole bunch of second-class citizens with diabetes that are getting suboptimal care compared to people who have drug plans. That stands for a lot of drugs probably, as well, but especially in this case. There are people that are being denied access to drugs that they would benefit from and that would really improve their quality of life by not having them covered, and I think that they should be covered." (D12)

Lack of Evidence to Support Switching to an Analogue: "I haven't seen a lot of evidence from the literature that shows that Levemir and Lantus are better than regular insulins in terms of providing better control of their diabetes." (D8)

Physicians participating in the study varied in the ease with which they were able to access tertiary care facilities. Even though most physicians may have access to a diabetes treatment team (e.g., pharmacists, nurses, volunteers), physicians in areas without easy access to tertiary care could not rely as much on "knowledge sharing" with an endocrinologist. This does not mean they use insulin analogues less often, but that they must be more engaged in all aspects of insulin usage. Interestingly, these physicians seem to be the strongest advocates of insulin analogues, although as the second following quote shows, the lack of the ability to knowledge-share in rural areas can seriously impede analogue use.

Rural Experiences with Analogues: "My colleague here really taught me how to use the analogues because I wasn't comfortable with them, I didn't really understand, so honestly I didn't understand how they could be used to correct high blood sugars and what to do. I had to learn because it's over a thousand dollars every time a patient goes down to the city – the accommodations and the appointment. We have a catchment area of 40,000 over about 4,000,000 square kilometres. We probably count primarily as rural. Our primary access is a flight away; you can't just drive there, so, for most diabetes management, it's pretty much us. The analogues, learning to use them, freed me up, gave me so much more to work with the huge variety of patients I see. We have a diabetes education program with a full-time nurse and a full-time dietician, and they travel to other communities and they also do diabetes workshops. So, I actually share my diabetic patients very much with them and I'll ask them to do things, they ask me [to] see patients, and there are times when we do formal clinics together when people come in from all over. Since we don't have any endocrinologists, the workshops are primarily type 2's because there are so many, and they try to group together older aboriginal men and young white women, that kind of thing, just to keep people talking with their peers. I see a lot of pregnant women with pre-existing type 1 or type 2 on insulin, and we have quite a number of type 1 patients." (D15)

Lack of Knowledge Sharing Impedes Analogue Use: "When you have exhausted diet, exercise, and metformin, and it has finally resulted in suboptimal, prolonged suboptimal, questionable control, it's at that point that either supplementation with something like an insulin analogue on top of a metformin, for

example, or using an analogue alone as a substitute for those things, seems to be the right thing to do. That seems to make the most sense to me. A barrier to starting for me is the lack of multi-disciplinary personnel within a short reach from where I'm doing things. So, I have no difficulty in starting people on insulin therapies and have done so, but the practical impediments of teaching people how to use the needles, and mode of administration, and that sort of thing, is typically performed in the realm of a diabetic education centre, and most of the diabetic education centres are usually closely linked to an endocrinologist. That's why I usually exhaust every possible avenue first before I use an analogue." (D17)

Patient Factors

Patient beliefs are a critical factor in physicians' decisions to initiate, switch and/or adjust insulins. With the advent of so many new medications to treat a variety of chronic illnesses, diabetic patients are commonly at risk for drug-drug interactions, requiring extra time and care. This is further complicated by the patients' economic situations. Some analogues are covered only through limited use and special authorization programs in various provinces, and most of the physicians participating in the study noted about half their patients do not have private health insurance.

Cost Reduces Use of Analogues: "Look, I love insulin analogues. If they cut the price, I'd use a lot more. They are unaffordable, unattainable to most of my population base, unfortunately." (D11)

Cost Reimbursement and Choosing an Analogue: "Well, the kids that we see have to go on insulin so not taking insulin's not an option. I think, initially, because reimbursement is also crappy in BC, Humalog and NovoRapid is still not covered beyond the cost of regular, Lantis is just now covered for 17 and over with a note from the doctor, and Levemir is still not covered at all. So, we have consider the cost to the patient. As time goes on, we've less thought about the cost for NovoRapid and Humalog because if we really need them, we can just get compassionate supplies from the company." (D3)

Being a Healthy Diabetic is Expensive: "If you want to eat healthy, it's more expensive. You want to get into an exercise program, you got to pay for them, so we don't often think of that. We just sort of think medications are covered, but in this part of the world, you want to eat a healthy diet in the winter, fruits and vegetable. I have a lot of patients saying it just becomes too expensive to eat that well in the winter. Or with exercise, you want to join a gym. I try to tell them they can go outside, but people that have more access to funds tend to be able to get certain things a little bit easier." (D1)

Having a Drug Plan Significantly Increases the Likelihood of Using an Analogue: "Most of the time I'm starting patients on HS insulin, and a lot of the time, if the patient has a drug plan, I'll start them on the Lantus or the Levemir before the NPS, because I think there's less hypoglycemia and less weight gain with that. I think it gives you a smoother insulin. So, I think my preference now is to start those at night for the HS. I start the HS insulin for them and try to get their fasting sugars in the morning down below 7 that way." (D2)

Many participants, especially the endocrinologists, argued that formal policies and guidelines focus too much on A1c levels rather than the ability to increase control of nighttime hypoglycemia. There was a very strong feeling that future policy changes must include recognition of patient concerns of hypoglycemia over A1c levels.

A1v Levels versus Hypoglycemia: "And you know there is the cost factor, but again, most people at that point are willing to shell out the bucks, even if they have to pay cash for it to fix overnight hypoglycaemia; that is a huge stress for patients. Just as an aside, certainly in BC, this is what happens. But I am sure this is what happens with the federal government, too, is that when they're thinking about government paying for these medications, they always look at the A1c's as the bottom line. This is it, does it get the blood sugars better now, but they never ever think about hypoglycemia like they should and hypoglycemia is much more of an immediate concern to families because they don't want their kid having a seizure in the middle of the night. Yeah, they don't want their kid to get eye problems down the road, either, but the hypoglycemia is more the one that freaks them out. I mean, we have been using Humalog and NovoRapid since they came out. Between the rapids, I don't think there's a difference. I think they seem to work exactly the same. There is some indication that NovaRapid maybe has more of a tail than Humalog does but I don't... we really don't notice a great benefit one way or the other between the two." (D3)
A1c Should Not Be the Only Reimbursement Consideration: "I know a lot of the clinical trials haven't shown benefit in terms of A1c. A1c is not everything I think of when I'm trying to get control. Predictability, risk of hypoglycemia...[it is] predictability, I think, that leads to quality of life in a way, in that the patient become so frustrated with trying to manage their diabetes. If they can at least now have a better idea of how the insulin is going to work, they can manage it better. So, fear of hypoglycaemia, I think, is a lot of what drives me towards using the analogues versus the old ones. You know, there is literature that I'm sure you're aware of that shows that fear of hypoglycemia is actually a bigger concern for a lot of patients taking insulin than the fear of blindness and renal failure." (D7)
Government and Industry Policies for Analogues: "I think it's a very small subset of people who actually end up benefiting from it, the people who have a lot of hypoglycemic episodes, and it seems to decrease that. The challenges with it is it's very expensive and no almost no drug plans cover it, and so, you know, it becomes an issue of the drug companies providing it compassionately, or only with very good drug insurance programs that actually cover it. But I do have a few people on it." (D8)

Using Insulin Analogues

The use of insulin analogues is guided by how well the analogue fits with the physician's practice of medicine. Physicians discussed different phases of using analogues, each with its own fit issues. These included the initiation of insulin, switching to an analogue insulin, and adjusting existing insulins. Depending on the resources available to physicians, they may have little involvement in the overall use of insulin analogues (i.e., if they have access to an endocrinologist), or they may look after the entire spectrum of insulin care for the patient, along with their diabetic care team.

Adjusting and monitoring ongoing insulin use requires a complex team approach. Physicians take full responsibility for prescribing care once an analogue is initiated, even if they are not that comfortable in initiating these medications themselves. A point of referral is reached when adjustments are not having much effect, and the physician feels the endocrinologist may need to reassess the prescription. This team approach, although lauded for many advantages, also brings some disadvantages. With workloads in diabetes care continually increasing, physicians are finding that there are more and more delays in setting up patient appointments. Some physicians speculate that this not only has a clinical outcome for the progress of diabetes, but also affects patient perceptions of their own disease. If it requires three to six months to receive care, patients may assume that constant monitoring and adjustments to their regimen of care are not very important.

The Team Approach to Finding a Fit: "We better tailor insulin to the patient, and they're always asking about stuff like that. And they learn more from their local diabetes educators, as well, because the diabetes educators are really the ones that end up putting a lot of people on insulin and switching a lot of people over and doing that kind of stuff." (D3)

Teams and Referrals: "We have an endocrinologist three hours away. I'll often phone them and refer to them. Usually it's the nurse educators I'm using – they're nearby, fh-hour away – just because they're much more accessible. We've got interns in the nearby city, as well, but they're hard to get into and I find the nurse educators know as much as they do, quite frankly, and they're quite practical with things, as well." (D5)

Delays in Referrals to a Team: "It takes so long to get the patient in to see the specialist. Sometimes, it could be up to six months to get the patients in, which I think really is too long. Most of the patients should be started on insulin a lot sooner. I think there is a clinical problem. I think they have more complications long-term the longer that their HgA1c isn't at target, their sugars aren't well controlled. I think, also, psychologically often at some point in time, a lot of patients are reluctant to take insulin, and then at some point they get to a point where they are agreeable to it and then if they have to wait another six months before they actually start it after they get to that point, there is, sometimes, psychologically, more of a difficulty getting them to go onto the insulin. They say, "Well, if it's six months, it can't be that important."(D2)

Insulin initiation is time-consuming for the physician, often occurring over a period of several months of meetings, using motivational techniques to encourage patients to change to an insulin therapy. This process also requires the set-up of a care team, and the development of a partnership with the patient that links up constant monitoring and data flow for the first few months between the care team and patient.

Delaying Treatment to Find a Fit With Patient Reluctance: "Most patients that I end up putting on insulin are reluctant. It is always, "Give me three more months, I'll try harder, I'm going to exercise more, there is always something that I can do better." Yes, only because of the fact that I would rather them be committed to it when they do it, and, obviously, diabetes is a life-long issue, so whether the next two or three months is going to have no impact on them overall, unless they are running 20 or 25 and they are at risk for hyperglycemias... in the long run, in terms of what you are trying to accomplish, three months is not going to make a difference. Whereas, if the patient clearly understands and is committed to what they are doing, you are more likely to improve compliance. To me that is a trade-off. And again, part of it would depend on whether I am looking at long-term issues or short-term issues. I mean, if they are coming in and their sugar is 20 to 25 and they are very symptomatic and I am really worried that they are going to have real problems, then I might really push it. But, if they are running 14 to15 and they don't particularly care or understand, then I would spend more time getting them to understand their disease and the relevance of treating it rather than pushing it, because it just creates confrontation and I am already kind of at odds with them. So, just trying to get them to do something else that they don't want to do wouldn't be worth it. But I have some people that their sugar is 6.8 and I say, "Listen. I am a little bit worried and you should probably exercise," and they come back a month later and they have lost four kilos, they are going to the gym, it's like, "Work for me", and then you have other people who's sugar is 12 or 13 and it's "What's the big deal?" (D1)

Motivating Patients to Find a New Fit: The discussion about insulin, I think, is really rather hard to bring up on the first meeting, like when they are first diagnosed, because it's an overwhelming thing, really. Now, even for a type 2 diabetic, they're on, pretty well, the obligatory five drugs for cardiovascular prevention and then everything else. Insulin often scares people tremendously and so

rather than discourage them to no end, I find you really have to approach the issue of insulin very carefully with patients. I will, however, begin the discussion when it's clear that the medications aren't working and they really aren't doing enough in terms of lifestyle. I've had a few patients who have lost 80 pounds and they've nearly cured their diabetes, so there are times where, with the right motivation, you can get people to really change. But the discussion of insulin usually begins sometime after the first visit again, depending on how severe their disease, how bad they are right from the start, what I feel like, how much I can work with them. I don't want to discourage them, and very often, the discussion of insulin patients find very discouraging. Sometimes it's a motivation to improve. I find that, in the real world, the patients are much slower able to grasp that concept and to accept the idea and I've had quite a few patients who've actually not started it. They've been prescribed it and they didn't start it. They would say, "Well, I'd like to try again" is often the words I hear. So, it is something that patients are finding very difficult even when I explain. Sometimes giving them a shot is sometimes easier than swallowing those two pills and, you know, with the very sharp fine needles, it doesn't hurt very much and it doesn't necessarily mean that you know that you're in the end stages of diabetes." (D11)

Physicians are feeling the need to initiate insulin sooner than they would have even just a few years ago, as the number of options for diabetic care increases and guidelines continue to suggest tighter and tighter levels of control. Participants have told us that with all of these considerations, once the decision to prescribe insulin has been made, physicians often stay with the more traditional insulins they are familiar with. Physicians spoke clearly about wanting to be comfortable with their choice of insulin, so the patient would, in turn, be comfortable with the physician. As one physician said: "I don't want to fumble around with charts, web sites, and things like that when my patient's stress is already through the roof in worrying about getting the insulin started. If I do that, what happens to trust, what happens to their return visit?"

Guidelines Demanding Tighter Control: "I think we are seeing more diabetics and, also, the targets for control for diabetics in the guidelines is becoming more and more stringent." (D16)

Tighter Guidelines Demand Finding a Fit More Quickly: "Well, when I have brought it up – and I often do bring it up, especially now with the newer guidelines they are recommending – that if they're failing oral therapy, usually within six months or so you've got to really start thinking about insulin. Certainly you give them three months to start to improve and then you've got to start the discussion etcetera, so things are happening relatively quickly." (D18)

The decision to switch insulins seems to often be led by endocrinologists or recommended by diabetes care team members. Most physicians reported a trend towards staying with the traditional insulins if they are working, but if problems crop up, then change is considered. Also, physicians felt that if patients want a better quality of life and feel an analogue will provide that for them, then they will consider switching. These beliefs were confirmed in the case study simulations included in the interviews. The emphasis of these case studies was to garner physician opinions of switching from traditional insulin to an insulin analogue.

Do Not Switch if the Fit is Good: "I might say, if you're just asking. But if things are going well, there may not be any need to change. So, sometimes it's better if something's working well, don't change it; and certainly if they didn't have a drug plan and it was going to cost them out-of-pocket and there was no absolute indication to change, then I would not recommend changing." (D7)
Switching More Often But Only if the Fit Becomes a Problem: "I'm seeing more and more of that. I think there's actually a shift towards the switching in the last few years. I have a few patients who are established on older analogues and I have noticed specialists, if they're well controlled, they're just leaving them alone. It's pretty interesting in patients that are having problems; there is a definite shift towards switching to an analogue." (D10)
Switching to Gain Better Control: "When a patient feels like the current medicines just are not working. They know their high and they know their low, and it means that they're willing to try something new. But, if I have a patient that's happy with where they're at, it's going to be hard to switch them. But if they're dissatisfied and they want some new tools, that's the best time for me to see them and, actually, that's when they often get referred to me from their GP. As long as someone doesn't want any more input and refuses to check and just wants to take their 30/70 b.i.d., and that's what they're going to do, there's not much point in my seeing them. But I tend to get sent patients who are asking for better control." (D12)
Switching Often Involves Endocrinologist to Help Find a Fit: "I would probably make ongoing adjustments until such a time as the situation gets somewhat out of control and unresponsive to the adjustments I'm making [and then] I will refer back. More often, I find I do the monitoring, so endocrinologists will get involved initially and stabilize the patient on their insulin and then refer back to me." (D4)

Case Study Summary

All participating physicians were asked to briefly respond to four case studies designed to present patient scenarios that varied in patient age, severity and type of diabetes, and patient behaviours and preferences. Overall, the case studies revealed that physicians were willing to switch to an insulin analogue if the quality of life for the patient and/or a problem with the current insulin treatment fitted with the decision.

CASE 1

Pediatric type 1 diabetic newly diagnosed. Parents are cooperative, child is good-natured about illness. How would you initially manage this patient, specifically with respect to the insulins prescribed?

- Although some physicians were willing to respond to this question, and all the endocrinologists did so, most of the participants did not feel they dealt often enough with type 1 diabetes or children to be able to respond appropriately to this question.

CASE 2

Adult type 1 diabetic, stable and well-controlled on human bolus and basal insulins, but has been visiting a lot of web sites and is asking about insulin analogues. Would you make any changes to insulin therapy?

- Participants in the study focused on improving the quality of life for this patient. In this case, most participants felt that switching would be an appropriate fit if the patient truly felt an analogue would improve their quality of life for either convenience or clinical reasons.

CASE 3

Newly-diagnosed, middle-aged type 2 diabetic, poorly-controlled on diet and exercise, appears indifferent to diagnosis, compliance is possible problem. Would you prescribe insulin as initial therapy? If yes, what type of insulin would you prescribe? Would you prescribe an insulin analogue?

- In the case of compliance issues, physicians did not think anything could actually be solved by choosing one type of insulin over another. This case brought about descriptions of a number of personal experiences physicians have had with the non-compliance of patients. Several physicians described having to delay insulin initiation anywhere from one to five years, as patients can be very slow in their decision to undertake a dramatic change in their care.

CASE 4

Sixty-six-year-old retiree, active, good physical shape. Type 2 diabetic, not well-controlled on oral hypoglycemic drugs. Would you add insulin to this patient's therapeutic regimen? Would you switch from oral hypoglycemic drugs to insulin? If yes to either question, what type of insulin would you prescribe? Would you prescribe an insulin analogue*?*

- Insulin analogues were seen as an appropriate fit for this type of situation, although a number of participants felt that this would require a consultation with an endocrinologist.

Discussion

The main objective of this study was to foster an understanding of how insulin analogues are currently being prescribed and used in Canada, and to describe physician beliefs and perceptions regarding these agents. Seventeen general practitioners and five endocrinologists from across Canada were interviewed by telephone using qualitative techniques. Analysis showed that although physicians feel that insulin analogues are useful medications, many physicians have only started making use of analogues in the past one or two years. When asked to describe their views of insulin analogues, all participants stated, "it depends". Participants clearly pointed out that, unlike most other medicines, decisions about insulin analogues seem to involve more art than science. Physicians frequently explore a "fit" between an analogue and each individual patient. Although an analogue may be the perfect medication for one patient, it may not be used at all for another patient who has a very similar clinical need.

> "Taking insulin is all about how you want to live and what you're willing to put up with. You tailor it to the family, you tailor it to the person, and you now certainly try to tailor it because they have to do this every day, and it's a huge pain. So, you try to make it as acceptable to the family or to the person, or to the parent or the teenager, so that they will actually take their insulin. By and large, the analogues are an improvement over what we've had before in some ways, in many ways, so when you're moving a patient to an analogue, you're usually doing them a favour because you are trying to fix something that they don't like. Like the fact they are having lows in the nighttime, having to eat lunch on time every single day. It's finding a fit, tailoring the fit to the person." (D3)

The conceptual model of "finding a fit" between an insulin and the patient provides a new and intriguing metaphor for insulin prescribing. Choosing the right fit in an analogue can be likened to purchasing a new shirt. Although a shirt may have all of the correct measurements for a given body type, that shirt still might not be a perfect fit. Even if one individual feels the fit is good, a person with a similar build may not. Similarly, it seems that physicians attempt to fit an insulin with a patient, looking to a variety of qualitative variables. These variables, if not properly aligned, will be felt to provide a poor fit.

A good fit with an analogue exists if:

- there are sufficient physician resources to knowledge share among the diabetes treatment team members
- patient beliefs and resources will accept the fit of an analogue
- the quality of life of the patient can be improved
- there is a problem with the current insulin regime that needs correcting.

Different types of "fitting" were described. The initiation of insulin may or may not begin with an analogue. Insulin initiation entails particular concerns for finding an appropriate fit that differs significantly from finding a fit for an analogue after patients have already been using a conventional insulin.

Comparing Analogues to Human Insulins

Is there a single reason why physicians choose to switch a patient over to an analogue? The "fit model" would suggest, in most cases, that there is not. In the world of diabetes prescribing, people and contexts are continually evolving and changing.

There are several benefits to using insulin analogues that most physicians felt facilitated analogue usage. The most important benefit of an analogue over human insulin is the flexibility and convenience. That is, the 'patient as a barrier' to analogue use can be addressed, in large part, by the significant benefits to lifestyle that can be achieved by adapting an analogue. The lifestyle issue is also a facilitator from the physician's perspective, because it increases the probability that the patient will comply with the treatment plan.

A second major perceived benefit is the reduction in hypoglycemia, especially at night. Several physicians pointed out that patient fear of a hypoglycemic attack can outweigh any other concern diabetes patients may have about their disease. Several endocrinologists and GP/family medicine physicians felt that analogues may actually improve A1c levels, but it was hard to predict which patients would experience this benefit, and who would not. And, many admit that they probably have not used insulin analogues often enough or long enough to really see A1c benefits.

As already discussed, almost all physicians expressed frustration that a lack of significant reduction in A1c levels in clinical trials is cited as the main reason why insulin analogues are not covered under provincial health insurance plans. Participants felt that A1c levels are only one aspect of diabetes treatment, and policies must start to consider the issues of compliance and hypoglycemia as well.

Cost and Insurance Policies

All participating physicians were very cognizant of the approximate cost differences between the insulin analogues, and human and NPH insulins. Each province has varying levels of coverage, limited use, and/or special authorization policies. However, all physicians described how, if the conversation with a diabetes patient started moving towards a switch to an analogue, before more clinical questions were discussed, the physician would ask the patient what kind of private health insurance that patient had. That is, cost and reimbursement issues are currently an important part of the decision making process for using an analogue.

The Patient as a Barrier to Analogue Use

The model of finding a good fit with an insulin is based largely on the need to determine how to address patient needs and lifestyle issues. All participants in the study stated, in some form or another, that "probably one of the biggest barriers to insulin analogue use, and insulin in general, is the patient." Just as cost, reimbursement policies, and evidence can be barriers, one could interpret that patient resistance to the initiation of insulin and the complex demands patients place on the process are also barriers to insulin analogue use. In large part, this is why a switch is not considered if traditional insulin is working and the patient is content. However, a patient with exactly the same medical profile who feels a lifestyle issue is not being met will happily consider a new fit, possibly by switching to an analogue.

Differences Between Physician and Endocrinologist Perceptions of Insulin Analogues

Even in quantitative studies, it is often difficult to make comparisons between uneven groups. In qualitative research, this becomes even more problematic. In this study, 17 GPs and family physicians were balanced with five endocrinologists to create the overall qualitative model. With this caveat, there were several very obvious differences. First and foremost, endocrinologists were absolutely convinced of the merits and benefits of insulin analogues regarding patient lifestyle issues, and to a degree, in clinical benefits, although two endocrinologists were less enthusiastic about the latter than the others. Another significant difference between the endocrinologists and the GP/family medicine physicians was the confidence that the endocrinologists possessed in prescribing and using analogues. They felt no need for hesitating in prescribing analogues. As one endocrinologist said:

> *"These analogues are great, wonderful. I use them all the time. We have to teach the family dotors to use these a lot more, don't send [the patients] to me. Just use them [analogues]. I mean, I understand why they hesitate, but I do workshops in the community, show them how. They get it, but still send a lot to me. It is ok, but most of these family doctors, they are great, they could do this easily."*

Limitations

One of the main limitations in the current study is the use of telephone interviewing. Face-to-face interviews can provide a number of advantages in qualitative research, including the ability to more effectively share non-verbal information between the researcher and the participant through visual cues. However, the cost of traveling to seven provinces and the Northwest Territories would have been prohibitive. The telephone interviewing approach employed a variety of techniques to ensure that at least some non-verbal cues were elicited (e.g., the interviewer would ask the participant if that person was smiling after a joke was made). A second limitation is that only one researcher collected and analyzed the transcripts. This can lead to a variety of biases. However, the interviewer was not a physician, and therefore began the project with no preferences or bias towards any type of insulin or particular type of care procedure for diabetes. A third limitation is that only 22 physicians participated in this study, so comparisons between rural and urban experiences, and other such organizational variables, cannot be expected to reflect true variability across Canada.

Relating the Current Findings to the Literature

Most of the findings in this study are supported by previous research. As Grant *et al.* found[12], physicians' diabetic medication choice is indeed based more on their qualitative assessment of patient psychosocial factors rather than evidence-based guidelines and clinical factors such as A1c levels. This study also supports findings by Simpson *et al.* who suggest that even if clinical benefits are negligible, the convenience and flexibility of insulin analogues can help with lifestyle issues.[11] As with "the fit" model developed in the current study, a qualitative study of physician perceptions of overall diabetes management found that physicians tailor recommendations to individual patients, producing wide variations in diabetes care.[35] A recent qualitative study of 31 type 1 and type 2 diabetes patients supports this wide variation in diabetes treatment, calling for the health care system and its professionals to pay much more attention to the emotional and individual needs of patients with flexible, customized care plans.[36]

Several studies have been found to support the three subcategories that weave throughout the current fit model. Hayes *et al.* performed 18 focus groups with 138 socio-economically diverse type 2 diabetes patients, citing their Number 1 concern as the inflexibility of the timing and frequency of diabetes treatments.[37] This is

consistent with the subcategory "tailoring decisions". Hayes *et al.* found that the other issue most often described by patients are the physical and emotional side effects of diabetes treatments, which can continue to change across a lifespan.[37] This idea is consistent with the "weaving" subcategory of adjusting the fit of insulin analogues as an ongoing process. Finally, Larme and Pugh found that when physicians compare the difficulties of treating diabetes to other chronic illness, diabetes was rated as significantly harder to treat than hypertension, angina, hyperlipidemia, arthritis, etc.[38] The physicians explained that the reason diabetes is more of a challenge to treat is due to the complexity of management, and the ever-changing characteristics of the disease itself. This is consistent with the "weaving" subcategory of "unique decision process" found in the current study, which shows how physicians feel insulin analogue decisions are unique and unusual, when compared to most other types of decisions they make.

This study found that physicians vary significantly in their knowledge and utilization of insulin analogues, which is consistent with Ratsep *et al.*, who found that doctors' knowledge and self-reported behaviours in type 2 diabetes patient follow-up care is highly variable and not related to the availability or usage of guidelines.[39] This may be, at least in part, due to the fact that a number of studies have questioned the overall utility of insulin analogues.[4,5,7,9,10] However, several studies have found that Canadian physician compliance with Canadian Diabetes Association guidelines is poor, and that there is room for improvement in diabetes care in family practice.[40,41]

The implications for the findings in the current study are important, especially regarding attempts to standardize insulin usage through guidelines. As Ratsep *et al.* states, "Practice guidelines may be a useful source of information but they should not be overestimated."[39] As one physician in this study explained, she is very aware of the guidelines and what should be done. But because the need for finding a good fit is critical, guidelines are simply one variable in the decision making process of finding the overall fit.

> "Oh, I think... there's certainly these guidelines that you try to get to, but at the same time, in the back of my mind, there's patients. You know that your targets for them will be less than for somebody else. I mean, it's still medicine and it's still very much, I think, an art; it's not an exact science. I use the guidelines for what they are and they are guidelines, but recognizing a lot of the time that if I try to get some patients at the targets, they're just going to have too many problems. You know they're going to get hypoglycemic reactions, and some people can deal with that much better than other people." (D21)

Knowledge Gaps and Evidence

All the family physicians interviewed described a growing understanding of the evidence supporting the use of insulin analogues in a variety of patient contexts. Although most physicians acknowledged that they knew about insulin analogues for many years, it has only been in the past one to two years that they have begun to choose these medications as options for treating diabetes. The reasons given for this shift in knowledge and use involves several variables. Only a few physicians cited better, more trustworthy research studies that have been published in the past two years, that have convinced them to try analogues more often. Other physicians stated they had not attempted to critically analyze the evidence, mostly because the insulins they were currently using worked effectively, and endocrinologists and other care team members could be relied upon to guide analogue use if it was seen as a viable option.

There did not seem to be any concerns regarding medication safety or side effects. The main concern was that the evidence did not really offer enough advice on how to dose and adjust the analogues in the complex areas of patient lifestyle needs and patient resistance to change. This is very important, because although most physicians were unsure if the analogues provided real clinical benefits that were worth the effort to switch,

almost all felt that the analogues offered important alternatives to address patient lifestyle needs and resistance to traditional insulins. Aside from local endocrinologists (whose views have been discussed in-depth already), representatives from drug companies were seen as important interpreters and guides in addressing patient lifestyle and compliance issues. They can offer individualized attention to the physician, targeting summaries of evidence to a specific patient population. They can also offer free sample medications and "compassionate access" to analogues, which are not covered by all provincial drug plans.

Dealing with diabetes is frustrating for the physician and the patient. In "the fit" model, physician descriptions of prescribing insulins were similar to the frustrations that occur in any clothing store. A diet and insulin protocol that works incredibly well for one patient does not work at all for the next patient. A treatment regime that is loathed by one patient is loved by the next patient. Evidence can provide generalities, but it does not yet help much with the tailoring of the treatment to the huge variety of complex, contextually-based patient needs. As one physician said:

> *"Well, I already talked about the endocrinologist. I call her all the time, she is great. About the only other person I talk to, get information from, is the...well, this may sound bad...I guess that group who is funding this project won't want to hear this, but... well, we have a couple of great drug reps. Let's face it. They know the stuff, they know what we face in the clinic. I had a patient last week. I thought an analogue might be worth a try. I called the drug rep, he sent over some trial meds. I can give this to him [the patient], no cost, and see how he likes it. And, while I was talking to the [drug] rep, I described the patient, the situation. He had a few thoughts, it helped. Let's face it, the evidence can't do that."*

What this Study Adds

This study provides the first qualitative study of insulin prescribing, and offers a unique qualitative perspective of physician perceptions and use of insulin analogues for the treatment of diabetes in Canada. The conceptual model of "finding a fit" between an insulin and the patient provides a new and intriguing metaphor for insulin prescribing, with clinical applications in the family practice setting, as well as providing important insights for policy makers and professionals involved in the development of diabetes guidelines. As this and other studies have shown, diabetes treatment is more challenging than many other prescribing issues faced by physicians. It requires individualized, patient-specific solutions that must focus on both clinical and lifestyle needs. Future research must consider these aspects of physician needs.

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APPENDIX 1

Applied Health Sciences www.brocku.ca

Dr. Jarold L Cosby, Assistant Professor
St. Catharines, Ontario, Canada L2S 3A1 jcosby@brocku.ca
T:905-650-2471 Main Office: 905-688-5550 x4358/4957 F: 905-688-8364

Telephone Interview: Using Insulins to Treat Diabetes

Dear Doctor _____,

Background & Purpose: Choosing an insulin to treat diabetes is becoming more complex. Little is understood about how physicians balance the advantages and disadvantage of various conventional and analogue insulins in diabetes treatment. The objective of this project is to understand how insulins are perceived by Canadian physicians.

Invitation: We are inviting you to participate in an academic study of physician perceptions of insulins in Canada. Your involvement is important, as we are trying to collect physician views that balance provincial and rural/urban variables. The data you supply will form an important component of a national study that will identify strengths and gaps in the treatment of diabetes in Canada.

Telephone Interview: I would like to interview you on the telephone for 20-30 minutes regarding your perceptions of insulins. The interview will be recorded and transcribed.

Honoraria: An honorarium of $100.00 will be provided.

Confidentiality: All participation will be kept strictly confidential. There will be no linkages between personal identifiers and the data.

Ethics Clearance: This study has been reviewed and cleared by the Brock University Research Ethics Board. For further details, contact the REB Officer at 905-688-5550x3035 (reb@brocku.ca)

Project Funding: The Canadian Agency for Drugs and Technologies in Health is an independent, not-for-profit organization funded by the federal/provincial/territorial governments. (www.cadth.ca)

When: We can arrange the telephone interview for a time that is most convenient for you.

If you are interested, fax this letter back to 905-688-8364 or email me at jcosby@brocku.ca. Then I will telephone you, provide you with further information, and set-up a time for the telephone interview.
I look forward to talking with you soon,

Dr. Jarold L Cosby, Assistant Professor, Brock University
Principal Investigator, Current Practices in the Use of Insulins

---

Yes, I am interested in participating in this study: ❑ Phone Number: _____

Please fax this to 905-688-8364, or email me at jcosby@brocku.ca

APPENDIX 2

Current Practice Regarding Insulin Analogues

Telephone Script: Initial Recruitment Contact with Physician

Hello Dr._____. This is Dr. Jarold Cosby, working with the Canadian Optimal Medication Prescribing and Utilization Service. Last week, you faxed back your interest in being involved in a telephone interview regarding the use of insulin analogues in treating diabetics. This is an academic study funded by the Canadian Agency for Drugs and Technologies in Health, which is in turn funded by the national and provincial governments. I am the principal investigator on this study – I am an assistant professor at Brock University, and a member of the Centre for Evaluation of Medicines at McMaster University.

To date, we have little knowledge on how insulin analogues are used and/or evaluated by physicians. The main purpose of this study is to begin to foster some discussion about how physicians perceive insulin analogue therapies for diabetes. This information will form the basis of a CADTH report on 'current practices' of diabetes treatments in Canada.

Are you still interested in participating in the study? Keep in mind your participation is voluntary, and you can withdraw from the study at any time without penalty to you or your practice. The interview will be by phone and will last about 30 minutes. Would you like to set up a time for the interview? Thank you again for your cooperation – you will be receiving a 'research consent form' in the next few days. Please complete the form and return it to us. At this time, do you have any further questions?

APPENDIX 3

PHYSICIAN CONSENT FORM

Assessing Current Practices in the Use of Insulin Analogues

Dr. Jarold L Cosby, BAhons, MA, PhD
Principal Investigator

Background & Purpose: Insulin analogues (lispro, aspart, glargine, detemir) have been available in Canada for 6 years, but little is understood about how physicians perceive these alternatives to regular insulin. The objective of this project is to foster an understanding of how insulin analogues are currently perceived by Canadian physicians.

Invitation: We are inviting you to participate in an academic study of the physician perceptions of the use of insulin analogues in Canada. Your involvement is important, as we are trying to collect physician views that balance provincial and rural/urban variables. The data you supply, along with that of all other participants, will form an important component of the CADTH 'Current Practice Analysis Report' for diabetes, used by physicians treating diabetics throughout Canada. The results of this study may also be published in academic journals. All participants will be sent a brief summary of the study findings.

Telephone Interview: I would like to speak to you for 25-35 minutes regarding your perceptions of insulin analogues. The interview will be recorded and transcribed.

Risks: There are no foreseeable risks from participating in this study.

Honoraria: An honorarium of $100.00 will be provided.

Voluntary Participation: Your choice to participate in this study is completely your own. You may withdraw yourself from this study at anytime with no penalty to yourself.

Confidentiality: All names and other identifying information will be removed from the study results and all subsequent publications. Your participation will only be identified by a coded identification number. All audio-recordings will be digitally encrypted and written information will be kept in a locked cabinet. Only members of the research team will have access to the information. Linkages between personal identifiers and the data will be known only by the principal investigator and the transcriber.

Ethics Clearance: This study has been reviewed and cleared by the Brock University Research Ethics Board. If you have any questions about your rights as a research participant, please contact the REB Officer at 905-688-5550x3035 (reb@brocku.ca)

Conflict of Interest: There is no apparent conflict of interest on the part of the researchers, their institutions, or sponsors.

Project Funding: Canadian Agency for Drugs and Technologies in Health

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Feedback

After completion of the analysis of the data, may we contact you to review and comment on a summary of the study (maximum 3 pages)? YES NO

I have reviewed the consent form, understand the nature of this study, have had the opportunity to ask questions about the study, and agree to participate in this study.

_____
NAME

_____ _____
SIGNATURE DATE

I have explained the nature of this study to the participant and believe that he or she has understood it.

_____ _____ _____
Dr. Jarold L Cosby, BAhons, MA, PhD Signature Date
Principal Investigator
Assessing Current Practices in the
Use of Insulin Analogues
Assistant Professor,
Applied Health Sciences
Brock University,
St. Catharines, Ontario L2S 3A1
Tel: (905)-650-2471
Email: jcosby@brocku.ca

PLEASE KEEP ONE COPY OF THE FORM FOR YOURSELF, AND MAIL THE OTHER COPY BACK TO US

APPENDIX 4

Current Practice Regarding Insulin Analogues
Physician Interview
June 20, 2007

Introduction: Hello Dr._____. This is Dr. Jarold Cosby, working on the CADTH project regarding insulin analogues. Do you recall agreeing to participate in this interview today? Is this still a good time for you to do the interview?

Thank you for agreeing to participate in this interview. It will last about 30 minutes, and as you recall, your participation is voluntary, so you can discontinue the interview at any time without any consequences to you or your practice.

With your consent, I will turn on the audio-recorder now so I can have this interview transcribed and analyze it more thoroughly at a later time. Only I and the transcriber will know the names of the participants in this study. All identifying information will be removed from all data.

As you recall, we are trying to understand how physicians currently use insulin analogues in their clinical practice. Do you have any questions?

1) **Perhaps we could begin with a description of the diabetics you see in your practice.**
    a. Age
        i. Pediatric
        ii. Adult
        iii. Seniors over 65
    b. Diabetes is becoming more and more prevalent. About how many:
        i. Diabetic patients do you have on your roster? (how many would you see in a week?)
        ii. Newly diagnosed patients do you have each year?
    c. Case mix: It seems like there is a huge range in type, severity, and complexity of diabetics now. What would you say is the balance of diabetic patients you see?
        i. Type 1
        ii. Type 2
        iii. Fairly standard diabetic patients (maybe overweight, low activity, poor eating habits)
        iv. Complex patients (variety co-morbidities, etc.)

2) **How long have you been in your current practice?**
    a. How long have you been practising medicine? _____

    b. How would you describe your practice?
        i. Solo
        ii. Group
        iii. Community clinic
        iv. Community hospital
        v. Academic centre

c. Practice size: Would you describe your practice as large/small? _____

d. SES overview of patients
   i. Rural/urban/suburban/downtown
   ii. SES of patients – lower income, middle income, higher income
   iii. Insurance coverage
      - ❑ provincial plan
      - ❑ private coverage
      - ❑ no coverage

3) Diabetes management- Resources: I now have a good understanding of the diabetics you see in your practice. The next important issue is the resources you and your patients can access to deal with this illness.

a. What kinds of support are accessible for you for prescribing **and** monitoring for diabetics (are these resources easily accessible?)
   - ❑ specialists
   - ❑ academic hospital
   - ❑ professional diabetes clinics
   - ❑ volunteer, community-run help groups

   i. Initiation of insulin therapy: For some physicians, initiating insulin therapy is common practice, whereas others now have access to a referral specialist/clinic that typically begins these treatments.
      - *In terms of starting a diabetic on insulin therapy, under what circumstances do you refer diabetics to an endocrinologist or other specialist? (for GPs/Family MDs only)*

      _____

      _____

   ii. Monitoring therapy: In some geographic areas, there is the ability for a "team" approach to monitoring diabetes. Would this be a resource you utilize with your patients?

      _____

      _____

   iii. Adjust insulin: Once a patient is on insulin, will you monitor and adjust the prescription, or are there other resources available to take on some of this role for you?

      _____

      _____

4) **Choosing various types of insulin can be challenging. Based on your own experience:**
   a. What type of basal and bolus insulins do you prescribe most frequently?

      _____

      _____

   b. Do you prescribe any other types of basal and bolus insulins?

      _____

      _____

      i. Is there one <u>basal</u> insulin that you believe is better for your general diabetic population (or a specific subgroup of patients) than others?
         - If so, why is it better?

         _____

         _____

      ii. Is there one <u>bolus</u> insulin that you believe is better for your general diabetic population (or a specific subgroup of patients) than others?
         - If so, why is it better?

         _____

         _____

5) **Based on your experience with insulin analogues, would you describe them as:**
   a. "good" medications (useful)
   b. What have you based that assessment on?
      i. Observations in your own practice
      ii. Clinical trial evidence, conference proceedings, Cochrane
      iii. Pharmaceutical reps/monographs
      iv. Specialist recommendations, practices
      v. Colleagues experiences
   c. Information needs and sources:
      i. Currently, what would you say is your most pressing information need regarding insulins and insulin analogues?
      ii. Where do you receive most of your information on insulins and insulin analogues?
      iii. Is information on insulins easily accessible to you when you need it?
      iv. In what form do you prefer to receive information on insulins and insulin analogues?

6) **Insulin analogue for type 1 and type 2 diabetic prescribing:**
   a. When you sit your patients down to discuss insulin, does the subject of insulin analogues come up in the initial discussions?
      i. Do you initiate the discussion?
      ii. Do patients bring insulin analogue information to the discussion?

iii. Have you ever had a patient ask specifically for an insulin analogue?
- How did you respond to that request?

_____

_____

b. Have you ever prescribed the insulin analogues?

_____

_____

c. Do you initiate patients on analogues as a first-line insulin therapy?

_____

_____

d. Under what circumstances will you begin to consider the initiation of an insulin analogue?
   i. Is it more common for you to try a patient out on regular insulin, and then switch to an analogue?
   ii. Would you ever consider starting a patient on an analogue without trying regular insulin first?
      1. How often have you tried this? _____
      2. In your own opinion, what did you think of this process?

_____

_____

What did the patient think?

_____

_____

   iii. Why would you choose to switch a patient (poor control, adverse effects?)

_____

_____

7) Economics: Are there cost differences across the various basal and bolus insulins on the market? If yes, can you elaborate?

_____

_____

_____

_____

_____

8) I would like to do two final things in this interview. First, I would like to give you a few clinical scenarios, and get your overall response to how you would approach these types of patients, and provide a rationale for your choices of insulin in each case. Then we will sum up the interview, and be done.

a. Pediatric type 1 diabetic, newly diagnosed. Parents are cooperative, child is good-natured about illness. How would you initially manage this patient, specifically with respect to the insulins prescribed?

_____

_____

_____

_____

b. Adult type 1 diabetic, stable and well-controlled on human bolus and basal insulins, but has been visiting a lot of web sites about illness and is asking about insulin analogues. Would you make any changes to insulin therapy?

_____

_____

c. Newly-diagnosed, middle-aged type 2 diabetic, poorly controlled on diet and exercise, appears indifferent to diagnosis, compliance is possible problem. Would you prescribe insulin as initial therapy? If yes, what type of insulin would you prescribe? Would you prescribe an insulin analogue?

_____

_____

_____

_____

d. Sixty-six-year-old retiree, active, good physical shape. Type 2 diabetic, not well-controlled on oral hypoglycemic drugs: Would you add insulin to this patient's therapeutic regimen? Would you switch from oral hypoglycemic drugs to insulin? If yes to either question, what type of insulin would you prescribe? Would you prescribe an insulin analogue?

_____

_____

_____

_____

9) **At this point, I would just like to ask you two summary questions regarding the influences on, and barriers to, optimal prescribing of insulin therapy:**
    a. What would you say are the major influences on the choice of insulin therapy prescribed?

    _____

    _____

    b. What are the most important barriers to prescribing optimal insulin therapy to your patients?

    _____

    _____

Do you have anything you would like to add, or any questions for me?

_____

_____

_____

_____

_____

I would like to thank you again for this excellent discussion. The data you provide will form an important part of the "current practices" report on diabetes that CADTH is currently compiling. If you have any questions, please feel free to contact me. In a few months, if you are interested, we would like to send you a summary of the findings from the interviews with you and your colleagues. If possible, perhaps you could send us a few brief comments on the summary and tell us if you think we have accurately represented current practices in the use of insulin analogues.